

**U.S. Consumer Product Safety Commission  
LOG OF MEETING**

OFFICE OF  
SECRETARY

03/11/03 P 1:24

**SUBJECT: Proposed changes to the entrapment protection provision of UL 325 (Door, Drapery, Gate, Louver, and Window Operators and Systems) to account for partially open garage doors.**

**DATE OF MEETING: March 10, 2003**

**LOG ENTRY SOURCE: Hope Johnson**

**DATE OF LOG ENTRY: March 11, 2003**

**LOCATION: Conference Call**

CPSA 6 (b)(1) Cleared 3/12/03  
 No Mfrs/PrvtLblrs or  
Products Identified  
\_\_\_\_ Excepted by \_\_\_\_\_  
\_\_\_\_ Firms Notified,  
Comments Processed.

**CPSC ATTENDEE(S): Hope Johnson, John Murphy; Engineering Sciences**

**NON-CPSC ATTENDEE(S): Colin Willmott, Barbara Kelkhoff - Chamberlain; Gene Colucci, Brett Reed, Larry Murphy - Genie/Overhead Door; Jim Murray, Richard Gagnon - Wayne-Dalton; Joe Hetzel - DASMA**

**SUMMARY OF MEETING: The conference call began at 2pm. Barbara Kelkhoff began by summarizing the working group's proposal and reminded the group that this meeting was to discuss comments on the proposal. The working group received comments from Wayne-Dalton and Genie the week before, and CPSC staff comments were distributed during the call.**

**The discussion began by discussing the newest proposal, which would change**



the operation of the garage door operator when the photosensors are blocked. Currently, in this case the door will not move down unless the wall control button is held. This is referred to as constant contact override. The proposal would require the door to move upward on the first press of a wall control, but would allow constant contact to lower the door on a second press.

Jim Murry (Wayne-Dalton) began the discussion by summarizing his comment that the verification proposed in item 6 did not match the current standard and recommended amending the verification test until the working group agreed on the changes in the standard. Larry Murphy (Genie) agreed, brought up that the changes proposed to the constant contact override of the photosensors were changes made to an established safety standard with no problems and asked why the group should change this. He raised the concern about entrapments in the up directions, pointed out that we haven't seen any accidents in the up direction, and expressed concern that the changes could lead to entrapments in the up direction. Hope Johnson (CPSC) read the CPSC comment on this proposed change, and expressed that the CPSC was concerned the door would do nothing on the first press. The intention of the proposal was that the door would go up on the first press, then down on the second press, so she recommended clarifying this behavior. Other issues brought up by the working group during this discussion included the possibility of a 3 button control (up, down, and stop), concern that the proposal would not work for 1 piece doors, and that momentary contact should not bring the door down. The working group was not in unanimous agreement on this last point, although CPSC staff feel ideally the door should not move down when the photosensors are blocked. It appeared from the discussion that the group did not agree if changes to the constant contact override feature were needed.

The discussion then moved to testing and verification. As currently worded, the operator is required to remove the door "fully from the obstruction" before any contact with the wall button interferes with the operator. John Murphy (CPSC) read the CPSC staff comment expressing concern that testing the door with a 1-inch high block does not represent an entrapped child and it cannot be guaranteed that "fully from [a 1-inch high solid] obstruction" would ensure that a child could not become entrapped. The working group asked if CPSC has information that could help identify a proper testing material or removal distance. John Murphy (CPSC) said that he would talk to CPSC Health Sciences about this issue. It was noted that gate operators always reverse a minimum of 2 inches.

The meeting concluded with the working group in agreement that it would put forth a proposal to UL 325 that consisted of items 1 – 5 of the proposal once the test for "fully from the obstruction" was determined. CPSC staff will be defining this with help from Health Sciences. The call ended at 3:25 pm.

Proposal and comments discussed are attached.



