UL 681

STANDARD FOR SAFETY

Installation and Classification of Burglar and Holdup Alarm Systems

UL Standard for Safety for Installation and Classification of Burglar and Holdup Alarm Systems, UL 681

Fifteenth Edition, Dated January 16, 2014

Summary of Topics

This revision of ANSI/UL 681 dated January 15, 2021 is to Unify Nomenclature and Correct Cellular DACT References; 1.8, 2.2.1, 2.2.6, Table 19.1, Table 19.2, Figure 19.4, Figure 19.5, 19.3.1.9, 19.3.2.1, Appendix A

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

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated July 17, 2020 and October 30, 2020.

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UL 681

Standard for Installation and Classification of Burglar and Holdup Alarm Systems

The first through the sixth editions were titled Installation, Classification, and Certification of Burglar-Alarm Systems. The seventh through the eleventh editions were titled Installation and Classification of Mercantile and Bank Burglar-Alarm Systems.

Twelfth Edition – June, 1994
Thirteenth Edition – February, 1999
Fourteenth Edition – January, 2014

Fifteenth Edition

January 16, 2014

This ANSI/UL Standard for Safety consists of the Fifteenth Edition including revisions through January 15, 2021.

The most recent designation of ANSI/UL 681 as an American National Standard (ANSI) occurred on December 17, 2020. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page. Any other portions of this ANSI/UL standard that were not processed in accordance with ANSI/UL requirements are noted at the beginning of the impacted sections.

The Department of Defense (DoD) has adopted UL 681 on January 2, 1992. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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 https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 These requirements provide criteria for the installation of protective wiring and devices for burglar alarm systems covering premises, stockrooms, alarmed areas, safes, vaults, night depositories, automated teller machines, and other security containers. The amount of alarm protection installed in a system is designated as the extent of protection.

1.2 Burglar-alarm systems are classified by type of system. The types of systems covered by these requirements include central station, mercantile, bank, proprietary, and national industrial security systems. Requirements for residential burglar alarm systems are covered in the Standard for Installation and Classification of Residential Burglar Alarm Systems, UL 1641.

1.3 These requirements also cover the installation of holdup alarm initiating devices used to send holdup or duress signals to an off premises location.

1.4 These systems employ Class 2 remote-control and signal circuits as defined by Article 725 of the National Electrical Code, ANSI/NFPA 70.

1.5 The requirements assume that standard communication industry operating practices are acceptable for leased or other lines connecting to a police or central station as defined by Article 800 of the National Electrical Code, ANSI/NFPA 70.

1.6 A central station burglar alarm system shall transmit signals to a central station operated by the alarm service company and complying with the Standard for Central-Station Alarm Services, UL 827.

1.7 A bank or mercantile burglar alarm system that provides signal transmission to a remote location shall transmit the signals to:

a) The dispatch location of the law enforcement agency having jurisdiction over the protected property; or

b) A central station or residential monitoring station complying with the Standard for Central-Station Alarm Services, UL 827.

When signals from a bank or mercantile burglar alarm system are monitored in a remote location the alarm service company and an authorized representative of the protected property shall agree to the signals that are monitored, and the actions that are taken. The alarm service company shall notify the monitoring station of the agreed upon signals and the actions.

1.8 A proprietary burglar alarm system shall transmit signals to a proprietary central supervising station operated by personnel responsible to the owner of the protected property and complying with the Standard for Proprietary Burglar Alarm Units and Systems, UL 1076, or the Standard for Commercial Premises Security Alarm Units and Systems, UL 2610.

1.9 A national industrial security system shall transmit signals to:

a) A monitoring station operated by a government contractor and complying with the Standard for National Industrial Security Systems, UL 2050; or

b) A central station or residential monitoring station complying with the Standard for Central-Station Alarm Services, UL 827; or

c) The dispatch location of the law enforcement agency having jurisdiction over the protected property.

