UL 4200A

STANDARD FOR SAFETY

Products Incorporating Button Batteries or Coin Cell Batteries

UL Standard for Safety for Products Incorporating Button Batteries or Coin Cell Batteries, UL 4200A

First Edition, Dated February 10, 2015

Summary of Topics

This revision of ANSI/UL 4200A dated August 30, 2023 includes the addition of the Compression Test for little surface areas: 6.3.4C.

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 new and revised requirements are substantially in accordance with Proposal(s) on this subject dated April 28, 2023 and July 7, 2023.

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ANSI/UL 4200A-2023

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UL 4200A

Standard for Products Incorporating Button Batteries or Coin Cell Batteries

First Edition

February 10, 2015

This ANSI/UL Standard for Safety consists of the First Edition including revisions through August 30, 2023.

The most recent designation of ANSI/UL 4200A as an American National Standard (ANSI) occurred on August 30, 2023. 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 cover household type products that incorporate or may use button batteries or coin cell batteries.

1.2 These requirements do not cover products that exclusively use zinc-air battery technologies.

1.2A These requirements do not cover toy products that comply with battery accessibility and labeling requirements of ASTM F963, Safety Standard for Toys.

1.3 These requirements apply to consumer products containing button batteries or coin cells batteries. They do not apply to products that by virtue of their dedicated purpose and instructions are not intended to be used in locations where they may be accessed by children, such as products for dedicated professional use or commercial use in locations where children are not normally or typically present.

1.4 These requirements are intended to supplement other safety requirements for products that incorporate button batteries or coin cell batteries, and are not intended to supersede specific requirements that are incorporated into other safety standards to mitigate physiological hazards from button batteries or coin cells batteries.

2 Units of Measurement

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

3 Undated References

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.

4 Glossary

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

4.2 ACCESSIBLE – Able to be contacted by the accessibility probe.

4.3 BUTTON/COIN CELL BATTERY – A single cell battery having a diameter of 32 mm (1.25 in) maximum, and diameter greater than its height.

4.3A HAND-HELD PRODUCT – A product that is reasonably foreseeable to be used or misused while being held in one or both hands. Products specifically designed to be carried easily, with a mass not exceeding 4.5 kg (10 lbs).

4.4 PORTABLE DEVICE – A device that is reasonably foreseeable to be routinely carried or lifted as part of its use or misuse but not operated during transit with mass not exceeding 18 kg (39.7 lb).

4.5 PRINCIPAL DISPLAY PANEL – The display panel for a retail package of button cell or coin batteries or retail package of a consumer product containing such batteries that is most likely to be displayed, shown, presented or examined under normal or customary conditions of display for retail sale. The principal display panel is typically the front of the package.

4.6 PRODUCT DISPLAY PANEL – The surface area on, near, or in the battery compartment. For consumer products with replaceable button cell or coin batteries, the product display panel must be visible while a consumer installs or replaces the button cell or coin battery. For consumer products with non-replaceable button cell or coin batteries, the product display panel must be visible upon access to the battery compartment.

4.7 SECONDARY DISPLAY PANEL – A display panel for a retail package of a button cell or coin batteries or retail package of a consumer product containing such batteries that is opposite or next to the principal display panel. The secondary display panel is typically the rear or side panels of the package.

CONSTRUCTION

5 Products with Button/Coin Cell Batteries

5.1 Products that use button/coin cell batteries shall be designed to minimize the risk of children removing and ingesting or aspirating the batteries. Products that allow user removal or replacement of button/coin cells shall comply with the requirements of 5.2 – 5.6. Products with button/coin cells that are not intended to allow user removal/replacement of the cells shall comply with 5.7.

5.2 To reduce the likelihood of unintentional access, products with removable or replaceable button/coin cell batteries shall not allow the button/coin cell to be contacted by Test Probe 11 of the Standard for Protection of Persons and Equipment by Enclosures – Probes for Verification, IEC 61032 when applied as described in 5.3.

5.3 The probe shall be applied to any depth that the opening will permit and shall be rotated or angled before, during, and after insertion through the opening to any position that is necessary to examine the enclosure. The probe shall be used as a measuring instrument to judge the accessibility provided by an opening, and not as an instrument to judge the strength of a material. The probe shall be applied with the minimum force necessary to determine accessibility.