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March 5, 2003

DASMA BULLETIN NO. 89-03 (E)

To: UL 325 Working Group – Partially Open Garage Doors

Colin Willmott	- Chamberlain
Barbara Kelkhoff	- Chamberlain
Hope Johnson	- CPSC
John Murphy	- CPSC
Gene Colucci	- Genie/Overhead Door
Brett Reed	- Genie/Overhead Door
Gary Leigh	- Miller Edge
Jim Murray	- Wayne-Dalton

SUBJECT: Conference Call to Discuss UL 325 and Partially Open Garage Doors

This will confirm a conference call has been scheduled for **Monday, March 10, 2003 at 2:00 p.m. EST**. The conference call is a rescheduling of the February 25, 2003 call since not all Working Group members were able to access that call.

To participate in the conference call, please dial **800-204-4427**. You will be prompted to “press 1 to attend a meeting.” You will then be asked to enter a meeting ID number followed by the pound (#) key: enter **8160#**. If you dial in and no else is on the call, please stay on the line, as you may be the first caller.

The purpose of the call will be to discuss the attached updated draft of a proposed revision to UL 325, along with Working Group member comments.

If you have any questions, please contact the DASMA office.

Sincerely,

JOSEPH R. HETZEL, P.E.  
Technical Director

JRH/jlb  
dasma  
Attachments

**UL 325 Working Group - Partially Open Garage Doors**  
**Proposed Revisions to UL 325, 5<sup>th</sup> Edition**  
**March 4, 2003 DRAFT**  
**(incorporates editorial changes from the 1/31/03 DRAFT)**

**1. Under “inherent entrapment protection”, change paragraph 32.2.1 as follows:**

32.2.1 Other than for the first 1 ft (305 mm) of travel as measured over the path of the moving door, 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 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 a second obstruction ~~or a control is actuated to stop the door during the upward travel.~~*

*Exception 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 only after the operator removes the door fully from the obstruction.*

**2. Under “inherent entrapment protection”, change paragraph 32.2.6 as follows:**

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 <sup>2profile<sup>2</sup></sup> 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 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 ~~or a control is actuated to stop the door during the upward travel.~~*

*Exception 2: The door operator is not required to return the door to, and stop the door at, the full up most position when a control is actuated to stop the door during the upward travel – but only after the operator removes the door fully from the obstruction.*

**3. Under “inherent entrapment protection”, change paragraph 32.2.7 as follows:**

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 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 ~~or a control is actuated to stop the door during the upward travel.~~ When the door is stopped manually during its descent, the 30 s shall be measured from the resumption of the close cycle.*

*Exception 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 only after the operator removes the door fully from the obstruction. When the door is stopped manually during its descent, the 30 s shall be measured from the resumption of the close cycle.*

**4. Under “external entrapment protection devices, all devices, general”, add a new paragraph 34.1.6 that reads:**

34.1.6 An operator using an external entrapment protection device, upon detecting 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 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 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 only after the operator removes the door fully from the obstruction.*

**5. Under “inherent secondary force activated door sensors”, add a new paragraph 46.3 that reads:**

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, the operator shall remove the door fully from the obstruction prior to any control causing the door to stop.

**6. The following proposal to the Operational Verification is done in an effort to verify the above requirements.**

OPERATIONAL VERIFICATION TEST: DATASHEET

METHOD

The door operator, with all external devices connected, was connected to a supply circuit of rated voltage. The operator was then operated in a manner that verified that the following functions operated as intended:

RESULTS

- A. Upon sensing a 1 in. high obstruction, the operator [ caused ] [ did not cause ] the door to move to the full upper most position.
  - B. Upon sensing a 1 in. high obstruction, rapid, sequential activations of the control (wall and remote) stopped the door [before][after] it was fully removed from the obstruction.
  - C. During downward movement, pressing of the control (wall and remote) [ caused ] [ did not cause ] movement of door to [ stop ] [ or ] [ reverse ] to the upward direction.
  - D. During upward movement, pressing of the control (wall and remote) [ caused ] [ did not cause ] movement of door to stop.
  - E. With the external entrapment device [ photoelectric sensor ] [ and ] [ edge sensor ] [ \_\_\_\_\_ ] non-functional, the first activation of a momentary pressing of wall control [ lowered ] [ did not lower ] the door.
  - F. With the external entrapment device [ photoelectric sensor ] [ and ] [ edge sensor ] [ \_\_\_\_\_ ] non-functional, the door [ was ] [ was not ] lowered by the remote control.
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**7. The concept of the following proposal should also be considered for inclusion in UL 325. The proposal, shown verbatim for inclusion in IEC 60335-2-95, and will be discussed at an MT 25 meeting being held the week of February 3, 2003 in Chamonix, France.**

**22.104 Drives** shall not be provided with a control which renders the **entrapment protection system** inoperative. However, a malfunctioning **entrapment protection system** can be overridden by a manual control. The manual control requires constant pressure to operate and is intended to be fixed within sight of the door.

