

§ 1211.11

Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(e) *Resistance to impact test.* (1) An external entrapment protection device employing a polymeric or elastomeric material as a functional part shall be subjected to the impact test specified in paragraph (e)(2) of this section. As a result of the test:

- (i) There shall be no cracking or breaking of the part, and
- (ii) The part shall operate as intended or, if dislodged after the test, is capable of being restored to its original condition.

(2) Samples of the external entrapment protection device are to be subjected to the Impact Test described in the Standard for Polymeric Materials—Use in Electrical Equipment Evaluations, UL 746C, 4th ed., dated December 27, 1995, as incorporated by reference in paragraph (d) of this section. The external entrapment protection device is to be subjected to 5 foot-pound (6.8 J) impacts. Three samples are to be tested, each sample being subjected to three impacts at different points.

(3) Each of three additional samples of a device exposed to outdoor weather when the door is the closed position are to be cooled to a temperature of minus 31.0±3.6 °F (minus 35.0±2.0 °C) and maintained at this temperature for 3 hours. Three samples of a device employed inside the garage are to be cooled to a temperature of 32.0 °F (0.0 °C) and maintained at this temperature for 3 hours. While the sample is still cold, the samples are to be subjected to the impact test described in paragraph (e)(1) of this section.

[57 FR 60455, Dec. 21, 1992, as amended at 62 FR 46667, Sept. 4, 1997; 65 FR 70659, Nov. 27, 2000]

EFFECTIVE DATE NOTE: At 72 FR 54817, Sept. 27, 2007, §1211.10 was amended by revis-

16 CFR Ch. II (1-1-08 Edition)

ing (a)(1) and adding a new (a)(6), effective Feb. 21, 2008. For the convenience of the user, the added and revised text is set forth as follows:

§ 1211.10 Requirements for all entrapment protection devices.

(a) *General requirements.* (1) An external entrapment protection device shall perform its intended function when tested in accordance with paragraphs (a)(2) through (4) and (6) of this section.

* * * * *

(6)(i) An operator using an external entrapment protection device, upon detecting a fault or an obstruction in the path of a downward moving door, shall initiate reversal and shall return the door to, and stop the door at, the full upmost position.

(ii) The door operator is not required to return the door to, and stop the door at, the full upmost position when an inherent entrapment circuit senses an obstruction during the upward travel.

(iii) The door operator is not required to return the door to, and stop the door at, the full upmost position when a control is actuated to stop the door during the upward travel—but the door can not be moved downward until the operator has reversed the door a minimum of 2 inches (50.8 mm).

* * * * *

§ 1211.11 Requirements for photoelectric sensors.

(a) *Normal operation test.* (1) When installed as described in §1211.10(a) (1)–(4), a photoelectric sensor shall sense an obstruction as described in paragraph (a)(2) of this section that is to be placed on the floor at three points over the width of the door opening, at distances of 1 foot (305 mm) from each end and the midpoint.

(2) The obstruction noted in paragraph (a)(1) of this section shall consist of a white vertical surface 6 inches (152 mm) high by 12 inches (305 mm) long. The obstruction is to be centered under the door perpendicular to the plane of the door when in the closed position. See figure 3.

