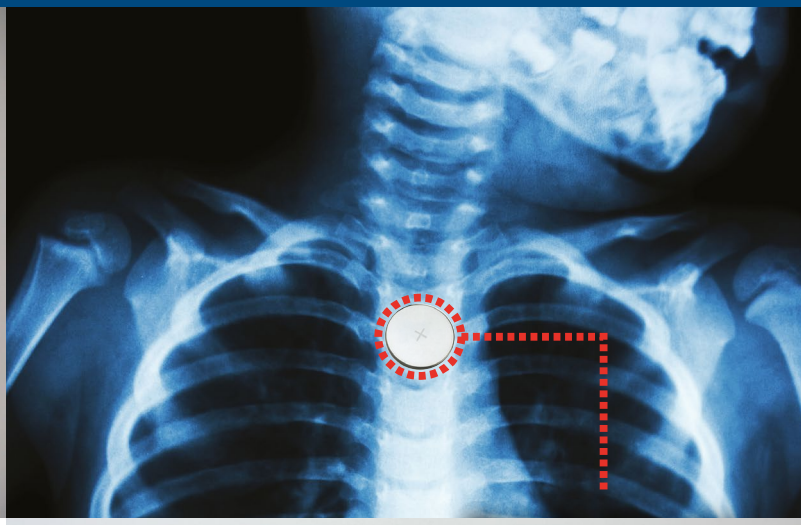
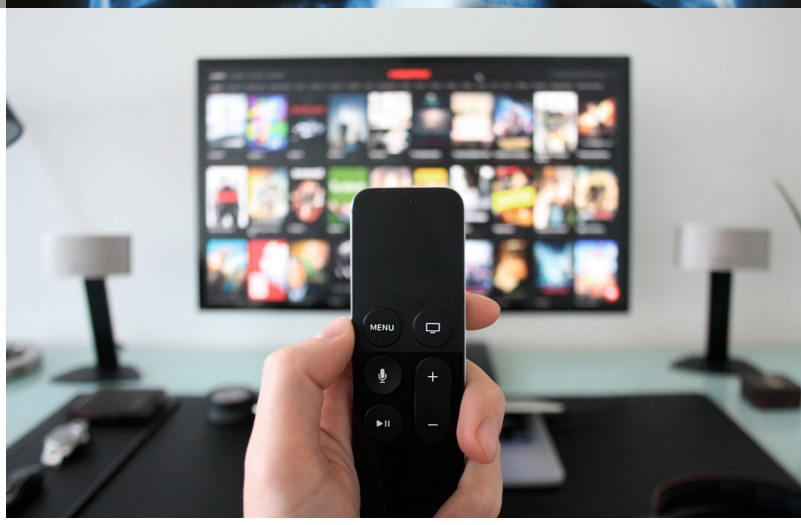
PAS 7055:2021

Button and coin batteries – Safety requirements – Specification





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Contents

Foreword

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- Office for Product Safety and Standards (OPSS)
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The provisions of this PAS are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

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0 Introduction

0.1 General

The aim of this Publicly Available Specification (PAS) is to address the safety issues posed by button (also known as non-lithium) and coin (also known as lithium) batteries, and to provide a consistent approach for products that contain these batteries. This is achieved by requiring warnings on the battery, battery packaging and on products that contain these batteries, in addition to testing requirements for products containing button and coin batteries.

There have been many global initiatives on this issue including awareness campaigns by the Office for Product Safety and Standards, the Child Accident Prevention Trust (CAPT), and the Royal Society for the Prevention of Accidents (RoSPA). Most recently (December 18, 2020), the Australian Government released four mandatory standards to reduce the risk of death and injury associated with the use of button and coin batteries:

- Consumer Goods (Products Containing Button/Coin Batteries) Safety Standard 2020 [1];
- Consumer Goods (Products Containing Button/Coin Batteries) Information Standard 2020 [2];
- Consumer Goods (Button/Coin Batteries) Safety Standard 2020 [3]; and
- Consumer Goods (Button/Coin Batteries) Information Standard 2020 [4].

This information and guidance have been considered in the development of PAS 7055.

There are four key themes that are associated with button and coin battery safety issues. These are summarized into:

- applicable legislation and relevant standards;
- actors (e.g. manufacturers, suppliers, retailers);
- battery types (chemistry, voltage, and size); and
- hazard and injury data.

0.2 Applicable legislation and relevant standards

One key piece of legislation that has been considered in the development of this PAS is The General Product Safety Regulations 2005 (GPSR) [5], which requires that new and used consumer products placed on the market are safe. PAS 7055 provides requirements that assist in this goal.

There are specific product safety requirements for batteries present in toys, electrical accessories, and medical devices. The challenge faced is that the existing requirements are inconsistent in terms of the definitions, warnings and test methods. There are also various ISO (International), IEC (International Electrotechnical), EN (European) and other global standards which are inconsistent. See Annex A, Annex B, and Annex C for further information on definitions, warnings, and test requirements, respectively.

