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**Underwriters Laboratories Inc.®**A not-for-profit organization dedicated to public safety
and committed to quality service**May 1, 1995****Revision pages for****Standard for****Antitheft Alarms and Devices****UL 1037, Fourth Edition**

Attached to this transmittal notice is a revision of the fourth edition of UL 1037.

A CHANGE ON A PAGE DATED MAY 1, 1995 IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM, PRECEDED AND FOLLOWED BY AN ASTERISK.

THESE REVISED REQUIREMENTS ARE NOW IN EFFECT.

Attention is directed to the note on the title page of this standard outlining the procedure to be followed to retain the approved text of ANSI/UL 1037-1994.

Revised and/or additional pages may be issued from time to time.

With the inclusion of the accompanying material, the standard consists of pages dated as shown in the following checklist:

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1	July 26, 1994 (Reprinted January 19, 1995)
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3 – 6	July 26, 1994
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61 – 79, A1	July 26, 1994

53 Residential Security Container

53.1 Locks

53.1.1 A residential security container as defined in 3.7 shall be provided with a combination lock complying with the requirements for combination locks, UL 768, for Group 3, 2, 1, or 1R; with a key lock complying with the requirements for key locks, UL 437, for locking cylinders or two-key locks; or with other means that have been determined to be the equivalent.

53.1.1 revised May 1, 1995



Underwriters Laboratories Inc.®

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January 19, 1995

Revision pages for

Standard for

Antitheft Alarms and Devices

UL 1037, Fourth Edition

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A CHANGE ON A PAGE DATED JANUARY 19, 1995 IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM, PRECEDED AND FOLLOWED BY AN ASTERISK.

THESE NEW AND REVISED REQUIREMENTS ARE NOW IN EFFECT.

The new and revised requirements are substantially in accordance with UL's bulletin on Subjects 291 (294, 365, 603, 609, 634, 639, 680, 752, 771, 983, 1023, 1034, 1037, 1076, 1610, 1635) dated February 24, 1994. The bulletin is now obsolete and may be discarded.

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Documents

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UL 1037

Standard for

Antitheft Alarms and Devices

First Edition – July, 1974
Second Edition – June, 1981
Third Edition – December, 1988

Fourth Edition

July 26, 1994

Approval as an American National Standard (ANSI) covers the numbered paragraphs on pages dated July 26, 1994. These pages should not be discarded when revised or additional pages are issued if it is desired to retain the ANSI approved text.

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

Approved as ANSI SE2.12-1975, January 31, 1975
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Approved as ANSI/UL 1037-1994, March 15, 1994

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 published set of revision pages.

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11.5 If a knot in a flexible cord serves as strain relief, a surface against which the knot may bear or with which it may come in contact shall be free from projections, sharp edges, burrs, fins, and the like, which may cause abrasion of the insulation on the conductors.

11.6 Clamps of any material (metal or otherwise) may be used on cords and supply leads without varnished-cloth insulating tubing, or that which is determined to be equivalent, unless the tubing, or that which is determined to be equivalent, is necessary to prevent the clamp from damaging the cord or supply leads.

11.7 The supply cord or supply leads shall not be capable of being pushed into the unit through the cord-entry hole if such displacement is likely to:

- a) Subject the cord or supply leads to mechanical damage or to exposure to a temperature higher than that for which the cord or supply leads are rated,
- b) Reduce spacings (such as to a metal strain-relief clamp) below the minimum values, or
- c) Damage internal connections or components.

12 Permanently Connected Products

12.1 General

12.1.1 A fixed product shall have provision for connection of one of the wiring systems that would be acceptable for it, in accordance with the National Electrical Code, ANSI/NFPA 70-1987.

12.1.2 A knockout provided for connection of a field-wiring system to a field-wiring compartment shall accommodate conduit of the trade size determined as specified in Table 12.1.

Table 12.1
Trade size of conduit, inches (mm OD)

Wire size, AWG (mm ²)		Number of wires									
		2		3		4		5		6	
14	2.1	1/2	21.3	1/2	21.3	1/2	21.3	1/2	21.3	1/2	21.3
12	3.3	1/2	21.3	1/2	21.3	1/2	21.3	3/4	26.7	3/4	26.7
10	5.3	1/2	21.3	1/2	21.3	1/2	21.3	3/4	26.7	3/4	26.7
8	8.4	3/4	26.7	1	33.4	1	33.4	1	33.4	1-1/4	42.3
6	13.3	3/4	26.7	1	33.4	1	33.4	1-1/4	42.3	1-1/4	42.3

NOTE — This table is based on the assumption that all conductors will be of the same size and there will be not more than six conductors in the conduit. If more than six conductors will be involved or if all of them are not of the same size, the internal cross-sectional area of the smallest conduit that may be used is determined by multiplying by 2.5 the total cross-sectional area of the wires, based on the cross-sectional area of Type THW wire.