5.4 During the examination of a product to determine whether it complies with the requirements in 5.3, a part of the enclosure that may be opened or removed by the user, either without using a tool or with less effort than two independent and simultaneous movements by hand, is to be opened or removed.

5.4A If a part of the battery compartment enclosure is protected by pliable material such as fabric, paper, foam, or vinyl, or a pliable material with a seam, apply the Tension Test for Seams in Stuffed Toys and Beanbag-Type Toys test in the Standard Consumer Safety Specification for Toy Safety, ASTM F963, to determine whether the battery compartment enclosure can become exposed or accessible, using a force of at least 70.0 N (15.7 lbf). If a new part of the battery compartment enclosure becomes exposed or accessible, repeat 5.4 and remove any further pliable material that is then exposed until no new part of the battery compartment enclosure becomes exposed or accessible, and then conduct the test in 5.3.

5.5 Products that locate removable or replaceable button/coin cell batteries inside a battery compartment shall be designed to prevent children from removing the battery by one of the following methods in (a) or (b) below. Compliance is checked by the tests of Section 6.

a) A tool, such as a screwdriver or monetary coin, is required to open the battery compartment. For a battery compartment secured by a screw or a twist-on access cover, a minimum torque of 0.5 Nm and a minimum angle of 90 degrees of rotation shall be required to open the compartment or the fastener shall engage a minimum of two full threads; or

b) The battery compartment door or cover requires the application of a minimum of two independent and simultaneous movements to open by hand. The movements to open shall not be combinable to a single movement with a single finger or digit.

5.6 If screws or similar fasteners are used to secure the door or cover providing access to a battery compartment, the fasteners shall be captive to the door, cover, or device.

Exception No. 1: Applies to products containing button batteries or coin cell batteries not intended to be replaced by the consumer. Products containing button batteries or coin cell batteries that can only be accessed through the removal of multiple enclosures or panels using a tool do not need captive screws. Such products shall have instructions and warnings that clearly state the battery is not to be replaced by the consumer.

Exception No. 2: Applies to products containing batteries not intended to be replaced by the consumer. Products that are only to be opened by a professional service center (where children are not present) are not required to have secured screws. Such products shall have instructions and warnings that clearly state the battery is not to be replaced by the consumer.

5.7 Products that incorporate button/coin cells that are not intended for user removal or replacement shall effectively prevent removal of the battery by the user or children. The button/coin cell shall be:

a) Made inaccessible by an enclosure or similar means that passes the applicable tests of 6.2 and 6.3; or

b) Held fully captive by the use of soldering, fasteners such as rivets, or equivalent means. The securement method shall pass the Secureness Test of 6.4.

PERFORMANCE

6 Protection from Ingestion or Aspiration of Button/Coin Cell Batteries

6.1 General

6.1.1 Products shall not present a risk of unintentional access by children to button/coin cells. Button/coin cell batteries shall not be accessible or liberated from the product as a result of mechanical abuse tests in applicable safety standards for the product, and products with button/coin cells shall comply with the tests in 6.2 – 6.4.

6.2 Pre-conditioning

6.2.1 One test sample shall be subjected to the following pre-conditioning conditions in sequence prior to testing in 6.3 and 6.4, as applicable:

a) Stress Relief Test – A product with an enclosure, battery compartment door/cover or battery compartment door/cover opening mechanism made of molded or formed thermoplastic materials shall be subjected to a stress relief test. A sample of the complete product is to be placed in a circulating air oven for a period of 7 h. The oven temperature is to be set to the higher of (1) or (2) below. After removal from the oven, the sample is permitted to cool to room temperature.

1) 70°C (158°F); or

2) 10°C (18°F) higher than the maximum temperature of thermoplastic enclosures, battery compartment door/covers, or battery compartment door/cover mechanisms during the most stringent normal operation of the device.

b) Battery Replacement Test – The battery compartment door/cover shall be opened and closed, and the battery removed and replaced, for a total of ten cycles. The process shall simulate replacement according to the manufacturer's instructions. If the battery compartment is secured with a screw(s), the screw(s) is to be loosened and then tightened by means of a suitable

screwdriver, applying a continuous linear torque according to the Torque to be Applied to Screws table, Table 20, of the Standard for Audio, Video and Similar Electronic Apparatus – Safety Requirements, UL 60065.

