

## Consumer Product Safety Commission

## § 1211.5

### Subpart A—The Standard

SOURCE: 57 FR 60455, Dec. 21, 1992, unless otherwise noted.

#### § 1211.1 Effective date.

This standard applies to all residential garage door operators manufactured on or after January 1, 1993 for sale in the United States.

#### § 1211.2 Definition.

As used in this part 1211: *Residential garage door operator* means a vehicular door operator which:

- (a) Serves a residential building of one to four single family units;
- (b) Is rated 600 volts or less; and
- (c) Is intended to be employed in ordinary locations in accordance with the National Electrical Code, NFPA 70, 1999 edition. 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 the National Fire Protection Association, 1 Batterymarch Park, Quincy, Mass. 02269-9101, tel. 1-800-344-3555. Copies may be inspected at the Consumer Product Safety Commission, Office of the Secretary, 4330 East West Highway, Bethesda, Maryland or at the National Archives and 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](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

[57 FR 60455, Dec. 21, 1992, as amended at 62 FR 46667, Sept. 4, 1997; 65 FR 70657, Nov. 27, 2000]

#### § 1211.3 Units of measurement.

If a value for measurement is followed by a value in other units, in parentheses, the second value may be only approximate. The first stated value is the requirement.

[57 FR 60455, Dec. 21, 1992, as amended at 65 FR 70657, Nov. 27, 2000]

#### § 1211.4 General requirements for protection against risk of injury.

- (a) If an automatically reset protective device is employed, automatic re-

starting of a motor shall not result in a risk of injury to persons.

(b) A residential garage door operator is considered to comply with the requirement in paragraph (a) of this section if some means is provided to prevent the motor from restarting when the protector closes.

(c) An electronic or solid-state circuit that performs a back-up, limiting, or other function intended to reduce the risk of fire, electric shock, or injury to persons, including entrapment protection circuits, shall comply with the requirements in the Standard for Safety for Tests for Safety-Related Controls Employing Solid-State Devices, UL 991, second edition, dated June 23, 1995, including environmental and stress tests appropriate to the intended usage of the end-product. 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. Copies may be inspected at the Consumer Product Safety Commission, Office of the Secretary, 4330 East West Highway, Bethesda, Maryland or at the National Archives and 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](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

[57 FR 60455, Dec. 21, 1992, as amended at 62 FR 46667, Sept. 4, 1997; 65 FR 70657, Nov. 27, 2000]

#### § 1211.5 General testing parameters.

(a) The following test parameters are to be used in the investigation of the circuit covered by § 1211.4(c) for compliance with the Standard for Safety for Tests for Safety-Related Controls Employing Solid-State Devices, UL 991, second edition, dated June 23, 1995, as incorporated by reference in paragraph (b)(3) of this section:

- (1) With regard to electrical supervision of critical components, an operator being inoperative with respect to

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downward movement of the door meets the criteria for trouble indication.

(2) A field strength of 3 volts per meter is to be used for the Radiated EMI Test.

(3) The Composite Operational and Cycling Test is to be used for 14 days at temperature extremes of minus 35 °Celsius (minus 31 °F) and 70 °C (158 °F).

(4) Exposure Class H5 is to be used for the Humidity Test.

(5) A vibration level of 5g is to be used for the Vibration Test.

(6) When a Computational Investigation is conducted,  $\lambda_p$  shall not be greater than 6 failures/10<sup>6</sup> hours for the entire system. For external secondary entrapment protection devices that are sold separately,  $\lambda_p$  shall not be greater than 0 failures/10<sup>6</sup> hours. For internal secondary entrapment protection devices whether or not they are sold separately,  $\lambda_p$  shall not be greater than 0 failures/10<sup>6</sup> hours. The operational test is conducted for 14 days. An external secondary entrapment protection device that is sold separately, and that has a  $\lambda_p$  greater than 0 failures/10<sup>6</sup> hours meets the intent of the requirement when for the combination of the operator and the specified external secondary entrapment protection device  $\lambda_p$  does not exceed 6 failures/10<sup>6</sup> hours. See § 1211.15(i) and (k).

(7) When the Demonstrated Method Test is conducted, the multiplier is to be based on the continuous usage level, and a minimum of 24 units for a minimum of 24 hours per unit are to be tested.

(8) The Endurance test is to be conducted concurrently with the Operational test. The control shall perform its intended function while being conditioned for fourteen days in an ambient air temperature of 60 °C (140 °F), or 10 °C (18 °F) greater than the operating temperature of the control, whichever is higher. During the test, the control is to be operated in a manner representing the opening and closing of the door at a rate of one open-close operation per minute.

(9) For the Electrical Fast Transient Burst Test, test level 3 is to be used for residential garage door operators.

(b) In the evaluation of entrapment protection circuits used in residential garage door operators, the critical con-

dition flow chart shown in figure 1 shall be used:

(1) To conduct a failure-mode and effect analysis (FMEA);

(2) In investigating the performance during the Environmental Stress Tests; and

(3) During the Power Cycling Safety for Tests in accordance with the Standard for Safety for Tests for Safety-Related Controls Employing Solid-State Devices, UL 991, second edition, dated June 23, 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. Copies may be inspected at the Consumer Product Safety Commission, Office of the Secretary, 4330 East West Highway, Bethesda, Maryland or at the National Archives and 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](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

[57 FR 60455, Dec. 21, 1992, as amended at 62 FR 46667, Sept. 4, 1997; 65 FR 70657, Nov. 27, 2000]

### § 1211.6 General entrapment protection requirements.

(a) A residential garage door operator system shall be provided with primary inherent entrapment protection that complies with the requirements as specified in § 1211.7.