Figure 3

STATIONARY OBSTRUCTION

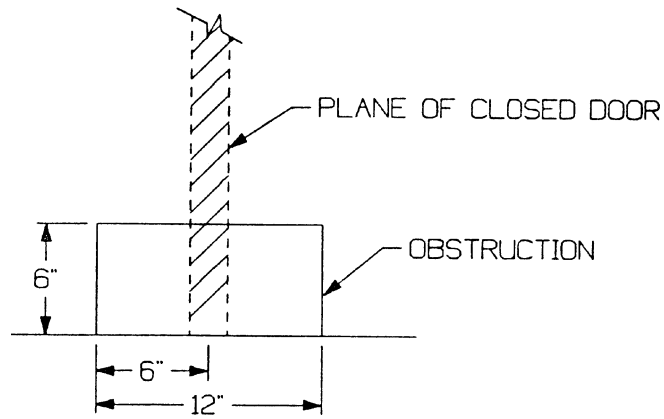
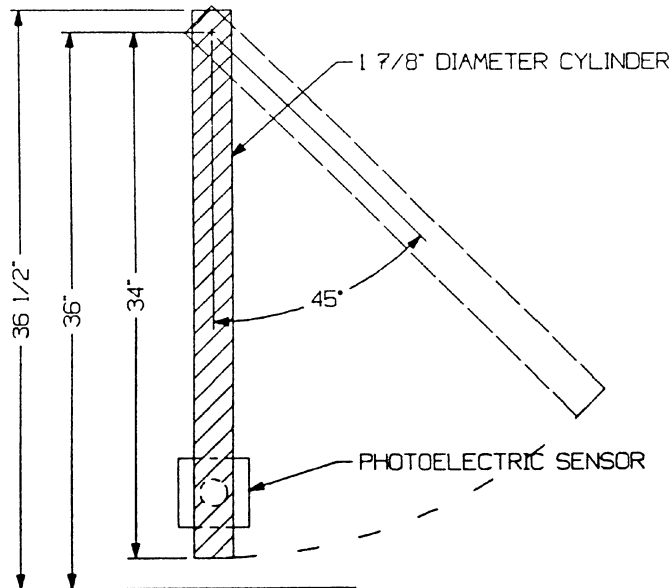


Figure 4

MOVING OBSTRUCTION



(b) *Sensitivity test.* (1) When installed as described in §1211.10(a)(1)-(4), a photoelectric sensor shall sense the presence of a moving object when tested according to paragraph (b)(2) of this section.

§ 1211.11

16 CFR Ch. II (1-1-08 Edition)

(2) The moving object is to consist of a 1 $\frac{1}{8}$ inch (47.6 mm) diameter cylindrical rod, 34 $\frac{1}{2}$ inches (876 mm) long, with the axis point being 34 inches (864 mm) from the end. The axis point is to be fixed at a point centered directly above the beam of the photoelectric sensor 36 inches (914 mm) above the floor. The photoelectric sensor is to be mounted at the highest position as recommended by the manufacturer. The rod is to be swung as a pendulum through the photoelectric sensor's beam from a position 45 degrees from the plane of the door when in the closed position. See figure 4.

(3) The test described in paragraph (b)(2) of this section is to be conducted

at three points over the width of the door opening, at distances of 1 foot (305 mm) from each end and the midpoint.

(c) *Ambient light test.* (1) A photoelectric sensor shall operate as specified in §1211.8 (a) and (b) when subjected to ambient light impinging at an angle of 15 to 20 degrees from the axis of the beam when tested according to paragraph (c)(2) and, if appropriate, paragraph (c)(3) of this section.

(2) To determine compliance with paragraph (c)(1) of this section, a 500 watt, 3600K Photo Floodlamp, type DXC RFL-2, is to be energized from a 120-volt, 60-hertz source.

