UL 1641

STANDARD FOR SAFETY

Installation and Classification of Residential Burglar Alarm Systems

UL Standard for Safety for Installation and Classification of Residential Burglar Alarm Systems, UL 1641

Fifth Edition, Dated January 26, 2015

Summary of Topics

This reaffirmation of ANSI/UL 1641 dated February 10, 2025 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The requirements are substantially in accordance with Proposal(s) on this subject dated December 20, 2024.

No Text on This Page

JANUARY 26, 2015
(Title Page Reprinted: February 10, 2025)

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UL 1641

Standard for Installation and Classification of Residential Burglar Alarm Systems

First Edition – April, 1983
Second Edition – April, 1989
Third Edition – September, 1994
Fourth Edition – February, 1999

Fifth Edition

January 26, 2015

This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through February 10, 2025.

The most recent designation of ANSI/UL 1641 as a Reaffirmed American National Standard (ANS) occurred on February 10, 2025. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 These requirements apply to the installation of alarm protection products and devices connected to form a residential burglar alarm system.

1.2 These requirements include the criteria for classifying the extent of alarm protection at an individual residence as either basic protection or expanded protection.

1.3 A residential burglar alarm system may or may not have a remote connection to a central station, proprietary station, residential monitoring station, or police station. If there is a remote connection, the signal receiving location shall comply with the requirements in the following standards, as applicable:

a) The Standard for Central-Station Alarm Services, UL 827;

b) The Standard for Proprietary Burglar Alarm Units and Systems, UL 1076; and

c) The Standard for Police Station Connected Burglar Alarm Units and Systems, UL 365.

1.4 Alarm systems covered by these requirements have a sounding device that may be mounted indoors or outdoors.

1.5 These systems comply with the requirements for Class 2 remote-control and signal circuits as defined by Article 725 of the National Electrical Code, NFPA 70. Systems using both fire and burglary protection operate as defined by Article 760 of the National Electrical Code, NFPA 70.

1.6 The requirements assume that standard telephone operating practices may be used for leased or other lines connecting to a police or central station as defined by Article 800 of the National Electrical Code, NFPA 70.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.5 Components of a residential alarm system shall comply with the requirements for those components, and shall not be modified before, during, or after installation into the system.

3 Units of Measurement

3.1 When a value for measurement is followed by a value in other units in parentheses, the first stated value is the requirement.

4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

5 Glossary

5.1 For the purpose of this standard the following definitions apply.

5.2 ALARM DETECTION – Equipment and wiring that is installed to provide electronic alarm detection within an alarm system.

5.3 AREA, INACCESSIBLE – An area in which people can not freely move about, such as crawl spaces and the like.

5.4 BOUNDARY, PHYSICAL – A barrier, such as a wall, ceiling, floor, partition, window, or door, that encloses the protected area.

5.5 COMBINATION SYSTEM – An alarm system that provides both burglary and fire detection. The alarm system may also provide additional supervisory circuits, such as medical alert, police call, basement flooding and the like.

5.6 CONTACT – A device installed on a movable opening complying with the Standard for Connectors and Switches for Use with Burglar-Alarm Systems, UL 634, and that initiates an alarm.

5.7 INTRUSION DETECTION DEVICE – An acoustic or shock type glass breakage detector, photoelectric beam, sound detector, vibration detector, or motion detector complying with the Standard for Intrusion-Detection Units, UL 639, designed to detect the penetration or attempted penetration of an intruder through the perimeter of the premise, or the presence, movement, sound or other activity of an intruder within the premise.

5.8 *Deleted*

5.9 MAINTENANCE – Repair service and inspections at prescribed intervals that are intended to keep the burglar alarm system and all installed equipment in a fully operative condition.

5.10 OPENING – A point at which entry can be gained through an aperture of manhole size without cutting or tearing down any part of the building structure. An opening can be fixed or movable.

5.11 OPENING, ACCESSIBLE – An opening that does not comply with the requirements for an inaccessible opening.

5.12 OPENING, INACCESSIBLE – An opening:

a) More than 12 feet (3.7 m) above either the ground or any projection from the same building, adjoining building or both;

b) More than 12 feet away from a directly or diagonally opposite window, fire escape, or roof; or

c) More than 3 feet (0.9 m) away from an opening, fire escape, fixed object, and the like, that is in or projecting from the same or adjacent wall and that leads to other premises. See Interpretations, General, Section 18.