The manual control has to fulfill the same requirements as applicable for a biased off switch operating in normal use.

NOTE The manual control can be the same control as used to operate the **drive** in sight of the door as in normal use.

*Compliance is checked by the following test.*

*During each test of 20.103, 20.104 and 20.105, hold the manual control switch closed. Each **entrapment protection system** is tested for proper operation and is not overridden when the system is fully functional. During each test, if the manual control can override a malfunctioning **entrapment protection system** on the second activation, the **drive** is returned to normal function. After one cycle of **normal operation**, the manual control must not override the **entrapment protection system** on the first activation.*

NOTE 1 Releasing the manual control is the same as introducing an obstruction.

NOTE 2 It is acceptable for the activation of a manual control to override a malfunctioning **entrapment protection system** on the second activation but not on the first activation.

**8. The following changes in the Reopen test procedure are proposed to verify the requirements detailed in Item 7.**

REOPEN TEST - DATASHEET

METHOD

The operator, with all external devices connected, was connected to a supply circuit of rated voltage. The system was installed as described in the Obstruction Test to [ Door A ][ Door B ].

Part 1 - The Obstruction Test was repeated with the following conditions:

- A. Shorted door switch: 1<sup>st</sup> activation
- B. Shorted door switch: 2<sup>nd</sup> activation
- C. Shorted signal from the radio control.
- D. Shorted \_\_\_\_\_.

For this test, the force adjustment set at the maximum setting or at the setting representing the most severe operating condition.

This test was repeated with the external entrapment sensor non-operational.

RESULTS

In each case without the External Entrapment Sensor Operational, the first activation of the operator [ did ][ did not ] allow the door to travel down and [ did ][ did not ] reverse the door to the full upmost position.

In each case without the External Entrapment Sensor Operational, shorted signal from the radio control [ did ][ did not ] allow the door to travel down and [ did ][ did not ] reverse the door to the full upmost position.

In each case where the door travels down, the operator [ did ][ did not ] initiate reversal of the door within 2 s of contacting the obstruction and [ completed ] [ did not complete ] the reversal process by stopping the door at the up limit.

	Activation 1 Door Travels Down (y/n)	Activation 2 Door Travels Down (y/n)	Time to Reverse (s)
With External Entrapment Sensor Operational:			
Shorted Door Switch			
Shorted Signal from the Radio Control			
Shorted			

	Activation 1 Door Travels Down (y/n)	Activation 2 Door Travels Down (y/n)	Time to Reverse (s)
Without External Entrapment Sensor Operational:			
Shorted Door Switch			
Shorted Signal from the Radio Control			

Shorted			
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**Supportive Reasoning:**

DASMA recommends that the drafted changes should be made to UL 325 to address the reversal requirements of operated doors when they start in a partially open position.

A significant reversal distance for a vertically moving garage door, as originally recommended in the July 19, 2002 proposed changes, raises a concern that hazards will be created while the door is moving up, and the proposed requirements would limit the control the homeowner has during that hazard.

The proposed changes are intended to address the following:

1. The reversal off an object must be allowed to happen. No actuation of controls should be able to stop the reversal until it is complete. Therefore, human intervention, or "panic" should be reduced while the door is in close proximity to the obstruction.
2. By implementing the requirements covered in item #1, there should be sufficient time to further reduce "panic" operations, or the user unintentionally stopping the door and starting the door back down again, before allowing the door to reverse off an obstruction.

UL325 Working Group – Partially Open Garage Doors  
Proposed Revisions to UL 325, 5<sup>th</sup> Edition  
March 4, 2003 DRAFT  
Compilation of Comments

Comments from Jim Murray, Wayne-Dalton Corporation:

Why for "Results, E" is "the first activation of a" added? At this time, there is no requirement nor proposal of any specific section changes to restrict the first activation from starting the door downward. I think we need the proposal(s) to change section(s) before we define the test(s). Once the section proposal is initiated, then I agree with the sentence.

