



UNITED STATES
 CONSUMER PRODUCT SAFETY COMMISSION
 4330 EAST WEST HIGHWAY
 BETHESDA, MD 20814

Memorandum

Date: **MAR 21 2006**

TO : The Commission
 Todd Stevenson, Secretary

THROUGH: Page C. Faulk, General Counsel *PCF*
 Patricia M. Semple, Executive Director *MS*

FROM : Jacqueline Elder, Assistant Executive Director, *je*
 Office for Hazard Identification and Reduction
 John R. Murphy, Mechanical Engineer *JRM*
 Directorate for Engineering Sciences

SUBJECT : Revision of garage door operator standard, 16 CFR Part 1211

Underwriters Laboratories Inc. (UL) has revised the entrapment protection requirements of its voluntary standard titled "Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems," also known as UL 325. Congress mandated that all automatic residential garage door operators (GDOs) conform to the entrapment protection requirements of this standard in the Consumer Product Safety Improvement Act of 1990 (the Improvement Act). In response to this mandate, the Commission issued the safety standard for automatic residential GDOs (16 CFR Part 1211) on June 19, 1991. The Improvement Act provides that when UL makes changes to the entrapment protection provisions of UL 325, UL must notify the Commission of proposed revisions. Those changes must be incorporated into the Commission rule unless the Commission notifies UL within 30 days that the Commission has determined the revisions do not carry out the purposes of the Improvement Act.

UL recently modified UL 325 in response to a request from the Commission staff. The staff identified several incidents in which children became entrapped beneath a garage door that had been left partially open. In most of the incidents a child tried to crawl under the partially open door and became stuck under the door. A bystander pressed the wall control button thinking that the door would go up and release the child. Instead the garage door moved down compressing and further entrapping the child. The Commission staff asked UL to modify UL 325 so that the likelihood of these incidents occurring would be diminished. The Commission staff worked closely with the UL 325 Standard Technical Panel (STP) and participated in an STP working group to develop the revisions.

As a result of these changes a residential automatic garage door operator cannot move downward from a partially open position until the operator reverses the door a minimum of 2 inches (50.8 mm). The new requirement has been inserted in paragraphs that apply to inherent

NOTE: This document has not been reviewed or accepted by the Commission.
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safety devices, such as a force sensor that is inherent to the GDO (inside the case), and external safety devices, such as electric eyes. A specific obstruction test has been created to test for compliance with these requirements.

The Commission staff received official notification of changes to UL 325 in a letter to Jacqueline Elder dated February 22, 2006 (attached). The letter was received on Thursday, February 23, 2006. As a result, should the Commission find that the revisions do not carry out the purposes of the Improvement Act, the Commission must notify UL before March 25, 2006, to prevent the changes from being incorporated into the Commission's product safety rule.

The Commission staff recommends that the Commission allow the changes to UL 325 to be incorporated into the product safety standard for automatic residential GDOs. Engineering Sciences staff believes that these changes improve the level of safety provided by the mandatory standard and will reduce the possibility of children becoming trapped under partially open garage doors. The staff will work with the Office of the General Counsel to prepare a draft Federal Register (FR) notice revising Part 1211 to include the new UL requirements. The staff will then forward the FR notice to the Commission for a vote.

Attachment



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February 22, 2006

Ms. Jacqueline Elder
Assistant Executive Director
U.S. Consumer Product Safety Commission
Office of Hazard Identification and Reduction
4330 East-West Highway
Bethesda, MD 20814

Subject: UL 325 - Published Revisions

Dear Ms. Elder,

In accordance with Public Law 101-608, Underwriters Laboratories Inc. hereby notifies the CPSC regarding published revisions to the fifth edition of the Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems, UL 325.

On March 25, 2005, UL proposed revisions to the residential garage door operator portion of UL 325. Ballots and comments to these proposed revisions were due May 10, 2005. During the course of UL's consensus (STP) process, no changes were made to the proposal, and revisions were published February 21, 2006.

Attached is a copy of the revised pages, related to residential garage door operators, as published in the Standard. If you have any questions, please feel free to contact me.

Yours truly,

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An independent organization working for a safer world with integrity, precision and knowledge.



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ANSI/UL 325-2006

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UL 325

Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems

First Edition – April, 1973
Second Edition – April, 1979
Third Edition – April, 1986
Fourth Edition – May, 1995

Fifth Edition

June 7, 2002

The most recent designation of ANSI/UL 325 as an American National Standard (ANSI) occurred on February 14, 2006. The ANSI approval for this standard does not include the Cover Page, transmittal pages, or Title Page.