5.13 OPENING, MANHOLE SIZE – An opening with a clear cross-section area of 96 square inches (619 cm^2) or more, and with the smallest dimension exceeding 6 inches (152 mm).

5.14 PROTECTION OF AN OPENING, COMPLETE – Alarm protection applied to a fixed or movable opening, plus contacts installed on a movable opening. A screen over an opening is considered complete protection of an opening. See also 15.4.1.

5.15 PROTECTION OF AN OPENING, PARTIAL – Contacts installed on a movable opening; or an intrusion detection device installed so as to detect entry through the opening. See also 15.4.1.

5.16 RESIDENCE – Any dwelling in which people reside.

5.17 RESIDENTIAL ALARM – A burglar alarm system used in a residence.

5.18 *Deleted*

5.19 SERVICE CENTER – A location that may be separate from the alarm service company's main business location providing installation, maintenance, and repair service to systems served by the company. The service center is to keep maintenance records for the systems that it serves unless the records can be accessed from another location.

5.20 SERVICE VEHICLE – A vehicle that is used to provide installation, maintenance, and repair service to systems served by the company.

5.21 SOUNDING DEVICE – An audible signal appliance used to signal unauthorized entry into a protected area.

5.22 *Deleted*

5.22A WINDOW SCREEN – A screen with the circuit wire secured to the mesh and frame, and complying with the Standard for Linings and Screens for Use with Burglar- Alarm Systems, UL 606.

5.23 *Deleted*

5.24 WIRING, INTERCONNECTING – Those conductors used to interconnect protective devices in a burglar alarm system.

6 Overall Requirements

6.1 The area protected by a residential alarm shall be provided with a complete physical boundary.

6.2 A sounding device is required, and if mounted outdoors it shall be in accordance with NFPA 70.

7 Control Units

7.1 A control unit used in a residential burglar alarm system shall comply with the control unit requirements in one or more of the following:

a) The Standard for Police Station Connected Burglar Alarm Units and Systems, UL 365;

b) The Standard for Local Burglar Alarm Units and Systems, UL 609;

c) The Standard for Household Burglar-Alarm System Units, UL 1023;

d) The Standard for Proprietary Burglar Alarm Units and Systems, UL 1076;

e) The Standard for Central-Station Burglar-Alarm Units, UL 1610;

f) The Standard for Digital Alarm Communicator System Units, UL 1635; or

g) The Control Panel Standard-Features for False Alarm Reduction, SIA CP-01.

EXTENT OF PROTECTION FOR RESIDENTIAL ALARMS

8 General

8.1 Details

8.1.1 An individual alarm system protecting an entire residence or a portion thereof shall be identified as expanded or basic (see 8.2.1 and 8.3.1). The alarm system may or may not include fire or supervisory alarm protection.

8.1.2 The fire protection portion of a combination system shall comply with the requirements of Chapter 29 of the National Fire Alarm and Signaling Code, NFPA 72.

8.2 Basic protection

8.2.1 Basic protection shall consist of:

a) Contacts on all movable accessible openings; or

b) Contacts on all accessible exterior doors and:

1) A motion detection device in one or more selected areas;

2) A photoelectric beam or motion detector across one or more hallways, stairways, rooms, or the like;

3) A floor mat in one or more selected areas, such as a hallway, stairway, room entrance, and the like; or

4) A contact on one or more interior doors leading from one area of the residence to another.

8.3 Expanded protection

8.3.1 Complete protection shall be applied to all accessible openings. In addition, partial protection shall be applied to one or more interior doors of selected areas, such as the master bedroom, dining room, or library. Complete protection shall consist of:

a) Contacts;

b) Contacts plus an intrusion detection device; or

c) Contacts and floor mats (see 14.3).

9 Wiring

9.1 General

9.1.1 Interconnecting wiring shall not be smaller than 24 AWG (0.20 mm^2) copper wire and shall comply with the applicable requirements specified for burglar alarm wires, cables, or limited energy fire detector cable in the Standard for Thermoset-Insulated Wires and Cables, UL 44, or in the Standard for Thermoplastic-Insulated Wires and Cables, UL 83.