Under "8, Re-Open Test, Results," I think the first item does not require the clause "the first activation of" since the sentence begins with "In each case" which requires a test of items A -D. Also, I do not believe that the second sentence is required, "In each case without the External..." The "Method" is the Obstruction Test repeated and the Obstruction tests states to test with and without external devices operational. Or, if the second sentence is required for a shorted radio signal, then sentence three is unclear, "In each case...". The correct answer for sentence three is questionable, since a radio signal should not start the door downward. The third sentence could be rewritten to "In each case with the door traveling downward, ..."

Comment from Larry Murphy, Genie:

Items 7 and 8:

We agree with the intent of the first paragraph labeled as 22.104 as we understand it. In this paragraph it is stated that "Drives shall not be provided with a control which renders the entrapment protection system inoperative." It is our belief that the intent of this paragraph is to preclude a person from overriding a set of non-blocked safety beams that may become blocked during the operation of the operator in its closing direction.

We would like to recommend that wording to the effect of, "whenever an operator is moving a door in the closing direction, a change in state of an external entrapment device from its unobstructed to obstructed state, regardless of condition of control input, will result in the operator initiating a reversal of the door."

This system could be tested by simply initiating a run of the operator in its closing direction and using the pendulum of section 35.3 Sensitivity Test to verify that even with constant pressure maintained on the push button, the operator still reverses.

It is also our belief that Note 2 has a greater risk of creating a safety issue than any that it would address and it is our recommendation that we continue to allow the first activation of the push button to override external entrapment devices.

It should also be noted that the statements made in 22.104 would also allow for the overriding of any entrapment system. It is our belief that the standard should not allow for the overriding of any inherent entrapment device.

March 4, 2003

**CPSC staff comments on the January 31, 2003 Proposed Revisions to UL 325 (Door, Drapery, Gate, Louver, and Window Operators and Systems) 5<sup>th</sup> Edition**

The following are CPSC staff comments and have not been reviewed or approved by the Commission.

**This comment applies to item 4**

As currently written, the door must be moving before checking any entrapment protection devices. It does not address incidents associated with stopped, partially open garage doors. In the incidents that we are trying to prevent, it appears that the photoelectric sensor beam was broken while the door was stopped, then the door operator was activated. CPSC staff recommends that the phrase “in the path of a downward moving door” be replaced with “underneath the door.”

CPSC staff also recommends there be no downward movement of the door when the secondary entrapment protection device detects any obstruction underneath the door. Therefore, CPSC staff recommends the following language:

34.1.6 An operator using an external secondary entrapment protection device upon detecting an obstruction ~~in the path of a downward moving~~ underneath the door shall ~~initiate reversal~~ not allow the door to move downward, and shall return the door to, and stop the door at the full upmost position.

**This comment applies to the operational verification test (item 6)**

It is not clear if the rigid, 1-inch high obstruction will accurately predict if the operator will remove the door “fully from the obstruction” if the obstruction is a human. Soft tissue provides some resilience and cushioning, therefore the forces will not go from high to zero as quickly as they would with a rigid, 1-inch high obstruction.

**IEC proposal (item 7)**

This should be reworded to match terms used in UL 325. As an example, where the IEC proposal uses the term “entrapment protection system,” the UL standard should use “secondary entrapment system” or “photoelectric sensor.” This would differentiate between the inherent and secondary entrapment systems. The inherent system should not be subject to override.

Also, CPSC Human Factors staff does not feel that this proposal will be an improvement as currently written. The proposal does not specify the behavior of the door upon the first activation. As written, staff assumes that the door will do nothing on the first activation, and then override the entrapment protection device on the second activation. Staff is concerned that this could cause consumers to crush the obstruction further. If the door does not move upon the first activation, foreseeable behavior will be to press the button with more authority – that is

press it longer and harder – causing the operator to override the entrapment protection and move the door down further. CPSC staff is concerned this proposal could worsen possible injuries.

CPSC staff recommends that the door should move in the upward direction before any manual override begins. The staff requests that the working group explore other methods that would prevent unintended override.