This ANSI/UL Standard for Safety, which consists of the Fifth Edition including revisions through February 21, 2006, is under continuous maintenance, whereby each revision is ANSI approved upon publication. Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <http://csds.ul.com>.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

The Department of Defense (DoD) has adopted UL 325 on January 21, 1992. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

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- b) Shall be provided with a means for connection of an external secondary entrapment protection device as described in 32.3.1 – 32.3.3; or
- c) Shall be provided with an inherent secondary entrapment protection device as described in 32.3.1, 32.3.2, and 32.3.4.

32.1.3 In the case of a combination sectional overhead garage door operator system, the door shall comply with the requirements in Specifications for Sectional Overhead Type Doors, ANSI/DASMA 102-1996. A pinch point shall not be contacted by the probe illustrated in Figure 9.1 using the procedures described in paragraphs 9.3, 9.4, 9.5, and 9.7. In addition, a section joint of a residential sectional garage door, that admits a 0.35 in (8.9 mm) diameter rod that is 3.9-in (100-mm) long, shall also admit a 1.0 in (25.4 mm) diameter rod that is 3.9-in (100-mm) long, at all positions of the door. Rubber or textile coverings or shields, when used to cover the joint, shall pass the same test. Evaluation of pinch points shall be made with the door installed on all track configurations supplied with the door.

32.1.3 revised March 14, 2003

32.2 Inherent entrapment protection

32.2.1 Other than for the first 1 ft (305 mm) 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 s of contact with the obstruction as specified in 32.2.2. After reversing the door, the operator shall return the door to, and stop the door at, the full upmost position. Compliance shall be determined in accordance with 32.2.2 – 32.2.9.

Exception No. 1: 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.

Exception No. 2: 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 in (50.8 mm).

Revised 32.2.1 effective February 21, 2008

32.2.2 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-in (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.

Exception No. 1: 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 ft of each end of the door.

Exception No. 2: With reference to 46.3.1 and Exception No. 2 of 32.2.1, 32.2.6, 32.2.7, and 34.1.6; a 4 in (102 mm) high by 6 in (152 mm) wide by a minimum of 6 in (152 mm) long solid rectangular object is to be placed on the floor of the test installation to provide a 4 in (102 mm) high obstruction when operated from a partially open position.

Revised 32.2.2 effective February 21, 2008

32.2.3 An operator is to be tested for compliance with 32.2.1 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 32.2.5. 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.

32.2.4 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 solid object described in 32.2.2 at the maximum setting or at the setting that represents the most severe operating condition.

32.2.5 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 of these 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 in 59.3.1.

32.2.6 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 operation "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 in (25.4 mm).

Exception No. 1: 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.

Exception No. 2: 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 in (50.8 mm).

Revised 32.2.6 effective February 21, 2008

32.2.7 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 within 30 s or less following the initiation of the close cycle.

Exception No. 1: 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.

Exception No. 2: 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 in (50.8 mm). When the door is stopped manually during its descent, the 30 s shall be measured from the resumption of the close cycle.

Revised 32.2.7 effective February 21, 2008

32.2.8 To determine compliance with 32.2.6 or 32.2.7, an operator is to be subjected to 10 open-and-close cycles of operation while connected to the door or doors specified in 32.2.3 and 32.2.5. 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 32.2.1 and 32.3.1 are to be inoperative or defeated during the test. An obstructing object is to be used so that the door is not capable of activating a lower limiting device.

32.2.9 During the closing cycle, the system providing compliance with 32.2.1 and 32.2.6 or 32.2.1 and 32.2.7 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.

mechanism. The gripping surface (handle) shall be colored red and shall be distinguishable from the rest of the operator. The marking which includes instructions for detaching the operator shall be provided in accordance with 57.1 – 57.9.

d) A means (interlock) shall be supplied to de-energize the operator whenever the operator is manually detached from the door. An electromechanical switch or relay employed as the means (interlock) shall also comply with the requirements in Section 49, as applicable.

e) A means (interlock) shall be supplied to de-energize the operator whenever an operable window or access (service) door that is mounted in the garage door is opened perpendicular to the surface of the garage door. An electromechanical switch or relay employed as the means (interlock) shall also comply with the requirements in Section 49, as applicable.

f) The door shall not move outward from the exterior wall surface during the opening or closing cycle.

g) The door or door system (mounting hardware, track assembly, and components that make up the door) shall comply with Moving Parts, Section 27.

h) A horizontal track assembly, including installation hardware, shall support a dead load equal to the door weight when the door is in the horizontal position when tested in accordance with Dead Load Test, Section 53.

i) Instructions for the installation of operable windows and access (service) doors and the interlocks specified in (e) shall be supplied with the operator.