12.1.3 The location of a terminal box or compartment in which power supply connections are to be made shall permit the connections to be accessible without removal of parts other than a service cover or panel and the cover of the outlet box or compartment in which the connections are made.

12.1.4 A terminal compartment intended for the connection of a supply raceway shall be secured in position and shall be prevented from turning.

12.1.5 The product shall be provided with field-wiring terminals or leads for the connection of conductors having an ampacity not less than that required by the product. It is assumed that branch circuit conductors rated 60°C (140°F) will be used.

12.2 Field wiring terminals

12.2.1 General application

12.2.1.1 As specified in these requirements, field-wiring terminals are those terminals to which power supply (including equipment grounding) or control connections would be made in the field when the product is installed as intended.

12.2.1.1.1 A field wiring terminal shall comply with the requirements in:

- a) 12.2.1.3 – 12.2.1.7; or
- b) The field wiring requirements in the requirements for electrical quick-connect terminals, UL 310; or
- c) The Standard for Wire Connectors and Soldering Lugs for Use With Copper Conductors, UL 486A; or
- d) The Standard for Equipment Wiring Terminals for Use With Aluminum and/or Copper Conductors, UL 486E; or
- e) The field wiring requirements (Code 2) in the requirements for terminal blocks, UL 1059.

The current-carrying parts shall be silver, copper, a copper alloy, or a similar nonferrous conductive material. Securing screws and the like may be plated steel. Equipment provided with quick-connect terminals intended for field termination of electrical conductors to the equipment and complying with the requirements for electrical quick-connect terminals, UL 310, shall be provided with strain relief and the installation instructions shall include instructions for effecting the strain relief and include reference to the specific connectors to be used.

12.2.1.1.1 added January 19, 1995

12.2.1.2 A field-wiring terminal shall be prevented from turning or shifting in position. This may be accomplished by means such as two screws or rivets; by square shoulders or mortices; by a dowel pin, lug, or offset; or by a connecting strap or clip fitted into an adjacent part. Friction between surfaces shall not be used for preventing movement of the terminals.

12.2.1.3 Nonferrous soldering lugs or solderless (pressure) wire connectors shall be used for No. 8 AWG (8.4 mm²) and larger wires. If the connectors or lugs are secured to a plate, the plate thickness shall not be less than 0.050 inch (1.3 mm). Securing screws may be plated steel.

12.2.1.4 A wire binding screw intended for connection of the power supply (line voltage) source shall not be smaller than No. 10 (4.8 mm diameter). The screw may be of plated steel.

Exception: A No. 8 (4.2 mm diameter) screw may be used for the connection of one No. 14 AWG (2.1 mm²) conductor and a No. 6 (3.5 mm diameter) screw may be used for the connection of a No. 16 or 18 AWG (1.3 or 0.8 mm²) conductor.

12.2.1.5 For connection of other than power supply (line voltage) circuits using No. 10 AWG (5.3 mm²) and smaller wires, a wire binding screw shall not be smaller than No. 8 (4.2 mm diameter), except that a No. 6 (3.5 mm diameter) screw may be used for the connection of one No. 14 AWG (2.1-mm²) or smaller conductor and a No. 4 (2.8 mm diameter) screw may be used for the connection of one No. 19 AWG (0.65 mm²) or smaller conductor.

12.2.1.6 Terminal plates tapped for wire binding screws shall:

a) Have a minimum of two full threads in the metal (the terminal plate metal may be extruded to provide the two full threads) and shall have upturned lugs, clamps, or means that have been determined to be equivalent, to hold the wires in position. Other constructions may be used if they have been determined to provide equivalent thread security of the wire binding screw. However, two full threads are not required if fewer threads will result in a secure connection in which the threads will not strip with tightening torque in accordance with the values indicated in the Standard for Wire Connectors and Soldering Lugs for Use with Copper Conductors, UL 486A.

b) Be of minimum 0.050 inch (1.3 mm) thick nonferrous metal, if used with a No. 8 (4.2 mm diameter) or larger screw, and a minimum of 0.030 inch (0.76 mm) thick if used with a No. 6 (3.5 mm diameter) or smaller screw.