(b) In addition to the primary inherent entrapment protection as required by paragraph (a) of this section, a residential garage door operator shall comply with one of the following:

(1) Shall be constructed to:

(i) Require constant pressure on a control to lower the door,

(ii) Reverse direction and open the door to the upmost position when constant pressure on a control is removed prior to operator reaching its lower limit, and

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(iii) Limit a portable transmitter, when supplied, to function only to cause the operator to open the door;

(2) Shall be provided with a means for connection of an external secondary entrapment protection device as described in §§1211.8, 1211.10, and 1211.11; or

(3) Shall be provided with an inherent secondary entrapment protection device as described in §§1211.8, 1211.10, and 1211.12.

(c) A mechanical switch or a relay used in an entrapment protection circuit of an operator shall withstand 100,000 cycles of operation controlling a load no less severe (voltage, current, power factor, inrush and similar ratings) than it controls in the operator, and shall function normally upon completion of the test.

(d) In the event malfunction of a switch or relay (open or short) described in paragraph (c) of this section results in loss of any entrapment protection required by §§1211.7(a), 1211.7(f), or 1211.8(a), the door operator shall become inoperative at the end of the opening or closing operation, the door operator shall move the door to, and stay within, 1 foot (305 mm) of the up-permost position.

[57 FR 60455, Dec. 21, 1992, as amended at 65 FR 70657, Nov. 27, 2000]

**§ 1211.7 Inherent entrapment protection requirements.**

(a)(1) Other than for the first 1 foot (305mm) of door travel from the full upmost position both with and without any external entrapment protection device functional, the operator of a downward moving residential garage door shall initiate reversal of the door within 2 seconds of contact with the obstruction as specified in paragraph (b) of this section. After reversing the door, the operator shall return the door to, and stop at, the full upmost position. Compliance shall be determined in accordance with paragraphs (b) through (i) of this section.

(2) The door operator is not required to return the door to, and stop the door at, the full upmost position when the operator senses a second obstruction during the upward travel.

(3) 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 reverses the door a minimum of 2 inches (50.8 mm).

(b)(1) A solid object is to be placed on the floor of the test installation and at various heights under the edge of the door and located in line with the driving point of the operator. When tested on the floor, the object shall be 1 inch (25.4 mm) high. In the test installation, the bottom edge of the door under the driving force of the operator is to be against the floor when the door is fully closed.

(2) For operators other than those attached to the door, a solid object is not required to be located in line with the driving point of the operator. The solid object is to be located at points at the center, and within 1 foot of each end of the door.

(3) To test operators for compliance with requirements in paragraphs (a)(3), (f)(3), and (g)(3) of this section, §1211.10(a)(6)(iii), and §1211.13(c), a solid rectangular object measuring 4 inches (102 mm) high by 6 inches (152 mm) wide by a minimum of 6 inches (152 mm) long is to be placed on the floor of the test installation to provide a 4-inch (102 mm) high obstruction when operated from a partially open position.

(c) An operator is to be tested for compliance with paragraph (a) of this section for 50 open-and-close cycles of operation while the operator is connected to the type of residential garage door with which it is intended to be used or with the doors specified in paragraph (e) of this section. For an operator having a force adjustment on the operator, the force is to be adjusted to the maximum setting or at the setting that represents the most severe operating condition. Any accessories having an effect on the intended operation of entrapment protection functions that are intended for use with the operator, are to be attached and the test is to be repeated for one additional cycle.

(d) For an operator that is to be adjusted (limit and force) according to instructions supplied with the operator, the operator is to be tested for 10 additional obstruction cycles using the

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solid object described in paragraph (b) of this section at the maximum setting or at the setting that represents the most severe operating condition.

(e) For an operator that is intended to be used with more than one type of door, one sample of the operator is to be tested on a sectional door with a curved track and one sample is to be tested on a one-piece door with jamb hardware and no track. For an operator that is not intended for use on either or both types of doors, a one-piece door with track hardware or a one-piece door with pivot hardware shall be used for the tests. For an operator that is intended for use with a specifically dedicated door or doors, a representative door or doors shall be used for the tests. See the marking requirements at § 1211.16.

(f)(1) An operator, using an inherent entrapment protection system that monitors the actual position of the door, shall initiate reversal of the door and shall return the door to, and stop the door at, the full upmost position in the event the inherent door operating "profile" of the door differs from the originally set parameters. The entrapment protection system shall monitor the position of the door at increments not greater than 1 inch (25.4 mm).

(2) 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.

(3) 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 reverses the door a minimum of 2 inches (50.8 mm).

(g)(1) An operator, using an inherent entrapment protection system that does not monitor the actual position of the door, shall initiate reversal of the door and shall return the door to and stop the door at the full upmost position, when the lower limiting device is not actuated in 30 seconds or less following the initiation of the close cycle.

