

(c) Each suspension member must be arranged so that, when the ladder is in use on a vessel, the suspension member cannot come in contact with the vessel's side.

(d) Each step must be arranged so that it can bear on the side of the vessel when the ladder is in use.

**§ 163.003-17 Strength.**

(a) Each pilot ladder must be designed to pass the approval tests in § 163.003-21.

(b) [Reserved]

**§ 163.003-21 Approval tests.**

(a) *General.* Each approval test must be conducted on a ladder of the longest length for which approval has been requested. If the ladder fails one of the tests, the cause of the failure must be identified and any needed design changes made. After a test failure and any design change, the failed test, and any other previously completed tests affected by the change, must be rerun. Any ladder step that has a residual deflection after testing under this section may not be used thereafter in any ladder represented as Coast Guard approved.

(b) *Visual examination.* Before starting the approval tests, an assembled pilot ladder is examined for evidence of noncompliance with the requirements in §§ 163.003-11, 163.003-13, and 163.003-15.

(c) The following approval tests must be conducted:

(1) *Step flexibility test.* This test is performed on six different steps, one of which must be a molded step and one of which must be a replacement step if special replacement steps are made by the manufacturer. Each step is placed on a pair of supports located at the points where the step would ordinarily be attached to the suspension members. A static load must be applied uniformly for a period of at least one minute over a contact surface that is at the center of the step and is approximately 100 mm (4 in.) wide. The load must be 150 kg (330 lb.) for each molded step that is used only as one of the four bottom steps in the ladder. The load must be 320 kg (700 lb.) for each other step. The deflection of the step is measured while the step is under load and after the load is removed. The step

must not deflect more than 20 mm ( $\frac{3}{4}$  in.) under the load, and there must be no residual deflection after the load is removed.

(2) *Strength test #1.* An assembled ladder is supported so that a static load, if placed on any of its steps, would exert a force on both the step and each suspension member. A static load of 900 kg (2,000 lb.) is then placed on one step for at least one minute. The load must be uniformly distributed over a contact surface that is approximately 100 mm (4 in.) wide. The center of the contact surface must be at the center of the step. This test is performed on six different steps, one of which must be a molded step. None of the steps may break or crack. No attachment between any step and a suspension member may loosen or break during this test.

(3) *Strength test #2.* An assembled ladder is suspended vertically to its full length. A static load of 900 kg (2,000 lb.) is then applied to the bottom step of the ladder so that it is distributed equally between the suspension members. The suspension members, and inserts must not break, incur any elongation or deformation that remains after the test load is removed, or be damaged in any other way during this test.

(4) *Strength test #3.* A rolled up ladder is attached to anchoring fixtures in a location away from any wall or structure that would prevent it from falling freely, and where it can hang to its full length vertically. The ladder when dropped must unroll freely. When unrolling the ladder, its steps and attachments must not become cracked, broken, or loosened. Other similar damage making the ladder unsafe to use must likewise not occur.

(5) *Step friction test.* One step of each type used on a pilot ladder must be subjected to this test. This test compares the dry and wet surface friction characteristics of ladder steps with those of a standard oak step.

(i) The standard step must have a surface of clean oak that meets S/163.003-11(b) and that is 115 mm ( $4\frac{1}{2}$  in.) wide by 400 mm (16 in.) long. The stepping surface must have grooves that are 3 mm ( $\frac{1}{8}$  in.) deep and 3 mm wide. The grooves must run in two different

directions at right angles to each other, and at 45 degree angles with each edge of the stepping surface, so that the grooves form a diamond pattern covering the stepping surface. The centers of all parallel grooves must be 13 mm (½ in.) apart.

(ii) The standard step must be set in a level position. A metal block must be placed on one end of the step so that the block is in contact with the stepping surface. The metal block must weigh between 1.5 kg (3.3 lb.) and 3.0 kg (6.6 lb.) and must not be more than 100 mm (4 in.) wide by 135 mm (5½ in.) long. The surface of the block in contact with the step must have leather or composition shoe sole material attached to it.

(iii) The end of the step that has the metal block on it must be slowly raised until the block starts to slide. The angle of the step in this position must be measured and recorded. The step and block must then be placed under water and the procedure repeated.

(iv) The procedure in paragraph (c)(6)(iii) of this section must be repeated using a pilot ladder step in place of the standard step.

(v) The ladder step must then be secured in a horizontal position with a block resting on its stepping surface. The block must be of a size similar to the one used in the previous tests and have the same shoe sole surface used in the previous tests. The block must be arranged to apply a vertical load of 40 kg (88 lb.) to the step. The block must be then moved back and forth in the same line from one end of the stepping surface to the other. This must be done for a total of 1,500 cycles.

(vi) The step must again be tested as described in paragraph (c)(6)(iii) of this section, except that the initial position of the block must be on a part of the stepping surface that was subjected to the 1,500 cycles of rubbing.

(vii) The angles at which the block starts to slide on a wet and dry ladder step when tested under paragraphs (c)(6)(iv) and (c)(6)(vi) of this section must be equal to or greater than the corresponding angles measured for the standard step when tested under paragraph (c)(6)(iii) of this section.

#### § 163.003-25 Marking.

(a) Each pilot ladder step manufactured under Coast Guard approval must be branded or otherwise permanently and legibly marked on the bottom with—

- (1) The name of the manufacturer;
- (2) The manufacturer's brand or model designation;
- (3) The lot number or date of manufacture; and
- (4) The Coast Guard approval number.

(b) In addition to the markings required under paragraph (a) of this section each step sold as a replacement step must be branded or otherwise permanently and legibly marked with the words "REPLACEMENT STEP ONLY."

[CGD 74-140, 46 FR 63291, Dec. 31, 1981, as amended by CGD 79-032, 49 FR 25456, June 21, 1984]

#### § 163.003-27 Production tests and examination.

(a) *General.* Each ladder produced under Coast Guard approval must be tested in accordance with this section and subpart 159.007 of this chapter. Steps that fail testing may not be marked with the Coast Guard approval number and each assembled ladder that fails testing may not be sold as Coast Guard approved.

(b) *Test No. 1: Steps.* Steps must be separated into lots of 100 steps or less. Steps of different types must be placed in separate lots. One step from each lot must be selected at random and tested as described in § 163.003-21(c)(2) except that supports are placed under the step at the points where it would be attached to suspension members in an assembled ladder. If the step fails the test, ten more steps must be selected at random from the lot and tested. If one or more of the ten steps fails the test, each step in the lot must be tested. No step that has any residual deflection after the test may be used in a ladder represented by the manufacturer as Coast Guard approved.

(c) *Test No. 2: Ladders.* Assembled ladders must be separated into lots of 20 ladders or less. One ladder must be selected at random from the ladders in each lot. The ladder selected must be at least 3 m (10 ft.) long or, if each ladder in the lot is less than 3 m long, a