12.2.1.7 If two or more conductors are intended to be connected by wrapping under the same screw, a nonferrous intervening metal washer shall be used for each additional conductor. A separator washer is not required if two conductors are separated and are intended to be secured under a common clamping plate. If the wires protrude above terminal barriers, the nonferrous separator shall include means, such as upturned tabs or sides, to retain the wire.

12.2.2 Qualified application

12.2.2.1 Any of the following terminal configurations may be used for connection of field wiring if there is compliance with all of the requirements in 12.2.2.2:

- a) Push-In Terminals – Nonferrous (screwless) push-in terminals of the type used on some switches and receptacles wherein solid conductors may be pushed into slots containing spring-type retaining contacts. The leads may be removed by means of a tool inserted to relieve the spring tension on the conductor. Push-in terminals shall not for use with aluminum conductors. The marking adjacent to the terminal shall indicate that only copper conductors are to be used.
- b) Quick-Connect Terminals – Nonferrous quick-connect (push type) terminals consisting of male posts permanently secured to the device and provided with compatible female connectors for connection to field wiring. Requires special tool for crimping of field wires. Mating terminals shall be shipped with the product with instructions for their installation.
- c) Solder Terminals – Conventional nonferrous solder terminals.
- d) Solderless Wrapped Terminals – Solderless wrapped nonferrous terminals which require a special tool and terminal post design.
- e) Telephone-Type Terminals – Nonferrous terminal plates using a narrow V-shaped slot for securing of a conductor in a special post design. Requires special tool for wire connection.
- f) Other Terminals – Other terminal connections may be used if they have been determined to be equivalent to (a) – (e) and are limited to the same restrictions.

12.2.2.2 Any of the terminal configurations listed in 12.2.1 may be used for connection of field wiring if there is compliance with all of the following:

- a) If a special tool is required for connection, its use shall be indicated on the installation wiring diagram and the name of its manufacturer and its model number or equivalent shall also be indicated, along with information as to where the tool may be obtained.
- b) The range of wire sizes shall be indicated on the installation wiring diagram. The minimum permissible wire size is No. 22 AWG (0.32 mm²).
- c) The wire size to be used shall have the current-carrying capacity for the circuit application.
- d) The terminal configuration shall comply with the requirements in the Special Terminal Assemblies Tests, Section 51.

Exception: Terminals complying with the requirements in any of the standards specified in 12.2.1.1.1 are not required to be subjected to the Special Terminal Assemblies Tests, Section 51.

12.2.2.2 revised January 19, 1995

12.3 Field wiring leads

12.3.1 If leads are provided in lieu of wiring terminals, they shall be a minimum of 6 inches (152 mm) long, and the minimum permissible wire size shall not be smaller than No. 22 AWG (0.32 mm²).

Exception No. 1: A lead may be less than 6 inches in length if it is evident that the use of a longer lead:

- a) May result in damage to the lead insulation or product;*
- b) May result in a risk of fire, electric shock, or injury to persons; or*
- c) Is not required for the intended operation of the product.*

Exception No. 2: Solid copper leads as small as No. 26 AWG (0.13 mm²) may be used if:

- a) The current does not exceed 1 ampere for lengths up to 2 feet (61 cm) and the current does not exceed 0.4 ampere for lengths up to 10 feet (3.05 m),*
- b) There are two or more conductors and they are covered by a common jacket or other covering that has been determined to be equivalent,*
- c) The assembled conductors comply with the requirement of 41.3 for strain relief, and*
- d) The installation instructions indicate that the lead shall not be spliced to a conductor larger than No. 18 AWG (0.82 mm²).*

12.3.2 Leads intended for connection of a line voltage source shall not be smaller than No. 18 AWG (0.82 mm²).

12.3.3 Leads intended for connection to an external circuit shall be provided with a strain relief if stress on the lead may be transmitted to terminals, splices, or internal wiring. See the Strain Relief Test, Section 48.

12.4 Polarity identification

12.4.1 In a product intended to be connected to a grounded circuit, one terminal or lead shall be identified for the connection of the grounded conductor. The identified terminal or lead shall be the one connected to the screw shells of lampholders and to which no primary overcurrent-protective devices or other switching devices of the single-pole type are connected.