9.1.2 The size of interconnecting wiring between a battery or power supply and a sounding device shall be within the limits as specified in Table 9.1, or of a size or a length, or both, that permits equivalent operation of the sounding device.

Table 9.1
Wire size for a sounding device

Wire size		Maximum wire length	
AWG	(mm^2)	feet	(m)
16	(1.3)	100	(30.5)
18	(0.82)	60	(18.3)
20	(0.52)	40	(12.2)
22	(0.32)	20	(6.1)

9.2 Running and fastening

9.2.1 Interconnecting wiring shall be located where it will be least subject to damage. A wire routed over a sharp corner or projection shall be protected from abrasion by two layers of electrical tape or that which has been determined to be the equivalent.

9.2.2 Interconnecting wiring shall be attached to plaster or wood by staples, insulating knobs, drive rings, wire ties, or that which has been determined to be the equivalent. A wire shall be attached to a masonry surface by expansion bolts, fiber plugs and eyelets, drive rings, or that which has been determined to be the equivalent.

9.2.3 Staples or brads shall be spaced not more than 2 feet (610 mm) apart on wood or plaster, except that a wire resting on the top of a molding, cabinet, and the like, may be stapled at intervals of 4 feet (1.2 m) or less.

Exception: Inaccessible areas are not required to comply with these requirements.

9.3 Splices and connections

9.3.1 A conductor shall be spliced or joined with a splicing device determined to be acceptable for this purpose. A splice intended to be soldered shall be spliced or joined to be mechanically and electrically secured before being soldered. All splices and joints shall be covered with an insulation that has been tested and determined to be the equivalent to that of the conductors or with not less than two layers of electrical tape. A splice located in an area subjected to dampness shall be treated with a sealant that has been determined to be acceptable or treated in a manner that been determined to be the equivalent.

9.3.2 A wire secured to a terminal by upturned lugs or washers does not require soldering.

9.4 Connectors

9.4.1 A connector intended to carry a circuit onto a movable opening shall comply with the Standard for Connectors and Switches for Use with Burglar-Alarm Systems, UL 634.

9.5 Entrance to building and remote areas

9.5.1 Entrance of an overhead outside wire shall be as inaccessible as is practical. A wire passing through a wall shall have an insulating bushing, conduit, or electrical metallic tubing slanting upward from the outside. However, if slanting is not possible, a drip loop shall be used. Conduit shall be equipped with a service head.

9.5.2 Interconnecting wiring carried to a separate building, garage, or storeroom, or to another floor outside the residence, may be overhead or underground.

10 Windows

10.1 Contacts shall be installed so that a window cannot be opened more than 6 inches (152 mm) without initiating an alarm. The contacts and their wiring shall be protected from circumvention.

10.2 *Deleted*

10.3 *Deleted*

10.4 *Deleted*

10.5 *Deleted*

10.6 *Deleted*

10.7 *Deleted*

10.8 *Deleted*

10.9 Glazing complying with the Standard for Burglary Resisting Glazing Material, UL 972, does not require protection.

10.10 Glazing material of heat-treated or tempered glass may be protected by a single strip of foil that is extended the full length across the top, and spaced at least 6 inches (152 mm) from the nearest edge of the foil to the nearest edge of the glazing material frame.

10.11 *Deleted*

10.12 A window may be protected by an intrusion detection device that shall comply with the Standard for Intrusion-Detection Units, UL 639.

10.13 A window having an opening less than manhole size but large enough to provide access to its contacts, shall have the contacts and their wiring protected against circumvention.

11 Doors and Other Openings

11.1 A door and other opening shall be protected as specified in 11.2 – 11.11, depending on the construction and material of the door or opening.

11.2 Contacts shall be installed so that a door or other movable opening cannot be moved to create an opening of more than 2 inches (51 mm) without initiating an alarm.

Exception: If the contacts and their wiring are protected from circumvention, they may be installed so that the door can be opened 6 inches (152 mm) without initiating an alarm.

11.3 A double door shall have contacts on each door or be protected in a manner that has been determined to be the equivalent.

11.4 *Deleted*

11.5 *Deleted*

11.6 *Deleted*

11.7 *Deleted*

11.8 A door or other opening having an opening less than manhole size but large enough to provide access to its contacts, shall have the contacts and their wiring protected against circumvention.