(2) 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. When the door is stopped manually during its descent, the 30 seconds shall be measured from the resumption of the close cycle.

(3) 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 reverses the door a minimum of 2 inches (50.8 mm). When the door is stopped manually during its descent, the 30 seconds shall be measured from the resumption of the close cycle.

(h) To determine compliance with paragraph (f) or (g) of this section, an operator is to be subjected to 10 open-and-close cycles of operation while connected to the door or doors specified in paragraphs (c) and (e) of this section. The cycles are not required to be consecutive. Motor cooling-off periods during the test meet the intent of the requirement. The means supplied to comply with the requirement in paragraph (a) of this section and § 1211.8(a) are to be defeated during the test. An obstructing object is to be used so that the door is not capable of activating a lower limiting device.

(i) During the closing cycle, the system providing compliance with §§ 1211.7(a) and 1211.7(f) or 1211.7(a) and 1211.7(g) shall function regardless of a short- or open-circuit anywhere in any low-voltage external wiring, any external entrapment devices, or any other external component.

[65 FR 70657, Nov. 27, 2000, as amended at 72 FR 54817, Sept. 27, 2007]

### § 1211.8 Secondary entrapment protection requirements.

(a) A secondary entrapment protection device supplied with, or as an accessory to, an operator shall consist of:

(1) An external photoelectric sensor that when activated results in an operator that is closing a door to reverse direction of the door and the sensor prevents an operator from closing an open door,

(2) An external edge sensor installed on the edge of the door that, when activated results in an operator that is closing a door to reverse direction of

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the door and the sensor prevents an operator from closing an open door,

(3) An inherent door sensor independent of the system used to comply with §1211.7 that, when activated, results in an operator that is closing a door to reverse direction of the door and the sensor prevents an operator from closing an open door, or

(4) Any other external or internal device that provides entrapment protection equivalent to paragraphs (a)(1), (a)(2), or (a)(3) of this section.

(b) With respect to paragraph (a) of this section, the operator shall monitor for the presence and correct operation of the device, including the wiring to it, at least once during each close cycle. In the event the device is not present or a fault condition occurs which precludes the sensing of an obstruction, including an open or short circuit in the wiring that connects an external entrapment protection device to the operator and device's supply source, the operator shall be constructed such that:

(1) A closing door shall open and an open door shall not close more than 1 foot (305 mm) below the upmost position, or

(2) The operator shall function as required by §1211.6(b)(1).

(c) An external entrapment protection device shall comply with the applicable requirements in §§1211.10, 1211.11 and 1211.12.

(d) An inherent secondary entrapment protection device shall comply with the applicable requirements in §1211.13. Software used in an inherent entrapment protection device shall comply with the Standard for Safety for Software in Programmable Components, UL 1998, Second Edition, May 29, 1998. 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. Copies may be inspected at the Consumer Product Safety Commission, Office of the Secretary, 4330 East West Highway, Bethesda, Maryland or at the

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[65 FR 70658, Nov. 27, 2000]

**§ 1211.9 Additional entrapment protection requirements.**

(a) A means to manually detach the door operator from the door shall be supplied. The gripping surface (handle) shall be colored red and shall be easily distinguishable from the rest of the operator. It shall be capable of being adjusted to a height of 6 feet (1.8 m) above the garage floor when the operator is installed according to the instructions specified in §1211.14(a)(2). The means shall be constructed so that a hand firmly gripping it and applying a maximum of 50 pounds (223 N) of force shall detach the operator with the door obstructed in the down position. The obstructing object, as described in §1211.7(b), is to be located in several different positions. A marking with instructions for detaching the operator shall be provided as required by §1211.15(i).

(b) A means to manually detach the door operator from the door is not required for a door operator that is not directly attached to the door and that controls movement of the door so that:

(1) The door is capable of being moved open from any position other than the last (closing) 2 inches (50.8 mm) of travel, and

(2) The door is capable of being moved to the 2-inch point from any position between closed and the 2-inch point.

(c) Actuation of a control that initiates movement of a door shall stop and may reverse the door on the down cycle. On the up cycle, actuation of a control shall stop the door but not reverse it.

(d) An operator shall be constructed so that adjustment of limit, force or other user controls and connection of external entrapment protection devices

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can be accomplished without exposing normally enclosed live parts or wiring.

[57 FR 60455, Dec. 21, 1992, as amended at 65 FR 70658, Nov. 27, 2000]

### § 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.

(2) The device is to be installed in the intended manner and its terminals connected to circuits of the door operator as indicated by the installation instructions.

(3) The device is to be installed and tested at minimum and maximum heights and widths representative of recommended ranges specified in the installation instructions. For doors, if not specified, devices are to be tested on a minimum 7 foot (2.1 m) wide door and maximum 20 foot (6.1 m) wide door.

(4) If powered by a separate source of power, the power-input supply terminals are to be connected to supply circuits of rated voltage and frequency.

(5) An external entrapment protection device requiring alignment, such as a photoelectric sensor, shall be provided with a means, such as a visual indicator, to show proper alignment and operation of the device.

(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

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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).

(b) *Current protection test.* (1) There shall be no damage to the entrapment protection circuitry if low voltage field-wiring terminals or leads are shortened or miswired to adjacent terminals.