1.10 An alarm service that is new or different from that covered in this standard shall be evaluated using the appropriate additional service requirements to determine that the level of safety as originally anticipated by the intent of this Standard is maintained. A service that conflicts with the specific service provisions in this standard shall not be judged to comply with this standard. Where appropriate, the revision of service requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

2 General

2.1 Units of measurement

2.1.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.2 Components

2.2.1 All detection devices, including floor traps, intrusion detection devices, holdup alarm initiating stations, and similar devices; power supplies, relays, sounding devices (alarm, trouble, warning), cellular telephone communicator units, code transmitters, digital alarm communicator transmitters, Private Radio (one-way) and Private Radio System (Two-way) units, and other auxiliary devices; interconnecting wire; and protective wiring in excess of that which is required shall be equivalent to devices and material required for the application.

2.2.2 The requirement specified in 2.2.1 applies to the protection of a separate building area or floor outside of the premise covered and to additional protection within the premises that is in excess of the protection required. Such protection shall be connected in the circuit so that shunting or tampering will not defeat the protection of the primary area.

2.2.3 Equipment used in a burglar-alarm system shall comply with the requirements for that product and shall not be modified before, during, or after installation into the system.

2.2.4 To permit entry into or exit from alarmed areas protected by mercantile systems, a timer or shunting device may be employed. See 19.2.6 and 19.2.8.

2.2.5 Each burglar alarm system shall be provided with a complete physical boundary. See 3.7.

2.2.6 Communication Cloud quality, reliability and infrastructure are not evaluated by this standard.

2.3 System stability

2.3.1 Alarm systems shall be designed, installed, and operated in such a manner to minimize the likelihood the system will send unintended signals, such as alarms that are not caused by burglaries, attempted burglaries or vandalism.

2.3.2 The area in which an alarm system is to be installed or areas in which additions and revisions to an existing alarm system are to be made shall be examined to identify environmental factors and housekeeping issues that will have an impact on the stability and operation of the alarm system. The selection of equipment, loading of zones, and the method or methods of protection employed and placement of devices shall be based on this assessment.

2.3.3 The manufacturer's instructions for each control unit, transmitter, sensor, device and component that is used to form the alarm system shall be followed for the mounting, placement, wiring, adjustment and maintenance.

2.3.4 Personnel at the protected property that are authorized to arm and disarm the alarm system shall be trained in this process by either a qualified representative of the alarm service company or by a representative of the protected property that has been trained by the alarm service company.

2.4 Undated references

2.4.1 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.

3 Glossary

3.1 For the purpose of this standard, the following definitions apply.

3.2 ALARMED AREA – A vault, closed area, or container on which an alarm system is installed.

3.3 ALARM SOUNDING DEVICE – An audible signal appliance (bell, horn, siren, or speaker) that is used to signal unauthorized entry into a protected area and which complies with the requirements for an alarm sounding device in the Standard for Police Station Connected Burglar Alarm Units and Systems, UL 365, or the Standard for Audible Signal Appliances, UL 464 or the Standard for Local Burglar Alarm Units and Systems, UL 609.

3.4 ALARM SOUNDING DEVICE HOUSING – A housing, or an equivalent enclosure, that complies with the applicable requirements in the Standard for Police Station Connected Burglar Alarm Units and Systems, UL 365 and is used to provide attack resistance for an alarm sounding device that is mounted outside of the area that is protected by an alarm system. See ALARM SOUNDING DEVICES, General, Section 20.

3.5 APPROVED GSA CONTAINER – A security container that conforms to federal specifications and bears a GSA "Test Certification Label" attesting to the security capabilities of the container and integral combination lock.

3.6 APPROVED VAULT – An assembly of brick, concrete, tile or other masonry material which has been constructed in accordance with the construction requirements in "National Industrial Security Program Operating Manual (NISPOM)" DoD 5220.22-M. This vault must also have a GSA approved door, frame and combination lock.

3.7 AUTOMATED TELLER MACHINE (ATM) – An unattended machine available to the public that will dispense cash, and may also accept deposits or perform other banking functions, or both, when accessed by an authorized user. The cash and deposits are protected by a security container.

3.8 BOUNDARY, PHYSICAL – A barrier such as a wall, ceiling, floor, partition, window, wire and mesh screening (5.3.1) or door enclosing an alarm system. An opening that is covered with protective wiring such as an alarm screen is also considered to have a physical boundary.