6.3 Abuse tests

6.3.1 General

6.3.1.1 The tests in 6.3.2 – 6.3.4 shall be performed sequentially, as applicable, on one pre-conditioned sample of the product. After all test conditions have been completed, compliance is checked by 6.3.5.

6.3.2 Drop test for portable devices and hand-held products

6.3.2.1 Portable devices are subjected to drop tests from a height of 1.0 m (39.4 in) onto a horizontal hardwood surface in positions likely to produce the maximum force on the battery compartment or enclosure. Portable devices are subjected to three drops, except hand-held products are subjected to ten drops. The hardwood surface shall be at least 13-mm (1/2-in) thick, mounted on two layers of nominal 19-mm (3/4-in) thick plywood, placed on a concrete or equivalent non-resilient surface.

6.3.3 Impact test

6.3.3.1 The enclosure or battery compartment door/cover shall be subject to three, 2-J (1.5-ft·lbf) impacts. This impact is to be produced by dropping a steel sphere, 50.8 mm (2 inches) in diameter, and weighing approximately 0.5 kg (1.1 lb) from the height required to produce the specified impact, as shown in Figure 6.1, or the steel sphere is to be suspended by a cord and swung as a pendulum, dropping through the vertical distance required to cause it to strike the surface with the specified impact as shown in Figure 6.2. The steel sphere is to strike the battery compartment door/cover perpendicular to the enclosure surface.

Figure 6.1

Impact test

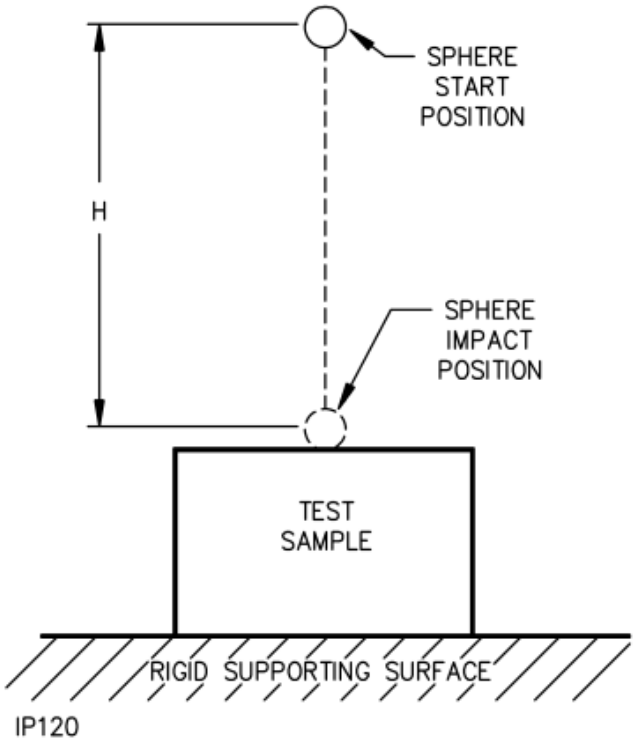
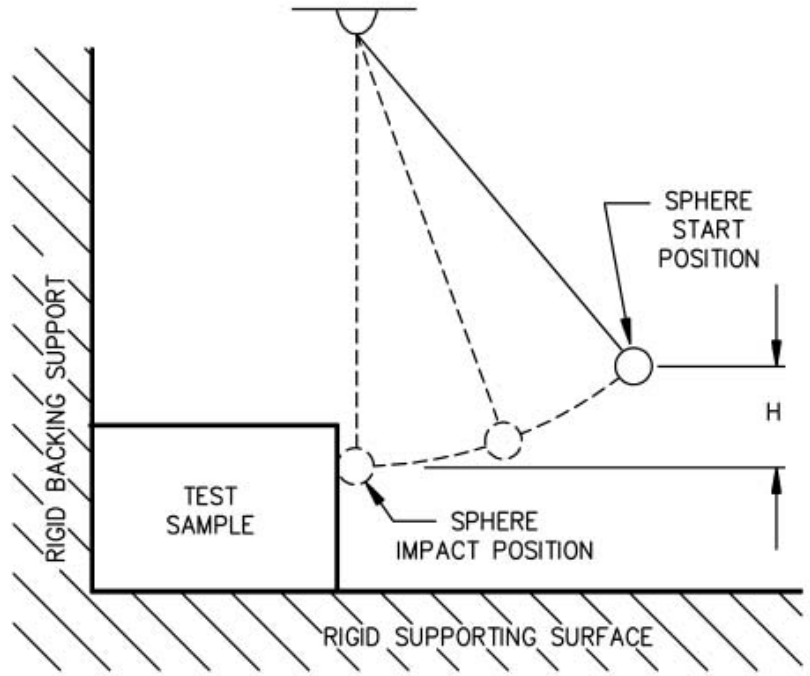