(2) To determine compliance with paragraph (b)(1) of this section, an external entrapment protection device is to be connected to a door operator or other source of power in the intended manner, after which all connections to low voltage terminals or leads are to be reversed as pairs, reversed individually, or connected to any low voltage lead or adjacent terminal.

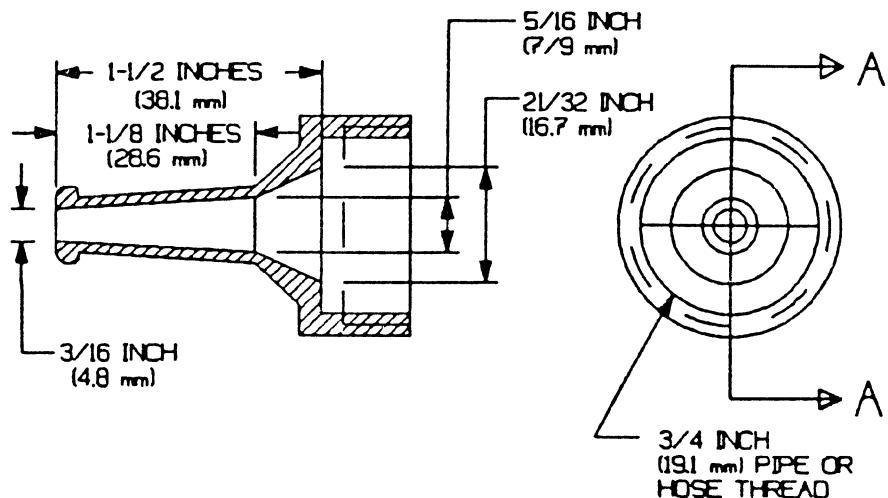
(c) *Splash test.* (1) An external entrapment protection device intended to be installed inside a garage 3 feet or less above the floor shall withstand a water exposure as described in paragraph (c)(2) of this section without resulting in a risk of electric shock and shall function as intended. After exposure, the external surface of the device may be dried before determining its functionality.

(2) External entrapment protection devices are to be indirectly sprayed using a hose having the free end fitted with a nozzle as illustrated in figure 2 and connected to a water supply capable of maintaining a flow rate of 5 gallons (19 liters) per minute as measured at the outlet orifice of the nozzle. The water from the hose is to be played, from all sides and at any angle against the floor under the device in such a manner most likely to cause water to splash the enclosure of electric components. However, the nozzle is not to be brought closer than 10 feet (3.05 m) horizontally to the device. The water is to be sprayed for 1 minute.

Figure 2

## NOZZLE

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(d) *Ultraviolet light exposure test.* A polymeric material used as a functional part of a device that is exposed to outdoor weather conditions shall comply 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. Copies may be inspected at the Consumer Product Safety Commission, Office of the Secretary, 4330 East West Highway, Bethesda, Maryland or at the National Archives and

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(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—

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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  $31.0 \pm 3.6$  °F (minus  $35.0 \pm 2.0$  °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

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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; 72 FR 54817, Sept. 27, 2007]

### § 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**

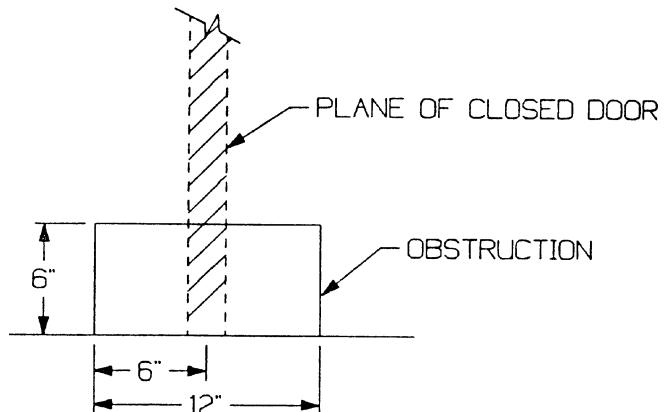
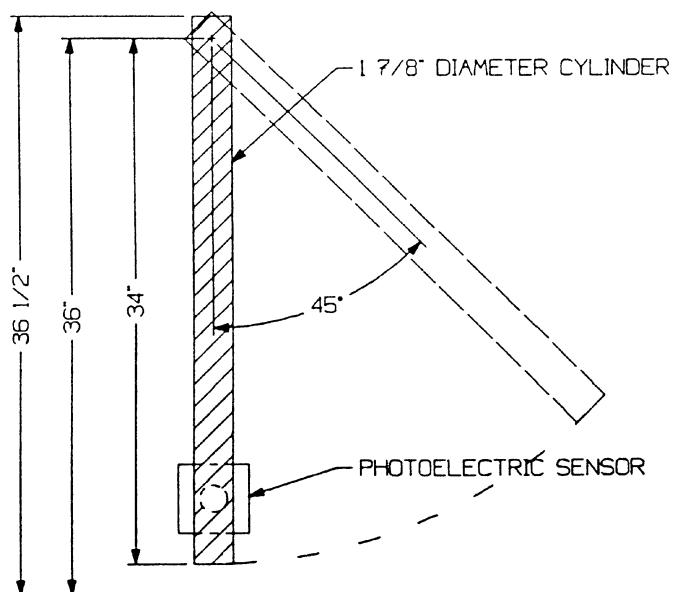


Figure 4

### 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 ac-

cording to paragraph (b)(2) of this section.