3.9 CABLE, ELECTRICALLY PROTECTED – Installation wiring that is encased within two shields composed of conductive foil or braided wire, one of which is connected to the positive and the other of which is connected to the negative polarities of the protection circuit.

3.10 CABLE, EMBEDDED – Protective wiring installed in a monolithic concrete, or equivalent, structure at the time of construction.

3.11 CIRCUIT, DOUBLE – Protective wiring of opposite polarities, applied and arranged "one and three" or "one and four." In the "one and three" arrangement, alternate protective conductors are of opposite polarity; in the "one and four" arrangement, the first and fourth conductors are one polarity and the second and third are the other.

3.12 CIRCUIT, SINGLE – Protective wiring of a single polarity.

3.13 CLOSED AREA – An enclosed area meeting the construction requirement in the "National Industrial Security Program Operating Manual (NISPOM)" DoD 5220.22-M.

3.14 COMMUNICATION CLOUD – The area in the communication path that is supported by providers of communication services in which signals travel between a protected property and a monitoring station. Depending on the type of transmission that is used, signals may travel on a single defined route or through various routes depending on what is available when the signal is initiated. See Table 19.1.

3.15 CONNECTOR – A device installed in a burglar alarm system that is intended to join various parts of protective circuit devices and installation wiring and which complies with the Standard for Connectors and Switches for Use with Burglar-Alarm Systems, UL 634.

3.16 CONNECTOR, FLEXIBLE – A device that is designed to extend installation wiring on to a movable opening such as a door, roof hatch, window and the like, and which complies with the Standard for Connectors and Switches for Use with Burglar-Alarm Systems, UL 634.

3.17 CONTACT – A device complying with the Standard for Connectors and Switches for Use with Burglar-Alarm Systems, UL 634 that is installed on a movable opening and that, when actuated, initiates an alarm condition. See 3.50.

3.18 GROOVED STRIPPING – Wooden strips grooved to accept fine wire, secured to a surface or across an opening to be protected.

3.19 INTRUSION DETECTOR – One or more unit assemblies of electrical components that are intended to detect the presence, movement, sound, or other activity of an intruder.

3.20 LACING – A circuit of fine wire or foil applied to a door or similar surface in continuous parallel strips, a maximum of 4-in (102-mm) center to center and mechanically protected by covering.

3.21 LINE SECURITY, ALTERNATE PRIMARY – A method of activating one or more signal paths to maintain the same level of supervision without interruption.

3.22 LINE SECURITY, STANDARD AND ENCRYPTION – Methods of supervising the communication path used to transmit signals between the alarm system and a remote monitoring location. This supervision serves to detect compromise attempts on the communication path that are intended to prevent signals indicating entry into the protected area or object from being received by the monitoring location.

3.23 MAINTENANCE – Required inspections and tests at prescribed intervals that are performed to keep the burglar alarm system and all installed equipment in a fully operative condition. See 3.38 and COMMISSIONING, SERVICE AND MAINTENANCE, General, Section 22.

3.24 MOTION DETECTOR – A special form of an intrusion detection device that is intended to detect the movement of an intruder (see Section 7).

3.25 NIGHT DEPOSITORY OR NIGHT SAFE – A safe located within a building and connected by a metal chute or equivalent to a depository head on the outside of the building wall to permit deposits after hours. See 3.36.

3.26 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 and may singly or in combination be nailed, bolted, screwed, welded, barred shut, or boarded-over. When secured by screws, the screws shall be nonremovable. See 5.1 – 5.4.

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

3.28 OPENING, INACCESSIBLE – An opening:

a) More than 18 feet (5.5 m) above either the ground or the roof of an adjoining building;

b) More than 14 feet (4.3 m) from a directly or diagonally opposite window, fire escape, or roof; or

c) More than 3 feet (0.9 m) from an opening, fire escape, ladder, and the like, that is in or projecting from the same or adjacent wall and leads to other premises. See Figure 5.1 – Figure 5.5.

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

3.30 POLLING DATA LOOPS – An installation wiring circuit in which each device or component of an alarm system that is attached to the loop is polled to verify the continuity of the circuit.