11.9 Fully framed heat-treated or tempered glass doors may be protected by contacts and a closed-circuit loop of foil across the top of the glass. The spacing of the foil from the top and sides of the frame shall comply with the requirements in 10.10.

11.10 For complete protection, a metal door, a metal sheathed door, or a solid wood door not less than 1-1/2 inches (38 mm) thick may be protected by means of contacts only.

11.11 A glass or removable panel installed in a door of the type described in 11.10 shall have complete protection.

11.12 A door or other opening may be protected by an intrusion detection device.

12 Air Conditioners, Exhaust Fans, and Similar Units

12.1 For complete protection, an exhaust fan or similar device whose removal will create a manhole size opening shall be electrically trapped to the building structure at two or more opposite points by traps or contacts. A room type air conditioner may have a trap or contact at a single point.

12.2 If the removal of an air conditioning unit, exhaust fan, or their internal mechanism, creates a manhole size opening, the movable section shall be trapped to the building structure.

13 Screens

13.1 A screen used to protect an opening shall comply with the Standard for Linings and Screens for Use with Burglar-Alarm Systems, UL 606.

13.2 A screen shall be installed so that it is trapped against removal on all four corners of the screen and it shall be electronically supervised.

14 Floor Mats

14.1 A floor mat shall be located under a carpet or rug, or otherwise concealed, and shall comply with the Standard for Connectors and Switches for Use with Burglar-Alarm Systems, UL 634.

14.2 A floor mat used in place of a contact for partial protection of an opening shall be as wide as the opening(s) and extend 30 inches (762 mm) from the opening.

14.3 A floor mat used in conjunction with a contact to provide complete protection of an opening shall extend 30 inches (762 mm) to each side of the opening or to a vertical barrier (such as a wall, partition, or the like), and 36 inches (914 mm) from the front or the back of the opening.

15 Intrusion Detection Devices

15.1 General

15.1.1 Intrusion detection devices used in combination with contacts to provide expanded or basic protection shall comply with the Standard for Intrusion-Detection Units, UL 639.

15.1.2 An intrusion detection device shall be installed so that it will not be influenced by movement or other interference outside the protected area.

15.2 Photoelectric units

15.2.1 A photoelectric unit used in conjunction with contacts for complete protection of an opening shall be installed so that the beam:

a) Spans the opening at not less than 18 inches (457 mm) nor more than 48 inches (1219 mm) above the floor; and

b) Is located horizontally not more than 24 inches (610 mm) from the opening.

15.3 Motion detection units

15.3.1 A motion detection unit shall respond, within four steps, to a person walking through the covered area at the rate of one 24-inch (610-mm) step per second.

15.4 Sound and vibration units

15.4.1 If a sound or vibration unit is used to protect an opening, the opening, if movable, shall also be protected by a contact.

16 Shunts

16.1 Contacts or intrusion detection devices may be shunted by an on/off switch to permit portions of the alarm to be deactivated while the occupant is at home to allow freedom of movement.

16.2 To permit exit or entry when the system has been activated, the alarm protection may be temporarily shunted by means of a key- or code-operated device or a timer.

16.3 The removal of a key- or code-operated shunted device located outside of the protected area shall initiate an alarm.

17 Control Unit

17.1 The residential control unit shall be located within the protected area.

INTERPRETATIONS

18 General

18.1 An opening 12 feet (3.7 m) or less above a roof or any accessible horizontal supporting surface is accessible if this supporting surface is at least 4 feet (1.2 m) wide.

18.2 If an opening or ledge is separated from a second opening or ledge by a distance of 12 feet (3.7 m) or less, and the second opening or ledge is accessible, the original opening or ledge is also considered accessible under the following conditions:

a) A line between openings or ledges in adjacent walls on the same floor level forms a 45-degree angle with each wall (see Figure 18.1);

b) A line between openings or ledges in opposite walls but on the same floor level forms an angle of 90 degrees, consisting of 45 degrees to the left and 45 degrees to the right (see Figure 18.2);

c) A line between openings or ledges in opposite walls that are directly above or below one another forms a 150-degree angle, consisting of 75 degrees above and 75 degrees below (see Figure 18.3); and

d) Openings on the same wall above a ledge that is between 3 feet and 3 feet, 11 inches (0.9 and 1.2 m) wide (see Figure 18.4).