Figure 6.2

Impact test



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6.3.4 Crush test

6.3.4.1 The sample is to be supported by a fixed rigid supporting surface, in positions likely to produce the most adverse results as long as the position can be self-supported. A crushing force of 330 ±5 N (74.2 ±1.1 lbf) is applied for a period of 10 s to the exposed surfaces. The force is to be applied by a flat surface measuring approximately 100 by 250 mm (3.9 by 9.8 in).

6.3.4A Torque test

6.3.4A.1 If a child can grasp any part of the battery compartment enclosure on a consumer product, including the door or cover, with at least the thumb and forefinger, or using teeth, apply the Torque Test for Removal of Components from the Standard Consumer Safety Specification for Toy Safety, ASTM F963, to the battery compartment enclosure, using a torque of at least 0.50 Nm (4.4 in-lbf).

6.3.4B Tension test

6.3.4B.1 If a child can grasp any part of the battery compartment enclosure on a consumer product, including the door or cover, with at least the thumb and forefinger, or using teeth, apply the Tension Test for Removal of Components from the Standard Consumer Safety Specification for Toy Safety, ASTM F963, to the battery compartment enclosure, using a force of at least 72.0 N (16.2 lbf).

6.3.4C Compression test

6.3.4C.1 If any surface of the battery compartment enclosure is accessible to a child and inaccessible to a flat surface contact during the Drop test in 6.3.2, apply the Compression Test from the Standard

Consumer Safety Specification for Toy Safety, ASTM F963, to that surface, using a force of at least 136 N (30.6 lbf).

6.3.5 Compliance

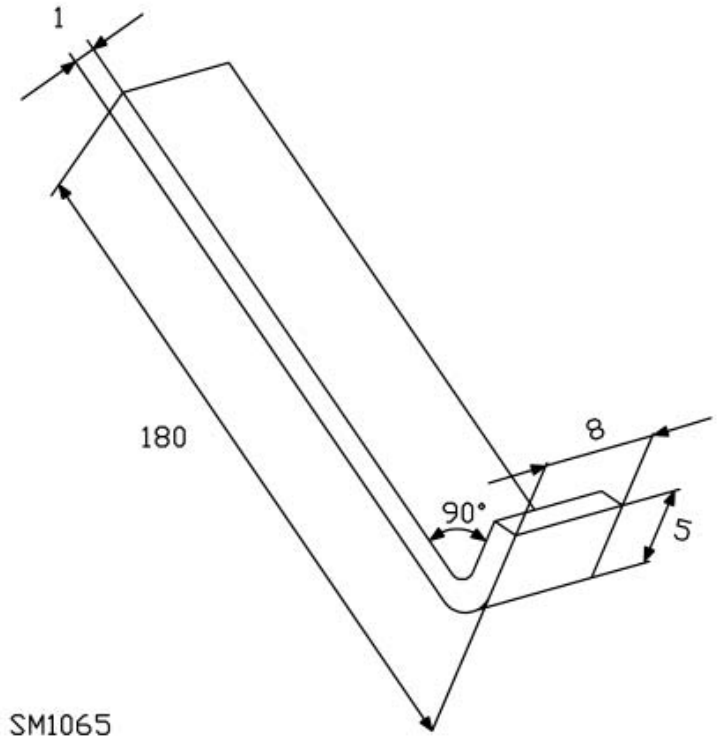
6.3.5.1 After the tests of 6.3.2 – 6.3.4B, a force of 50 +10/-0 N (11.2 +2.2/-0 lbf) is applied for 10 s to the battery compartment door/cover or enclosure by a rigid test finger according to Test Probe 11 of the Standard for Protection of Persons and Equipment by Enclosures – Probes for Verification, IEC 61032. The probe is applied at the most unfavorable place and in the most unfavorable direction. The force shall be applied in only one direction. A battery compartment door/cover shall not open and shall remain functional. The battery shall not be accessible.