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(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

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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**

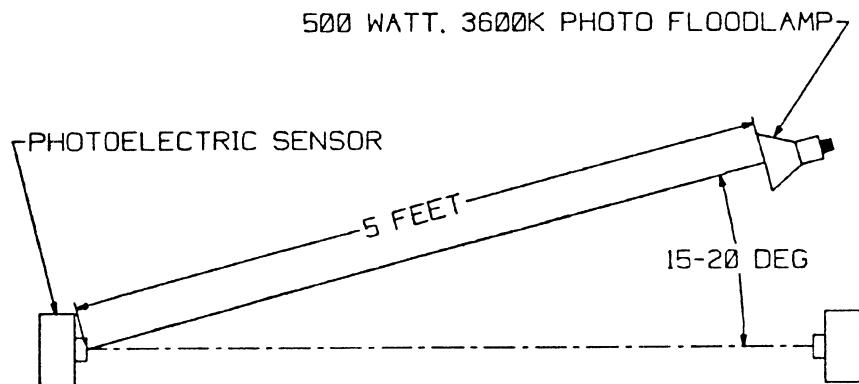
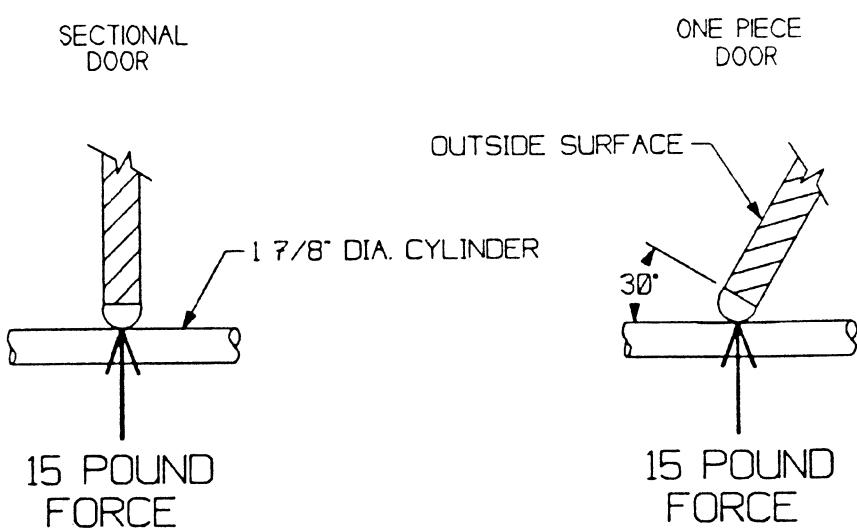


Figure 6  
**EDGE SENSOR NORMAL OPERATION TEST**



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.

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(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

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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.

Table 1  
**PHYSICAL PROPERTIES OF GASKET-ACCELERATED AGING TEST**

	<b>Before Accelerated Aging</b>	<b>After Accelerated Aging</b>
<b>Recovery --</b>	<b>1/2 inch (12.7 mm)</b>	<b>--</b>
<b>Maximum set when 2-inch (50.8-mm) gauge marks are stretched to 5 inches (127 mm), held for 2 minutes, and measured 2 minutes after release</b>		
<b>Elongation --</b>	<b>250 percent [2 to 7 inches (50.8–178.8 mm)]</b>	<b>65 percent of original</b>
<b>Tensile Strength --</b>	<b>850 pounds per square inch (59 mPa)</b>	<b>75 percent of original</b>

Copies may be inspected at the Consumer Product Safety Commission, Office of the Secretary, 4330 East West Highway, Bethesda, Maryland or at the National Archives and 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/](http://www.archives.gov/federal_register/)

*code\_of\_federal\_regulations/  
ibr\_locations.html*

(3) Rubber compounds forming gaskets that are depended upon for protection from rain shall have physical properties as specified in table 1, before and after conditioning for 168 hours in an air-circulating oven at 70 °C (158 °F).

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(d) *Puncture resistance test.* (1) After being subjected to the test described in paragraph (d)(2) of this section, an elastomeric material that is a functional part of an edge sensor shall:

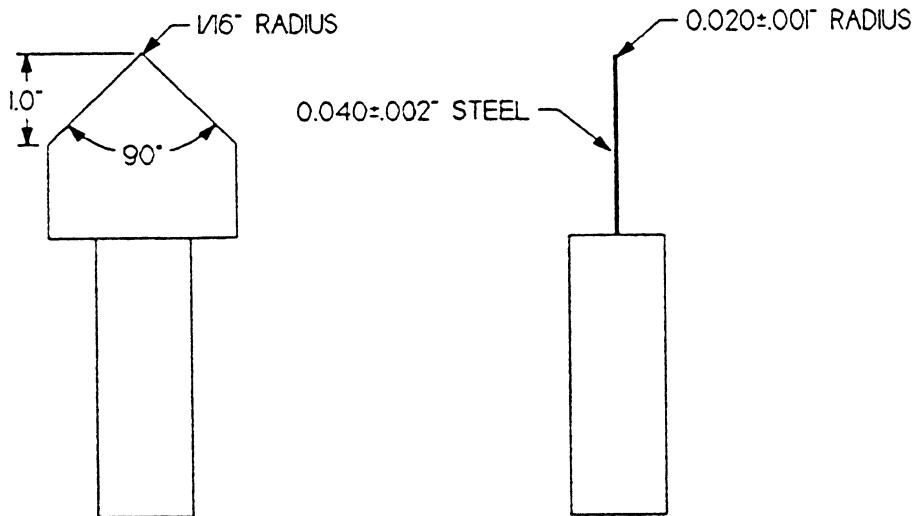
(i) Not be damaged in a manner that would adversely affect the intended operation of the edge sensor, and

(ii) Maintain enclosure integrity if it serves to reduce the likelihood of contamination of electrical contacts.

(2) A sample of the edge sensor is to be installed in the intended manner on a representative door edge. The probe described in figure 7 is to be applied with a 20 pound-force (89N) to any point on the sensor that is 3 inches or less above the floor is to be applied in the direction specified in the Edge Sensor Normal Operation Test, figure 6. The test is to be repeated on three locations on each surface of the sensor being tested.

Figure 7

## PUNCTURE PROBE



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

### § 1211.13 Inherent force activated secondary door sensors.

(a) *Normal operation test.* (1) A force activated door sensor of a door system installed according to the installation instructions shall actuate when the door applies a 15 pound (66.7 N) or less force in the down or closing direction and when the door applies a 25 pound (111.2 N) or less force in the up or open-

ing direction. For a force activated door sensor intended to be used in an operator intended for use only on a sectional door, the force is to be applied by the door against the longitudinal edge of a  $1\frac{1}{8}$  (47.6 mm) diameter cylinder placed across the door so that the axis is perpendicular to the plane of the door. See Figure 6 of this part. The weight of the door is to be equal to the

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maximum weight rating of the operator.

(2) The test described in paragraph (a)(1) of this section is to be repeated and measurements made at various representative points across the width and height of the door. For this test, a door sensor system and associated components shall withstand a total of 9 cycles of mechanical operation without failure with the force applied as follows:

- (i) At the center at points one, three, and five feet from the floor,
- (ii) Within 1 foot of the end of the door, at points one, three, and five feet from the floor,
- (iii) Within 1 foot of the other end of the door at points one, three, and five feet from the floor.

(3) The cycles are not required to be consecutive. Continuous operation of the motor without cooling is not required.

(b) *Adjustment of door weight.* (1) With the door at the point and at the weight determined by the tests of paragraphs (a)(2) and (b)(2) of this section to be the most severe, the door sensor and associated components shall withstand 50 cycles of operation without failure.

(2) At the point determined by the test in paragraphs (a)(1) and (a)(2) of this section to be the most severe, weight is to be added to the door in 5.0 pound (2.26 Kg) increments and the test repeated until a total of 15.0 pounds (66.72 N) has been added to the door. Before performing each test cycle, the door is to be cycled 2 times to update the profile. Similarly, starting from normal weight plus 15.0 pounds, the test is to be repeated by subtracting weight in 5.0 pound increments until a total of 15.0 pounds has been subtracted from the door.

(c) *Obstruction test.* For a door traveling in the downward direction, when an inherent secondary entrapment protection device senses an obstruction and initiates a reversal, a control activation shall not move the door downward until the operator reverses the door a minimum of 2 inches (50.8 mm). The test is to be performed as described in § 1211.7(b)(3).

[65 FR 70659, Nov. 27, 2000, as amended at 72 FR 54817, Sept. 27, 2007]

**§ 1211.14 Instruction manual.**

(a) *General.* (1) A residential garage door operator shall be provided with an instruction manual. The instruction manual shall give complete instructions for the installation, operation, and user maintenance of the operator.

(2) Instructions that clearly detail installation and adjustment procedures required to effect proper operation of the safety means provided shall be provided with each door operator.

(3) A residential garage door or door operator shall be provided with complete and specific instructions for the correct adjustment of the control mechanism and the need for periodic checking and, if needed, adjustment of the control mechanism so as to maintain satisfactory operation of the door.

(4) The instruction manual shall include the important instructions specified in paragraphs (b)(1) and (2) of this section. All required text shall be legible and contrast with the background. Upper case letters of required text shall be no less than  $\frac{5}{64}$  inch (2.0 mm) high and lower case letters shall be no less than  $\frac{1}{16}$  inch (1.6 mm) high. Heading such as "Important Installation Instructions," "Important Safety Instructions," "Save These Instructions" and the words "Warning—To reduce the risk of severe injury or death to persons:" shall be in letters no less than  $\frac{3}{16}$  inch (4.8 mm) high.

(5) The instructions listed in paragraphs 1211.13(b)(1) and (2) shall be in the exact words specified or shall be in equally definitive terminology to those specified. No substitutes shall be used for the word "Warning." The items may be numbered. The first and last items specified in paragraph (b)(2) of this section shall be first and last respectively. Other important and precautionary items considered appropriate by the manufacturer may be inserted.