0.3 Actors

With recent developments in product design and technology, batteries are now available in a wide range of consumer products which can be aimed at vulnerable groups, such as children. These products include: decorations, jewellery, clothing, calculators, pet toys and greeting cards. These items are available through a number of sources such as online, direct from manufacturers, or through retailers. This wide availability results in a variety of supply chain routes with a variety of actors involved in the production of batteries, or products that contain batteries.

The requirements in this PAS are directed at: manufacturers (and where appropriate producers) of batteries (see Clause **4**); manufacturers (and where appropriate producers) of consumer products containing batteries (see Clause **5**), and distributors (see Clause **6**). Businesses should identify which requirements are relevant to them (it can be one or more) and implement the requirements to address the safety issues posed by button and coin batteries and products that contain these batteries.

0.4 Battery types

The terms button and coin battery are sometimes used interchangeably; however, this PAS differentiates between the two as coin (also known as lithium) or button (also known as non-lithium) batteries, regardless of power, voltage or size.

Unless otherwise specified, this PAS uses three main terms for these batteries:

- where the term **battery** is used, it includes button and coin;
- where the term **button** is used it includes non-lithium; and
- where the term **coin** is used it includes lithium.

Button batteries are often powered by alkaline, silver oxide or zinc air and have a lower rated voltage (< 1.5 volts). Coin batteries are powered by lithium, rated at 3 volts and tend to be larger in diameter than button batteries. As they are considered more dangerous (due to voltage and size), the hazard associated with lithium (or coin) batteries has been emphasized by some existing standards and there have been different warnings used (see Annex B for examples).

Zinc air batteries are typically the smallest of these batteries; they are commonly found in hearing aids and require access to air (oxygen) to produce a current [6]. As these are often used in medical devices which are covered by other standards (see Annex D) these are excluded from the scope of this PAS. However, where possible, it is advised that the requirements noted in this PAS are taken into consideration for all consumer products that use button or coin batteries.

0.5 Hazard and injury data

Button and coin batteries can cause death if ingested. Although the larger the battery the more hazardous it potentially is (see Annex D for further information), the smaller button batteries (< 16 mm) can still cause harm, especially if it is relatively new (has not been used or activated). These small batteries can be inserted into body orifices such as ears and noses, causing serious injuries if undetected. An electrical potential of as little as 1.229 volts is enough to cause a dangerous reaction.

Both types of battery can present a choking, ingestion or insertion hazard. The warnings in this PAS focus on the "keep away from children" message and aim to align (as much as possible) with existing global standards. The intention is that this message mitigates the likelihood of any hazard occurring from these batteries.

The key hazard associated with these batteries is the chemical burn that occurs due to ingestion or insertion. When the battery becomes lodged and in contact with bodily fluid, a chemical reaction occurs (electrolysis), resulting in chemical burns to the body tissues that it is in close contact with.

The most severe injuries and fatalities occur as a combination of:

- battery diameter (the larger the more hazardous);
- voltage: > 1.229 volts are considered hazardous;
- ingestion (versus insertion), which has the potential to lead to the more severe injuries (versus insertion); and
- the age of the patient (where younger children are more at risk).

The significant difference between the hazards associated with the size, rated voltage and power is the time it takes for the hazardous reaction to occur; this is quicker with the larger lithium (coin) batteries.

Other variables to take into consideration include:

- the fact that larger batteries are more likely to become lodged in the oesophagus, posing a serious risk if it remains while the chemical reaction (electrolysis) takes place; and
- the time it can take for help to be sought. Therefore, the message of "seek medical attention" is emphasised in the warnings.

According to the National Capital Poison Centre (2020) [7] there have been 65 reported fatal button battery[1] ingestions globally. Lithium batteries accounted for 66%, 29% were of unknown chemistry and the remainder (5%) resulted from other chemistries.

In 2017, a fatal incident in the UK occurred to a 3-year-old who gained access to a lithium coin battery from an "infrequently used remote control". The battery was 23 mm (diameter) and it had become lodged in her oesophagus [8]. This incident has been a crucial driver in the development of this PAS.

[1)] The term in this research includes button and coin batteries.

For most of the cases, the source of the batteries is unknown. Where details are available, 62% of batteries were accessed from the product compartment and 8% were accessed directly from the battery packaging [9]. This highlights the need for safety requirements for both products and batteries themselves.

There have been numerous educational campaigns from government departments and charities, however, many parents remain unaware of the serious hazard posed by these batteries. This PAS also aims to increase the awareness of the serious hazard, thereby reducing the injuries and deaths from these products.

1 Scope

This PAS specifies safety requirements for button (also known as non-lithium) and coin batteries (also known as lithium) up to 32 mm in diameter to mitigate the risk of ingestion.