EXTERNAL ENTRAPMENT PROTECTION DEVICES

34 All Devices

34.1 General

34.1.1 An external entrapment protection device shall perform its intended function when tested in accordance with 34.1.2 – 34.1.4 and 34.1.6.

Revised 34.1.1 effective February 21, 2008

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

34.1.3 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-ft (2.13-m) wide door and maximum 20-ft (6.10-m) wide door.

34.1.4 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.

34.1.5 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.

34.1.6 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.

Exception No. 1: 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.

Exception No. 2: 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 in (50.8 mm).

Added 34.1.6 effective February 21, 2008

34.2 Current protection test

34.2.1 There shall be no damage to the entrapment protection circuitry if low voltage field-wiring terminals or leads are shorted or miswired to adjacent terminals.

34.2.2 To determine compliance with 34.2.1, an external entrapment protection device is to be connected to an 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.

34.3 Water exposure tests

34.3.1 Splash test

34.3.1.1 An external entrapment protection device intended to be installed inside a garage 3 ft (914 mm) or less above the floor shall withstand indirect water spray as described in 34.3.1.2 without resulting in a risk of electric shock and shall function as intended. After exposure to the water spray, the external surface of the device is to be dried before determining its functionality.

34.3.1.2 External entrapment protection devices are to be indirectly sprayed using a hose having the free end fitted with a nozzle as illustrated in Figure 34.1 and connected to a water supply capable of maintaining a flow rate of 5 gal (19 L) per minute as measured at the outlet orifice of the nozzle. The water from the hose is to be sprayed, from all sides and at any angle, against the floor under the device in a manner that results in water spray on the enclosure of electrical components. The nozzle is not to be brought closer than 10 ft (3.05 m) horizontally to the device. The water is to be sprayed for 1 min.

46.3 Obstruction test

46.3.1 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 in (50.8 mm). The test is to be performed as described in Exception No. 2 of 32.2.2.

Added 46.3.1 effective February 21, 2008

47 Metallic-Coating-Thickness Test

47.1 The method of determining the thickness of zinc and cadmium coatings by the metallic-coating-thickness test is described in 47.2 – 47.9.

47.2 The solution to be used for the test is to be made from distilled water and is to contain 200 g/L of reagent grade chromic acid (CrO_3) and 50 g/L of reagent grade concentrated sulfuric acid (H_2SO_4). The latter is equivalent to 27 mL/L of reagent grade concentrated sulfuric acid, specific gravity 1.84, containing 96 percent of H_2SO_4 .

47.3 The test solution is to be contained in a glass vessel such as a separatory funnel with the outlet equipped with a stopcock and a capillary tube having an inside bore of 0.025 in (0.63 mm) and a length of 5.5 in (140 mm). The lower end of the capillary tube is to be tapered to form a tip, the drops from which are to be about 0.05 mL each. To preserve an effectively constant level, a small glass tube is to be inserted in the top of the funnel through a rubber stopper and its position is to be adjusted so that, when the stopcock is open, the rate of dropping is 100 ± 5 drops per min. If desired, an additional stopcock may be used in place of the glass tube to control the rate of dropping.

47.4 The sample and the test solution are to be kept in the test room long enough to acquire the temperature of the room, which is to be noted and recorded. The test is to be conducted at a room temperature of 70.0 – 90.0°F (21.1 – 32.0°C).

47.5 Each sample is to be thoroughly cleaned before testing. All grease, lacquer, paint, and other nonmetallic coatings are to be removed completely by means of solvents. Samples are then to be thoroughly rinsed in water and dried with clean cheesecloth. Care is to be exercised to avoid contact of the cleaned surface with the hands or any foreign material.

47.6 The sample to be tested is to be supported from 0.7 to 1.0 in (17.7 to 25.4 mm) below the orifice, so that the drops of solution strike the point to be tested and run off quickly. The surface to be tested is to be inclined approximately 45 degrees from horizontal.

47.7 After cleaning, the sample to be tested is to be put in place under the orifice. The stopcock is to be opened and the time in seconds is to be measured with a stop watch until the dropping solution dissolves the protective metal coating, exposing the base metal. The end point is the first appearance of the base metal recognizable by a change in color at the point.

47.8 Each sample of a test lot is to be subjected to the test at three or more points, excluding cut, stenciled, and threaded surfaces, on the inside surface and at an equal number of points on the outside surface, at places where the metal coating may be expected to be thinnest. On enclosures made from precoated sheets, the external corners that are subjected to the greatest deformation are likely to have thin coatings.