(6) The instructions listed in paragraph (b)(1) of this section shall be located immediately prior to the installation instructions. The instructions listed in paragraph (b)(2) of this section shall be located immediately prior to user operation and maintenance instructions. In each case, the instructions shall be separate in format from other detailed instructions related to

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installation, operation and maintenance of the operator. All instructions, except installation instructions, shall be a permanent part of the manual(s).

(b) *Specific required instructions.* (1) The Installation Instructions shall include the following instructions:

### Important Installation Instructions

Warning—To reduce the risk of severe injury or death:

1. Read and follow all Installation Instructions.

2. Install only a properly balanced garage door. An improperly balanced door could cause severe injury. Have a qualified service person make repairs to cables, spring assemblies and other hardware before installing opener.

3. Remove all ropes and remove or make inoperative all locks connected to the garage door before installing opener.

4. Where possible, install door opener 7 feet or more above the floor. For products requiring an emergency release, mount the emergency release 6 feet above the floor.

5. Do not connect opener to source of power until instructed to do so.

6. Locate control button: (a) within sight of door, (b) at a minimum height of 5 feet so small children cannot reach it, and (c) away from all moving parts of the door.

7. Install Entrapment Warning Label next to the control button in a prominent location. Install the Emergency Release Marking. Attach the marking on or next to the emergency release.

8. After installing opener, the door must reverse when it contacts a 1½ inch high object (or a 2 by 4 board laid flat) on the floor.

(2) The User Instructions shall include the following instructions:

### Important Safety Instructions

Warning—To reduce the risk of severe injury or death:

1. Read and follow all instructions.

2. Never let children operate, or play with door controls. Keep the remote control away from children.

3. Always keep the moving door in sight and away from people and objects until it is completely closed. No one should cross the path of the moving door.

4. NEVER GO UNDER A STOPPED PARTIALLY OPEN DOOR.

5. Test door opener monthly. The garage door MUST reverse on contact with a 1½ inch object (or a 2 by 4 board laid flat) on the floor. After adjusting either the force or the limit of travel, retest the door opener. Failure to adjust the opener properly may cause severe injury or death.

6. For products requiring an emergency release, if possible, use the emergency release

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only when the door is closed. Use caution when using this release with the door open. Weak or broken springs may allow the door to fall rapidly, causing injury or death.

7. Keep garage door properly balanced. See owner's manual. An improperly balanced door could cause severe injury or death. Have a qualified service person make repairs to cables, spring assemblies and other hardware.

### 8. Save these Instructions.

[57 FR 60455, Dec. 21, 1992. Redesignated and amended at 65 FR 70659, Nov. 27, 2000; 72 FR 54818, Sept. 27, 2007]

## § 1211.15 Field-installed labels.

(a) A residential garage door operator shall be provided with labels for field installation and constructed as specified in paragraphs (c) through (i) of this section. The labels shall be acceptable for permanent installation. The instruction manual shall specify where the labels are to be located.

(b) If labels secured by adhesive are used, the instruction shall specify that an additional mechanical means shall be used to secure the labels to surfaces to which the adhesive will not adhere.

(c) A residential garage door operator shall be provided with a cautionary label intended for permanent installation to identify the possible risk of entrapment. The instruction manual shall direct that the label be affixed near the wall-mounted control button.

(d) The label required in accordance with paragraph (c) of this section shall be in a vertical layout with three panels:

(1) A signal word panel,

(2) A pictorial panel, and

(3) A message panel, with adjacent panels delineated from each other by a horizontal black line. The entire label shall be surrounded by a black border and shall measure at least 5 inches (127 mm) wide by 6¼ inches (159 mm) long overall.

(e) The signal word panel as specified in paragraph (d) of this section shall contain the word "WARNING," in uppercase letters, preceded by a safety alert symbol consisting of an orange exclamation mark on a black solid equilateral triangle background with the point of the triangle oriented upward. The word "WARNING" and the safety alert symbol shall be centered on one line and shall be in black letters

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at least  $\frac{7}{16}$  inch (11.1 mm) high on an orange background.

(f) The pictorial panel as specified in paragraph (d) of this section shall be positioned between the signal word panel and the message panel. The pictorial shall be black on a white background and shall clearly depict a child running toward or under a garage door. A red prohibition symbol (slash, oriented from the upper left to the lower right, through a circle) shall be superimposed over, and totally surround, the pictorial. The pictorial shall have an overall diameter of 1-7 $\frac{1}{8}$  inch (47.6 mm) minimum.

(g) The message panel as specified in paragraph (d) of this section shall include the following text or an equivalent wording:

(1) Possible Risk and Consequence Statement—"There is a risk of a child becoming trapped under an automatic garage door resulting in severe injury or death."

(2) Avoidance Statements—

(i) "Do not allow children to walk or run under a closing door."

(ii) "Do not allow children to operate door operator controls."

(iii) "Always keep a closing door within sight."

(iv) "In the event a person is trapped under the door, push the control button or use the emergency release." For products not having an emergency release use instead "In the event a person is trapped under the door, push the control button."

(3) Instructions—

(i) "Test Door Operator Monthly: Use a 1 $\frac{1}{2}$  inch thick object placed on the floor under the closing door. In the event the door does not reverse upon contact, adjust, repair, or replace the operator."