3.31 PREMISES – Any building or part of a building that has a complete physical boundary. Examples of premises include stores, banks, offices, manufacturing facilities, warehouses, lofts, and stockrooms, and similar locations, used for the storage, manufacturing, sale, or handling of merchandise, valuables, and the like.

3.32 PROTECTION, CONTACT – Contacts installed on a movable opening.

3.33 PROTECTION, FULL – Protective wiring or intrusion detection units installed to protect an opening (fixed or movable), a wall, a floor, a ceiling, or surface. A movable opening shall include the installation of contacts.

3.34 PROXIMITY DETECTOR – A device that utilizes mutual capacitance between an object, itself and an intruder so that persons approaching the object will be detected.

3.35 ROOF HATCH – A covered and secured opening that allows access to the roof of a building. May be secured by a thermal link that will open the hatch in the event of a fire and allow the venting of smoke and heat.

3.36 SAFE – An iron or steel, or equivalent, container that has its door(s) equipped with a combination lock.

3.37 SCREEN – A fully framed assembly of grooved-wood dowels having fine wire secured in the grooves. Polymeric material or insect screening may be used to support the fine wire and polymeric or metal may be used for the frame and cross members. The entire assembly shall comply with the Standard for Linings and Screens for Use with Burglar-Alarm Systems, UL 606.

3.38 SERVICE – Repair work initiated at the request of the user of the system or in response to the receipt of an alarm or trouble signal. See COMMISSIONING, SERVICE AND MAINTENANCE, General, Section 22.

3.39 SERVICE CENTER – A location that may be separate from the alarm service company's main business location providing alarm investigator (where required), installation, maintenance, and repair service to systems served by the company. If keys for protected premises are required, they are retained at the service center. The service center is to keep maintenance records for the systems that it serves unless the records can be accessed from another location.

3.40 SERVICE PERSON – A person (s) from an alarm service company that provides service and maintenance for the alarm equipment that forms an alarm system.

3.41 SERVICE TERRITORY – A geographic area, that is measured by driving time in a road based vehicle, within which a service center provides alarm investigator (where required), installation, maintenance, and repair service to systems served by the alarm service company (see 22.4.6).

3.42 SERVICE VEHICLE – A vehicle used to provide alarm investigator (where required), installation, maintenance, and repair service to systems served by the company.

3.43 SHOWCASE WINDOW – A structure of clear glass or other glazing material, such as plastic, acrylic, polycarbonate, and the like that forms a part of the perimeter of the premises and is used to display or store merchandise or other material.

3.44 SHOW WINDOW – A fixed window constructed of clear or opaque glass or other glazing material, such as plastic, acrylic, polycarbonate, and the like.

3.45 SIGNAL PATH, SINGLE – Signals from a protected property to a remote monitoring location are sent by a single transmission technique and pass through a single demarcation point as they leave the protected property.

3.46 SIGNAL PATH, DUAL – Signals from a protected property to a remote monitoring location are sent by different transmission technique, which pass through separate demarcation points as they leave the protected property.

3.47 STOCK CABINET – A fully enclosed container that is used for the display or storage of materials, goods, records, or the like.

3.48 STOCKROOM – A room with a complete physical boundary that is used for the storage of materials, goods, records, or the like.

3.49 STREET OR HIGHWAY, PUBLIC – A road that is accessible by the public for vehicular traffic.

3.50 SWITCH (CONTACT) – A device complying with the Standard for Connectors and Switches for Use with Burglar-Alarm Systems, UL 634, and which is intended for use in protective circuits to supervise doors, windows, hatches, vents, trapdoors, and the like to initiate an alarm condition when activated. A switch is usually referred to as a contact. See 3.17.

3.51 TRANSOM – A fixed or movable window constructed of glazing material, either transparent, translucent, or opaque, mounted in a frame and located immediately above a door or show window.

3.52 TRAP – A conductor or device fastened between a building structure and a screen, stripping, foiled or wired panel, fan, removable air conditioner or heating unit, or similar device so that the two cannot be separated without initiating an alarm.