12.4.2 A terminal intended for the connection of a grounded supply conductor shall be made of or plated with metal that is substantially white in color and shall be distinguishable from the other terminals, or identification of the terminal shall be clearly shown in some other manner, such as on an attached wiring diagram. A lead intended for the connection of a grounded power-supply conductor shall be finished to show a white or natural gray color and shall be distinguishable from the other leads.

13 Grounding

13.1 A grounding means shall be provided for all equipment containing parts which require grounding. See Bonding for Grounding, Section 17.

13.2 The following are considered to constitute means for grounding:

- a) In a product intended to be permanently connected by a metal-enclosed wiring system, a knockout opening in the metal enclosure of the product, or other opening that has been determined to be equivalent.
- b) In a product intended to be permanently connected by a nonmetal-enclosed wiring system, such as nonmetallic-sheathed cable, an equipment grounding terminal or lead.
- c) In a cord-connected product, an equipment grounding conductor in the cord.

voltage live parts. The force is to be applied by the curved side of a 1/2 inch (12.7 mm) diameter steel hemisphere. Any openings that occur during application of the force are to be evaluated according to the requirements specified in 5.2.4 and 5.2.5.

50.2 The external enclosure of a product containing only low-voltage power-limited circuits is to be subjected to the test in 50.1, except that the applied force is to be 10 pounds (44 N).

50.3 The external enclosure of a product containing high-voltage circuits or other than power-limited circuits shall withstand an impact of 5 foot-pounds (6.78 J) without permanent distortion to the extent that spacings are reduced below the values specified in 23.2 – 23.5, without transient distortion that results in the enclosure contacting live parts, and without causing openings that expose uninsulated high- or low-voltage live parts. The impact is to be applied by means of a solid, smooth, steel sphere 2 inches (50.8 mm) in diameter and weighing approximately 1.18 pounds (0.54 kg) falling freely from rest through a vertical distance of 51 inches (1.31 m). Any openings resulting from the impact are to be evaluated according to the requirements specified in 5.2.4 and 5.2.5.

50.4 The external enclosure of a product containing only low-voltage power-limited circuits is to be subjected to the test described in 50.3, except that the impact is to be 2 foot-pounds (2.7 J), and the sphere is to fall freely from rest through a vertical distance of 20-13/32 inches (0.51 m).

51 Special Terminal Assemblies Tests

51.1 General

51.1.1 To determine compliance with the requirements in 12.2.2.1 and 12.2.2.2, representative samples of the terminal assembly shall comply with the requirements specified in 51.3.1 – 51.6.2.

Exception: Terminals complying with the requirements in any of the standards specified in 12.2.1.1.1 are not required to be subjected to these tests.

51.1.1 revised January 19, 1995

51.2 Disconnection and reconnection

51.2.1 If a wire is to be disconnected for testing or routine servicing and then reconnected, each terminal is to be subjected to 20 alternate disconnections and reconnections prior to the tests specified in 51.3.1 – 51.6.2.

51.3 Mechanical secureness

51.3.1 A terminal connection shall withstand, without separating from the wire, the application of a straight pull of 5 pounds-force (22.2 N), applied for 1 minute to the wire in the direction which would most likely result in pullout.

51.3.2 Six terminal assemblies using the maximum wire size and six using the minimum wire size are to be subjected to this test. If a special tool is required to assemble the connection it is to be used, in accordance with the manufacturer's instructions. Each sample is to be subjected to a gradually increasing pull on the wire until the test pull of 5 pounds-force (22.2 N) is reached.

51.3.2 revised July 27, 1994

51.4 Flexing test

51.4.1 The wire attached to a terminal shall withstand five right-angle bends without breaking.

51.4.2 Six terminal assemblies using the maximum wire size and six with the minimum wire size are to be subjected to this test. The terminal is to be rigidly secured to prevent any movement. With each wire in 3 pounds-force (13.3 N) tension and held at a point 3 inches (76.2 mm) from the terminal-to-wire juncture, each wire is to be bent at a right angle from its nominal position. The wires are to be assembled to the terminals using any special tool required, according to the manufacturer's instructions.

51.5 Millivolt drop test

51.5.1 The millivolt drop across a terminal connection using the maximum and minimum wire sizes intended to be used shall not be greater than 300 millivolts with the maximum current specified by the manufacturer flowing through the terminal connections and the circuit connected to rated voltage.