(ii) Additional instructions on not removing or painting over the label, mounting the label adjacent to the wall control, and mounting the wall control out of children's reach shall be provided. These additional instruction shall be in less prominent lettering than those in paragraph (g)(3)(i) of this section.

(h) The lettering of the message panel described in paragraph (g) of this section shall be black on a white background and shall be sans serif letters in

combinations of upper case and lower case letters. The upper case letters of the Possible Risk and Consequence Statements and Avoidance Statements shall be  $\frac{1}{8}$  inch (3.18 mm) high minimum. The lettering of the Possible Risk and Consequence Statement shall be in italics, underlined, bold, or the like, and shall be double spaced from the Avoidance Statements. All other instructions shall be in letters less prominent than the Possible Risk and Consequence Statements and shall be separated with at least a single space between individual instructions.

(i) Except for door operators complying with § 1211.9(b), a residential garage door operator shall be provided with a cautionary marking attached to or adjacent at all times to the means provided to detach the operator from the garage door. The marking shall include the following statement or the equivalent: "If the door becomes obstructed, detach door from operator as follows: (The method to detach the operator shall be shown on the marking.)"

[57 FR 60455, Dec. 21, 1992. Redesignated and amended at 65 FR 70659, Nov. 27, 2000]

**§ 1211.16 UL marking requirements.**

(a) Unless specifically excepted, marking required in this standard shall be permanent. Ink-printed and stenciled markings, decalcomania labels, and pressure sensitive labels are among the types of marking that are considered acceptable if they are acceptably applied and are of good quality.

(b) Except as provided below, a garage door operator shall be plainly marked, at a location where the marking will be readily visible—after installation, in the case of a permanently connected appliance—with:

(1) The manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product may be identified—hereinafter referred to as the manufacturer's name;

(2) The catalog number or the equivalent;

(3) The voltage, frequency, and input in amperes or watts; and

(4) The date or other dating period of manufacture not exceeding any three consecutive months.

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(c) The ampere rating shall be included unless the full-load power factor is 80 percent or more, or, for a cord-connected operator, unless the rating is 50 watts or less. The number of phases shall be indicated if an operator is for use on a polyphase circuit. The date code repetition cycle shall not be less than 20 years.

(d) Exception No. 1: The manufacturer's identification may be in a traceable code if the operator is identified by the brand or trademark owned by a private labeler.

(e) Exception No. 2: The date of manufacture may be abbreviated or in an established or otherwise accepted code.

(f) If a manufacturer produces or assembles operators at more than one factory, each finished operator shall have a distinctive marking, which may be in code, to identify it as the product of a particular factory.

(g) The carton and the instruction manual for an operator shall be marked with the word "WARNING" and the following or the equivalent: "To reduce the risk of injury to persons—Use this operator only with (a) \_\_\_\_ door(s)."

(h) A residential garage door operator shall be marked with the word "WARNING" and the following or equivalent, "Risk of entrapment. After adjusting either the force or limits of travel adjustments, insure that the door reverses on a 1½ inch (or a 2 by 4 board laid flat) high obstruction on the floor."

(i) A separately supplied accessory, including external entrapment protection device, intended for installation with an appliance or appliances shall be marked with the manufacturer's name and catalog or model number and the type of appliance or appliances with which it is intended to be used—such as a residential garage door operator. Additionally, installation instructions, accompanying specifications sheet, or packaging of the accessory shall identify the appliance or appliances with which it is intended to be used by specifying the manufacturer's name and catalog or model number or by any other positive means to serve the identification purpose.

(j) An appliance provided with terminals or connectors for connection of a

separately supplied accessory, such as an external entrapment protection device, shall be marked to identify the accessory intended to be connected to the terminals or connectors. The accessory identification shall be by manufacturer's name and catalog or model number or other means to allow for the identification of accessories intended for use with the appliance.

(k) With reference to paragraph (k) of this section, instructions for installing a separately supplied accessory shall be provided. A statement shall be included in the instructions warning the user that the appliance must be disconnected from the source of supply before attempting the installation of the accessory.

[57 FR 60455, Dec. 21, 1992. Redesignated at 65 FR 70659, Nov. 27, 2000]

### § 1211.17 Statutory labeling requirement.

(a) A manufacturer selling or offering for sale in the United States an automatic residential garage door operator manufactured on or after January 1, 1991, shall clearly identify on any container of the system and on the system the month or week and year the system was manufactured and its conformance with the requirements of this part.

(b) The display of the UL logo or listing mark, and compliance with the date marking requirements of UL-325 now stated in §1211.5 of this subpart, on both the container and the system, shall satisfy the requirements of this subpart.

[57 FR 60455, Dec. 21, 1992. Redesignated at 65 FR 70659, Nov. 27, 2000]

## Subpart B—Certification

SOURCE: 57 FR 60468, Dec. 21, 1992, unless otherwise noted.

### § 1211.20 Purpose, scope, and application.

(a) *Purpose.* Section 14(a) of the Consumer Product Safety Act, 15 U.S.C. 2063(a), requires every manufacturer (including importers) and private labeler of a product which is subject to a consumer product safety standard to issue a certificate that the product