18.3 Openings on the same wall are accessible from a ledge that is not less than 1 foot (0.3 m) nor more than 3-1/2 feet (1.1 m) wide, if the width of the ledge is at least one-fourth the vertical distance to the opening (see Figure 18.4).

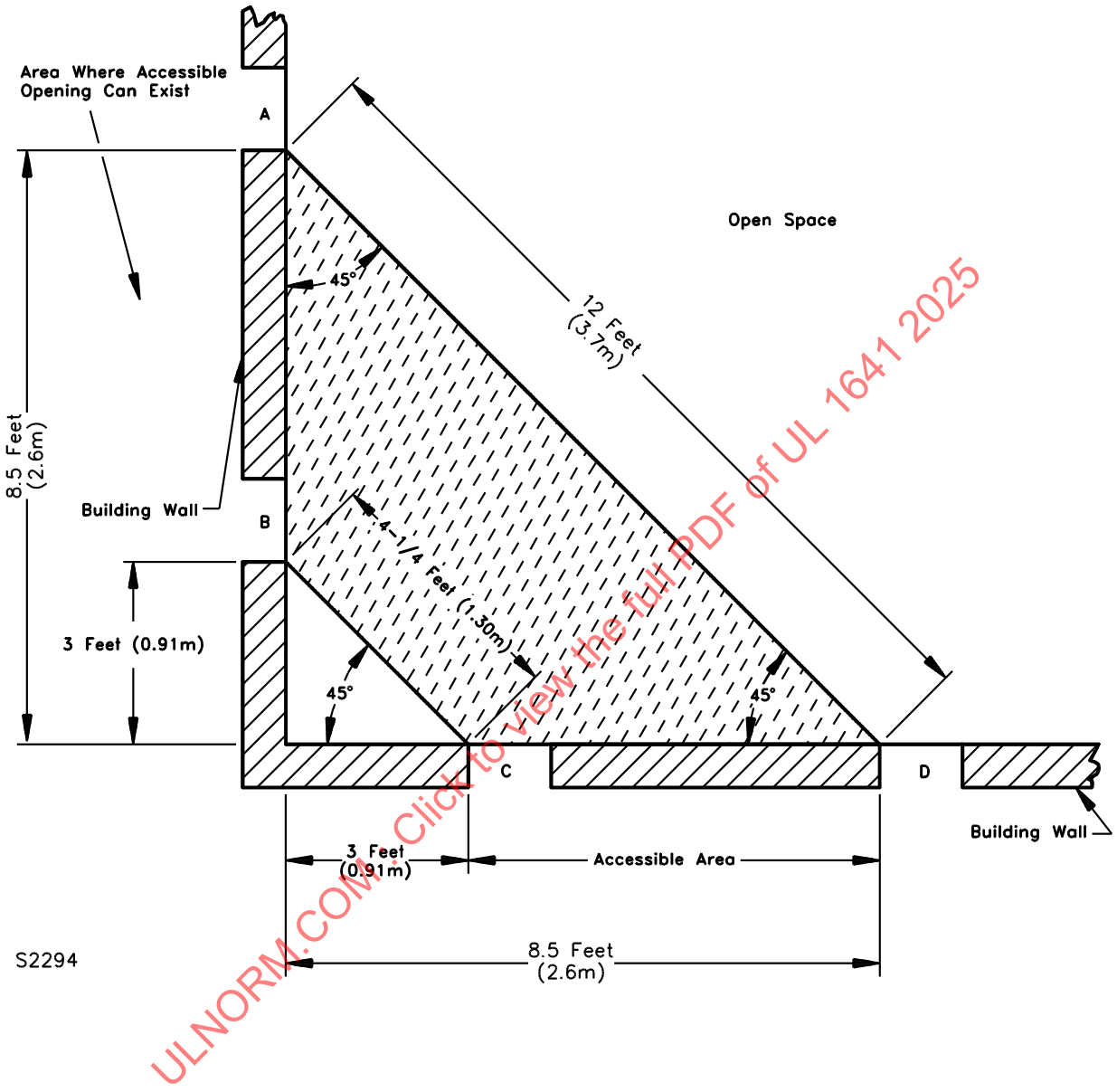
18.4 Any opening or ledge within 3 feet (0.9 m) of another opening or ledge is accessible regardless of the angle or direction between them, except for openings or ledges in the same wall and below (see Figure 18.5).