51.5.2 Six terminal assemblies using the maximum wire sizes and six assemblies using the minimum sizes are to be connected in series and subjected to this test. The wires are to be assembled to the terminals, using any special tool, if required, according to the manufacturer's instructions. The millivolt drop then is to be measured by using a high impedance millivoltmeter.

51.6 Temperature test

51.6.1 The maximum temperature rise on a terminal junction using the maximum and minimum wire sizes with which the terminal is intended to be used shall not be greater than 30°C (54°F) based on an ambient temperature of 25°C (77°F).

51.6.2 Six terminal assemblies using the maximum wire size and six using the minimum size are to be subjected to this test. The wire is to be assembled to the terminals using any special tools, if required, according to the manufacturer's instructions. The maximum current to which the wire will be subjected in service then is to be passed through the series connection of the terminals. The maximum temperature rise then is to be measured by the thermocouple method after temperatures have stabilized.

52 Attack Test

52.1 An antitheft device, as defined in 1.3, shall resist for at least 5 minutes an attack that would defeat its purpose. See 52.5.

52.2 Any disassembly of the protected property required to make it removable, is to be included in the 5 minutes of an attack test.

52.3 The tools used in the test are to include hammers, chisels, adjustable wrenches, pry bars, punches, and screwdrivers. The hammers are not to exceed 3 pounds (1.36 kg) in head weight, and no tool is to exceed 18 inches (457 mm) in length.

52.4 The product under test is to be mounted securely in its intended position, and the attack is to be performed by one operator.

52.5 If the attack would cause an audible alarm to operate, the duration of the attack may be reduced to 2 minutes.

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INTRODUCTION

1 Scope

1.1 These requirements apply to the construction, performance, and operation of equipment intended to provide antitheft protection.

1.2 An antitheft alarm is intended to give both audible and visible signals or only an audible signal if theft of protected property is attempted.

1.3 An antitheft device is intended to protect property by significantly limiting the mobility or portability of the property.

1.4 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involve a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

1.4 revised July 27, 1994

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

2.1.2 A component need not comply with a specific requirement that:

- a) Involves a feature or characteristic not needed in the application of the component in the product covered by this standard or
- b) Is superseded by a requirement in this standard.

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

2.1.4 Specific components are recognized as being 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 for which they have been recognized.

2.2 Units of measurement

2.2.1 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.

2.2.2 Unless otherwise indicated, all voltage and current values mentioned in this standard are root-mean-square (rms).

2.3 Undated references

2.3.1 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.

2.4 Terminology

2.4.1 The term "product" as used in this standard refers to all types of antitheft alarms and devices.

3 Glossary

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

3.2 CIRCUITS, ELECTRICAL:

- a) High-Voltage — A circuit involving a potential of not more than 600 volts and having characteristics in excess of those of a low-voltage power-limited circuit.
- b) Low-Voltage — A circuit involving a potential of not more than 30 volts alternating current (ac) rms, [42.4 volts peak or direct current (dc)].
- c) Power Limited — A circuit whose output is limited as specified in Tables 3.1 and 3.2. The power limitation shall be provided by the construction of the transformer, a fixed impedance, a noninterchangeable, fuse, a nonadjustable manual reset circuit protective device, or a regulating network.

Table 3.1
Power limitations for inherently limited power source
(overcurrent protection not required)

Circuit voltage $V_{\max}^a$ AC-DC, volts	Maximum nameplate ratings		Current limitation $I_{\max}^b$, amperes
	VA, volt-amperes	Current, amperes	
0 to 20	$5.0 \times V_{\max}^a$	5.0	8.0
over 20 to 30	100	$100/V_{\max}^a$	8.0
over 30 to 100	100	$100/V_{\max}^a$	$150/V_{\max}^a$
over 100 to 250 DC ^a only	$0.030 \times V_{\max}^a$	0.030	0.030

NOTE — Reproduced from the National Electrical Code (ANSI/NFPA 70), 1990 Edition, copyright National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

^a $V_{\max}$: Maximum output voltage regardless of load with rated input applied.

^b $I_{\max}$: Maximum output after 1 minute of operation under any noncapacitive load, including short circuit.

3.3 CORD-CONNECTED UNIT — A unit intended for connection to the power source by means of a supply cord. Such a unit is intended to be moved for reasons of interchange or realignment of the units of a system.

voltage live parts. The force is to be applied by the curved side of a 1/2 inch (12.7 mm) diameter steel hemisphere. Any openings that occur during application of the force are to be evaluated according to the requirements specified in 5.2.4 and 5.2.5.