Figure 5

AMBIENT LIGHT TEST

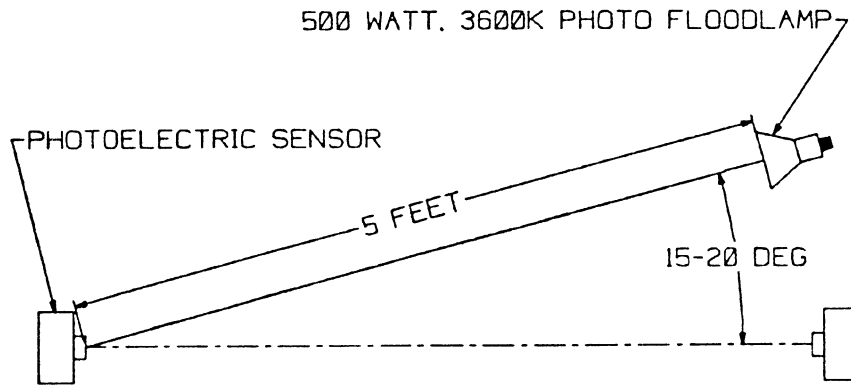
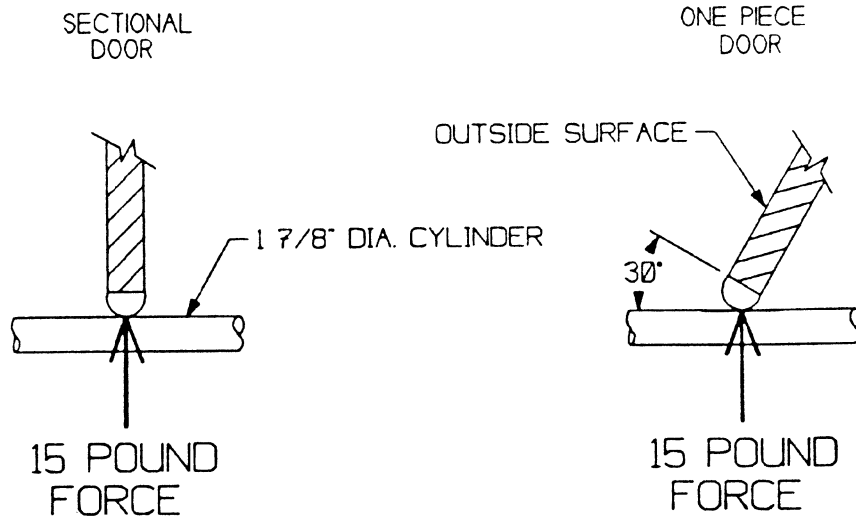


Figure 6

EDGE SENSOR NORMAL OPERATION TEST



The lamp is to be positioned 5 feet from the front of the receiver and aimed directly at the sensor at an angle of 15 to 20 degrees from the axis of the beam. See figure 5.

§ 1211.12

(3) If the photoelectric sensor uses a reflector, this test is to be repeated with the lamp aimed at the reflector.

§ 1211.12 Requirements for edge sensors.

(a) *Normal operation test.* (1) When installed on a representative door edge, an edge sensor shall actuate upon the application of a 15 pounds (66.7 N) or less force in the direction of the application. For an edge sensor intended to be used on a sectional door, the force is to be applied by the longitudinal edge of a 1 $\frac{1}{8}$ inch (47.6 mm) diameter cylinder placed across the switch so that the axis is perpendicular to the plane of the door. For an edge sensor intended to be used on a one piece door, the force is to be applied so that the axis is at an angle 30 degrees from the direction perpendicular to the plane of the door. See figure 6.

(2) With respect to the test of paragraph (a)(1) of this section, the test is to be repeated at various representative points of the edge sensor across the width of the door.

(3) Exception: The edge sensor need not be sensitive to actuation two inches (50.4 mm) or less from each end of the intended width of the door opening.

(b) *Endurance test.* An edge sensor system and associated components shall withstand 30,000 cycles of mechanical operation without failure. For this test, the edge sensor is to be cycled by the repetitive application of the force as described in paragraph (a)(1) of this section. The force is to be

16 CFR Ch. II (1–1–08 Edition)

applied to the same location for the entire test. For an edge sensor system employing integral electric contact strips, this test shall be conducted with the contacts connected to a load no less severe than it controls in the operator. For the last 50 cycles of operation, the sensor shall function as intended when connected to an operator.

(c) *Elastomeric material conditioning test.* (1) An elastomeric material used as a functional part of an edge sensor shall function as intended when subjected to:

(i) Accelerated Aging Test of Gaskets, stated in paragraph (c)(3) of this section, and

(ii) Puncture Resistance Test, stated in paragraph (d) of this section.

(2) An elastomeric material used for a functional part that is exposed to outdoor weather conditions when the door is in the closed position shall have physical properties as specified in table 1 after being conditioned in accordance with the Ultraviolet Light Exposure Test described in the Standard for Safety for Polymeric Materials—Use in Electrical Equipment Evaluations, UL 746C, 4th ed., dated December 27, 1995. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, Telephone (800) 854-7179 or Global Engineering Documents, 7730 Carondelet Ave., Suite 470, Clayton, MO 63105, Telephone (800) 854-7179.