18.5 Openings along a ledge that is not less than 4 inches (102 mm) nor more than 12 inches (305 mm) wide are accessible only if there are handholds in the wall above the ledge that are spaced at intervals of 3 feet (0.9 m) or less. Noncontinuous footholds similar to a ledge are considered as providing accessibility only if they occur at intervals of 3 feet or less, and if there are also handholds in the wall.

18.6 If the pitch of a roof is 45 degrees or less, openings above the roof line are accessible if the roof is at least 2 feet (610 mm) wide and the roof is accessible.

Figure 18.1

Accessibility of openings from adjacent wall on same level



TOP VIEW

NOTES

1 Opening B is accessible from opening C.

2 Opening A is accessible from opening D.

3 Opening B is not accessible from opening D because the angle formed with the building wall is not 45°.

4 Opening A is not accessible from opening C because the angle formed with the building wall is not 45°.

Figure 18.2

Accessibility of openings from opposite wall on same floor level

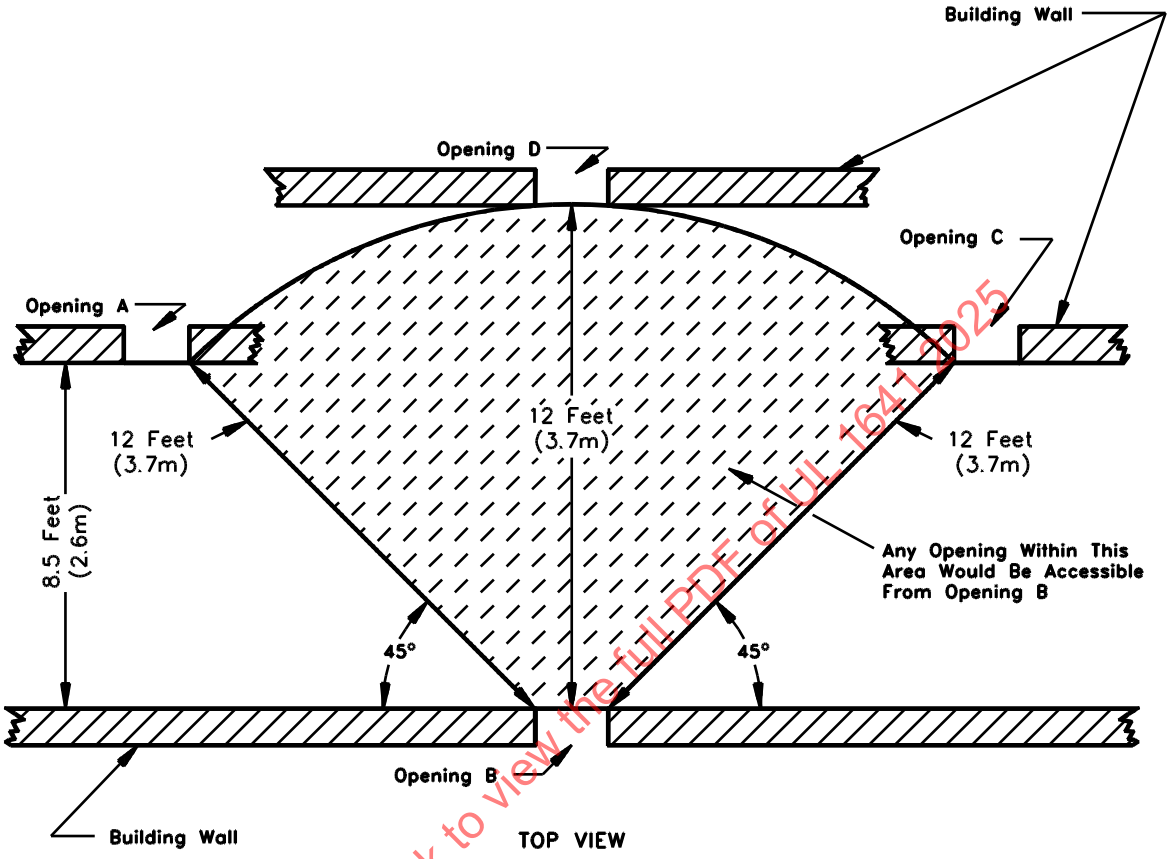


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Figure 18.3

Accessibility of openings from opposite wall