50.2 The external enclosure of a product containing only low-voltage power-limited circuits is to be subjected to the test in 50.1, except that the applied force is to be 10 pounds (44 N).

50.3 The external enclosure of a product containing high-voltage circuits or other than power-limited circuits shall withstand an impact of 5 foot-pounds (6.78 J) without permanent distortion to the extent that spacings are reduced below the values specified in 23.2 – 23.5, without transient distortion that results in the enclosure contacting live parts, and without causing openings that expose uninsulated high- or low-voltage live parts. The impact is to be applied by means of a solid, smooth, steel sphere 2 inches (50.8 mm) in diameter and weighing approximately 1.18 pounds (0.54 kg) falling freely from rest through a vertical distance of 51 inches (1.31 m). Any openings resulting from the impact are to be evaluated according to the requirements specified in 5.2.4 and 5.2.5.

50.4 The external enclosure of a product containing only low-voltage power-limited circuits is to be subjected to the test described in 50.3, except that the impact is to be 2 foot-pounds (2.7 J), and the sphere is to fall freely from rest through a vertical distance of 20-13/32 inches (0.51 m).

51 Special Terminal Assemblies Tests

51.1 General

51.1.1 To determine compliance with the requirements in 12.2.2.1 and 12.2.2.2, representative samples of the terminal assembly shall comply with the requirements specified in 51.3.1 – 51.6.2.

51.2 Disconnection and reconnection

51.2.1 If a wire is to be disconnected for testing or routine servicing and then reconnected, each terminal is to be subjected to 20 alternate disconnections and reconnections prior to the tests specified in 51.3.1 – 51.6.2.

51.3 Mechanical secureness

51.3.1 A terminal connection shall withstand, without separating from the wire, the application of a straight pull of 5 pounds-force (22.2 N), applied for 1 minute to the wire in the direction which would most likely result in pullout.

51.3.2 Six terminal assemblies using the maximum wire size and six using the minimum wire size are to be subjected to this test. If a special tool is required to assemble the connection it is to be used, in accordance with the manufacturer's instructions. Each sample is to be subjected to a gradually increasing pull on the wire until the test pull of 5 pounds-force (22.2 N) is reached.

51.3.2 revised July 27, 1994

51.4 Flexing test

51.4.1 The wire attached to a terminal shall withstand five right-angle bends without breaking.

51.4.2 Six terminal assemblies using the maximum wire size and six with the minimum wire size are to be subjected to this test. The terminal is to be rigidly secured to prevent any movement. With each wire in 3 pounds-force (13.3 N) tension and held at a point 3 inches (76.2 mm) from the terminal-to-wire juncture, each wire is to be bent at a right angle from its nominal position. The wires are to be assembled to the terminals using any special tool required, according to the manufacturer's instructions.

51.5 Millivolt drop test

51.5.1 The millivolt drop across a terminal connection using the maximum and minimum wire sizes intended to be used shall not be greater than 300 millivolts with the maximum current specified by the manufacturer flowing through the terminal connections and the circuit connected to rated voltage.

51.5.2 Six terminal assemblies using the maximum wire sizes and six assemblies using the minimum sizes are to be connected in series and subjected to this test. The wires are to be assembled to the terminals, using any special tool, if required, according to the manufacturer's instructions. The millivolt drop then is to be measured by using a high impedance millivoltmeter.

51.6 Temperature test

51.6.1 The maximum temperature rise on a terminal junction using the maximum and minimum wire sizes with which the terminal is intended to be used shall not be greater than 30°C (54°F) based on an ambient temperature of 25°C (77°F).

51.6.2 Six terminal assemblies using the maximum wire size and six using the minimum size are to be subjected to this test. The wire is to be assembled to the terminals using any special tools, if required, according to the manufacturer's instructions. The maximum current to which the wire will be subjected in service then is to be passed through the series connection of the terminals. The maximum temperature rise then is to be measured by the thermocouple method after temperatures have stabilized.

52 Attack Test

52.1 An antitheft device, as defined in 1.3, shall resist for at least 5 minutes an attack that would defeat its purpose. See 52.5.

52.2 Any disassembly of the protected property required to make it removable, is to be included in the 5 minutes of an attack test.