6.4 Secureness test

6.4.1 Button/coin cells that are not intended for user removal or replacement, and are accessible based on 5.3 and 5.4, shall comply with the following test. Compliance is checked by application of a test hook as shown in Figure 6.3, with a force of 20 ±2 N (4.5 ±0.4 lbf), directed outwards, applied for 10 s at all points where this is possible. During the test, the button/coin cell shall not become separated from the product.

Figure 6.3

Test hook



MARKINGS

7 General

7.1 *Deleted*

7.2 *Deleted*

7A General

7A.1 All warning statements or icons shall be prominent, legible, easily discernable under normal lighting conditions, and permanently marked.

7A.2 Unless otherwise specified, instructional safeguards do not have to be in multiple colors. If an instructional safeguard is present in more than one color to indicate hazard severity, the color shall be in accordance with the ISO 3864 series.

7A.3 Printed or screened markings shall also be permanent.

7A.4 Legibility of markings is determined by inspection. Permanency is determined by the tests of Section 7D, Permanence of Markings.

7A.5 Markings must be in the official language(s) of the country where the product is sold or in English if there is no official language(s).

7A.6 The safety alert symbol, an exclamation mark in a triangle, when used with the signal word, must precede the signal word. The base of the safety alert symbol must be on the same horizontal line as the base of the letters of the signal word. The height of the safety alert symbol must equal or exceed the signal word letter height.

7A.7 Certain text in the message panel must be in bold and in capital letters as shown in the example warning labels to get the attention of the reader.

7A.8 For labels that are provided on a sticker, hang tag, instructions or manual, the safety alert symbol and the signal word "WARNING" must be at least 0.2 in (5 mm) high. The remainder of the text must be in characters whose upper case must be at least 0.1 in (2.5 mm), except where otherwise specified.

7A.9 For labels that are required to be on the packaging of consumer products and directly on consumer products, text size shall be dependent on the area of the principal display panel. Text size shall be determined based on Table 7A.1.

Table 7A.1
Letter Size for Warning Labels

Letter Size Measurements in Inches								
Display Area: Inches^2	0 – 2	+2 – 5	+5 – 10	+10 – 15	+15 – 30	+30 – 100	+100 – 400	+400
Signal word (WARNING)	3/64	1/16	3/32	7/64	1/8	5/32	1/4	1/2
Statement of Hazard	3/64	3/64	1/16	3/32	3/32	7/64	5/32	1/4
Other Text	1/32	3/64	1/16	1/16	5/64	3/32	7/64	5/32
Letter Size Measurements in cm (For Reference Only)								
Display Area: cm^2	0-13	+13 – 32	+32 – 65	+65 – 97	+97 – 194	+194 – 645	+645 – 2,581	+2,581

Table 7A.1 Continued on Next Page

Table 7A.1 Continued

Signal word (WARNING)	0.119	0.159	0.238	0.278	0.318	0.397	0.635	1.27
Statement of Hazard	0.119	0.119	0.159	0.238	0.238	0.278	0.397	0.635
Other Text	0.079	0.119	0.159	0.159	0.198	0.238	0.278	0.397

7B Packaging Markings

7B.1 Except as allowed in 7B.2 and 7B.3, the principal display panel shall contain the warning label in Figure 7B.1 or Figure 7B.2. The icon in Figure 7B.1 shall be at least 7 mm in width and 9 mm in height. The icon in Figure 7B.2 shall be at least 8 mm (0.31 in) in diameter. The text in the warning label shall be as shown in Figure 7B.1 or Figure 7B.2. When on a printed label using more than one color the marking must use colors as shown in Figure 7B.1 or Figure 7B.2.

Figure 7B.1

Packaging Marking – Warning: Contains coin battery

⚠WARNING

- **INGESTION HAZARD**: This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.

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Figure 7B.2

Packaging Marking – Warning of ingestion Hazard

⚠WARNING

- **INGESTION HAZARD**: This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.

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