52.3 The tools used in the test are to include hammers, chisels, adjustable wrenches, pry bars, punches, and screwdrivers. The hammers are not to exceed 3 pounds (1.36 kg) in head weight, and no tool is to exceed 18 inches (457 mm) in length.

52.4 The product under test is to be mounted securely in its intended position, and the attack is to be performed by one operator.

52.5 If the attack would cause an audible alarm to operate, the duration of the attack may be reduced to 2 minutes.

53 Residential Security Container

53.1 Locks

53.1.1 A residential security container as defined in 3.7 shall be provided with a combination lock complying with the requirements for combination locks, UL 768, for Group 2, 1, or 1R; with a key lock complying with the requirements for key locks, UL 437, for locking cylinders or two-key locks; or with other means that have been determined to be the equivalent.

Antitheft Alarms and Devices



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July 26, 1994

Standard for

Antitheft Alarms and Devices

UL 1037, Fourth Edition

Accompanying this transmittal notice is a copy of the fourth edition of UL 1037.

A CHANGE IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM.

THIS EDITION OF THE STANDARD IS NOW IN EFFECT.

As indicated on the title page, this UL Standard for Safety is an American National Standard. Attention is directed to the note on the title page of this standard outlining the procedures to be followed to retain the approved text of ANSI/UL 1037-1994.

Revised and/or additional pages may be issued from time to time.

JULY 26, 1994



1

UL 1037**Standard for****Antitheft Alarms and Devices**

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Second Edition – June, 1981
Third Edition – December, 1988

Fourth Edition**July 26, 1994**

Approval as an American National Standard (ANSI) covers the numbered paragraphs on pages dated July 26, 1994. These pages should not be discarded when revised or additional pages are issued if it is desired to retain the ANSI approved text.

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

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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 published set of revision pages.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product employing materials or having forms of construction differing from those detailed in the requirements of this Standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be judged to comply with the Standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be used in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements apply to the construction, performance, and operation of equipment intended to provide antitheft protection.

1.2 An antitheft alarm is intended to give both audible and visible signals or only an audible signal if theft of protected property is attempted.

1.3 An antitheft device is intended to protect property by significantly limiting the mobility or portability of the property.

1.4 A product that contains features, characteristics, components, materials, or systems new or different from those in use when the standard was developed, and that involves a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the level of safety for the user of the product as originally anticipated by the intent of this standard.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

2.1.2 A component need not comply with a specific requirement that:

- a) Involves a feature or characteristic not needed in the application of the component in the product covered by this standard or
- b) Is superseded by a requirement in this standard.

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

2.1.4 Specific components are recognized as being 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 for which they have been recognized.

2.2 Units of measurement

2.2.1 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.

2.2.2 Unless otherwise indicated, all voltage and current values mentioned in this standard are root-mean-square (rms).

2.3 Undated references

2.3.1 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.

2.4 Terminology

2.4.1 The term "product" as used in this standard refers to all types of antitheft alarms and devices.

3 Glossary

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

3.2 CIRCUITS, ELECTRICAL:

- a) High-Voltage — A circuit involving a potential of not more than 600 volts and having characteristics in excess of those of a low-voltage power-limited circuit.
- b) Low-Voltage — A circuit involving a potential of not more than 30 volts alternating current (ac) rms, [42.4 volts peak or direct current (dc)].
- c) Power Limited — A circuit whose output is limited as specified in Tables 3.1 and 3.2. The power limitation shall be provided by the construction of the transformer, a fixed impedance, a noninterchangeable, fuse, a nonadjustable manual reset circuit protective device, or a regulating network.

Table 3.1
Power limitations for inherently limited power source
(overcurrent protection not required)

Circuit voltage $V_{\max}^a$ AC-DC, volts	Maximum nameplate ratings		Current limitation $I_{\max}^b$, amperes
	VA, volt-amperes	Current, amperes	
0 to 20	$5.0 \times V_{\max}^a$	5.0	8.0
over 20 to 30	100	$100/V_{\max}^a$	8.0
over 30 to 100	100	$100/V_{\max}^a$	$150/V_{\max}^a$
over 100 to 250 DC ^a only	$0.030 \times V_{\max}^a$	0.030	0.030

NOTE — Reproduced from the National Electrical Code (ANSI/NFPA 70), 1990 Edition, copyright National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

^a $V_{\max}$: Maximum output voltage regardless of load with rated input applied.

^b $I_{\max}$: Maximum output after 1 minute of operation under any noncapacitive load, including short circuit.

3.3 CORD-CONNECTED UNIT — A unit intended for connection to the power source by means of a supply cord. Such a unit is intended to be moved for reasons of interchange or realignment of the units of a system.

Table 3.2
Power limitations for power sources not inherently limited
(overcurrent protection required)

Circuit voltage $V_{\max}^a$ AC-DC, volts	Maximum nameplate ratings		Current limitation $I_{\max}^b$, amperes	Power limitation $(VA)_{\max}^c$, volt-amperes	Maximum overcurrent protection, amperes
	VA, volt-amperes	Current, amperes			
0 to 20	$5.0 \times V_{\max}^b$	5.0	$1000/V_{\max}^a$	250 (or footnote d)	5.0
over 20 to 100	100	$100/V_{\max}^a$	$1000/V_{\max}^a$	250	$100/V_{\max}^a$
over 100 to 150	100	$100/V_{\max}^a$	1.0	NA	1.0

NOTE — Reproduced from the National Electrical Code (ANSI/NFPA 70), 1990 Edition, copyright National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

^a $V_{\max}$: Maximum output voltage regardless of load with rated input applied.

^b $I_{\max}$: Maximum output after 1 minute of operation under any noncapacitive load, including short circuit, and with overcurrent protection bypassed.

^c $(VA)_{\max}$: Maximum volt-ampere output regardless of load with overcurrent protection bypassed.

^d If the power source is a transformer $(VA)_{\max}$ is 350 or less when $V_{\max}$ is 15 or less.

3.4 LINE VOLTAGE — The voltage at any field connected source of supply, nominally 50 – 60 hertz (Hz), and either 115, 208, or 230 volts.

3.5 NORMAL STANDBY CONDITION — The ready-to-operate condition of the product existing prior to its being tripped or operated by theft attempt.

3.6 PRIMARY BATTERY — A battery that by construction is not intended to be recharged.

3.7 RESIDENTIAL SECURITY CONTAINER — A container intended to be used in a residence to provide moderate protection to items against burglary or theft.

3.8 SAFETY CIRCUIT — Any primary or secondary circuit that is relied upon to reduce the risk of fire, electric shock, or unintentional contact with moving parts that may cause injury to persons (for example, an interlock circuit).

3.9 SECONDARY BATTERY — A battery that by construction is intended to be recharged.

4 Installation and Operating Instructions

4.1 A copy of:

- The installation and operating instructions intended to accompany each product or component as produced,
- The related schematic wiring diagrams, and

c) The installation drawings

is to be furnished with the sample submitted for investigation to be used as a guide in the examination and test of the product or component. For this purpose, a final printed edition is not required.

4.2 The instructions and drawings shall include at least the following:

- a) Typical installation drawing layouts and complete representative installation wiring diagrams for the product indicating recommended locations and wiring methods that shall be in accordance with the National Electrical Code, ANSI/NFPA No. 70. Locations where installations are not recommended shall also be included.
- b) Concise description of the operation, testing, and maintenance procedures for the product(s), and recommended testing frequency (that shall be at least once a year).
- c) Identification of replacement parts, such as lamps or batteries, by a part number, manufacturer's model number, or other means that have been determined to be equivalent.
- d) A description of the conditions that might be expected to result in false alarms or impaired operation of the product.
- e) A description of any features provided to reduce the risk of fire, electric shock, or injury to persons and a warning against bypassing such features.

4.3 The instructions may be incorporated on the inside of the product, on a separate sheet, or as part of a manual. If not included directly on the product, the instructions or manual shall be referenced in the marking information on the product. See Markings – All Products, Details, Section 57.

CONSTRUCTION – ALL PRODUCTS

ASSEMBLY

5 General

5.1 Product assembly

5.1.1 The product shall be factory-built as a complete assembly and shall include all the components necessary for its intended function when installed (used) as intended. The product may be shipped from the factory as two or more major subassemblies. See 5.1.2.

5.1.2 A product that is not assembled by the manufacturer as a complete unit shall be arranged in major subassemblies. Each subassembly shall be capable of being incorporated into a complete assembly without requiring alteration, cutting, drilling, threading, welding, or similar tasks by the installer (user). Two or more subassemblies, which must bear a definite relationship to each other for the intended installation or operation of the product, shall be arranged and constructed to permit them to be incorporated into the complete assembly only in the correct relationship with each other without need for alteration or alignment, or such subassemblies shall be assembled, tested, and shipped from the factory as one element.