This PAS defines the safety requirements for manufacturers and producers of button and coin batteries, including the consumer products that use them, and the retailers and distributors of these products (including in-store and online retailing) regarding:

- labelling, instructions and packaging (including warnings);
- alignment of safety and health warnings;
- merchandising, e.g. displays and locations;
- encouragement and facilitation of safe disposal and/or recycling; and
- product safety of typical consumer products using button and coin batteries, e.g. inclusion of warning text and requirements for secured battery compartments.

This PAS does not cover:

- disposal and recycling from an environmental perspective;
- batteries for professional and industrial use; and
- safety requirements in the manufacturing of batteries, safety requirements for toys, audio-visual equipment and medical devices, e.g. thermometers, hearing aids.

This PAS is relevant to manufacturers and producers of button and coin batteries (see Clause **4**), including the manufacturers and producers of consumer products that use them (see Clause **5**). This PAS is also relevant for retailers and distributors of these products (see Clause **6**).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this PAS.[2] For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

AS 5808-2009, *Child-resistant packaging – Requirements and testing procedures for non-reclosable packages for non-pharmaceutical products*

BS EN 862:2016, *Packaging – Child-resistant packaging. Requirements and testing procedures for non-reclosable packaged for non-pharmaceutical products*

BS EN 60598-1:2015+A1:2018, *Luminaries – Part 1: General requirements and tests*

BS EN IEC 60086-1:2016, *Primary batteries – Part 1: General*

BS EN IEC 60086-4:2019, *Primary batteries – Part 4: Safety of lithium batteries*

BS EN IEC 62115:2020+A11:2020, *Electric toys – Safety*

BS EN IEC 62368-1:2020+A11:2020, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*[3)]

BS EN ISO 8317:2015, *Child-resistant packaging – Requirements and testing procedures for reclosable packages*

UL4200A, *Standard for safety product incorporating button or coin cell batteries of lithium technologies*

USA:16 CFR §1700.15, *Poison prevention packaging standards*

[2)] Documents that are referred to solely in an informative manner are listed in the Bibliography
[3)] Currently under review, and replaces BS EN 60065: 2014+A11:2017.

3 Terms, definitions and abbreviated terms

For the purposes of this PAS, the following terms and definitions apply.

3.1 Terms and definitions

3.1.1 accessible

touchable by a body part

[SOURCE: BS EN IEC 62368-1:2020+A11:2020, **3.3.6.1**, modified]

3.1.2 battery

one or more cells electrically connected by permanent means, fitted in a case, with terminals, markings and protective devices, as necessary for use

NOTE *For the purposes of this PAS, where the term battery is used it includes button and coin battery.*

[SOURCE: BS EN IEC 60086-1:2016, modified]

3.1.3 button battery

small round battery where the overall height is less than the diameter and having an electrochemical system that does not contain lithium

[SOURCE: BS EN IEC 62115:2020+A11:2020, **3.6.3**]

3.1.4 cell

basic functional unit, consisting of an assembly of electrodes, electrolyte, container, terminals and usually separators, that is a source of electric energy obtained by direct conversion of chemical energy

[SOURCE: BS EN IEC 60086-1:2016, **3.3.17.2**]

3.1.5 coin battery

small round battery where the overall height is less than the diameter and having an electrochemical system that does contain lithium

[SOURCE: BS EN IEC 62115:2020+A11:2020, **3.6.4**]

3.1.6 consumer product

product intended for consumers or likely, under reasonably foreseeable conditions, to be used by consumers even if not intended for them and which is supplied or made available, whether for consideration or not, in the course of a commercial activity, whether it is new, used or reconditioned

NOTE *Consumer products include products that are supplied or made available to consumers for their own use in the context of providing a service.*

[SOURCE: General Product Safety Regulations 2005 [5], modified]

3.1.7 distributor

businesses in the supply chain, other than the manufacturer or the importer, who makes a product available on the market

NOTE *"Distributor" includes wholesalers, retailers, hiring organizations and other businesses that supply products and are not manufacturers or importers.*

[SOURCE: PAS 7100-1:2018, **2.5**, modified]

3.1.8 hazard

potential source of harm

[SOURCE: PD ISO/IEC Guide 51:2014, **3.2**]

3.1.9 importer

business who places a product from a third country on the UK market

[SOURCE: PAS 7100-1:2018, **2.8**, modified]

3.1.10 manufacturer

business that manufactures a product or has a product designed or manufactured, or rebrands a product with their own name or trademark, and markets that product under their name or trademark

NOTE *This would include the activities of any professional in the supply chain whose actions change the safety characteristics of a product.*

[SOURCE: PAS 7100-1:2018, **2.10**, modified]

3.1.11 producer

a) manufacturer of a product, when established in the United Kingdom, and any other person presenting themselves as the manufacturer by affixing to the product their name, trademark or other distinctive mark, or the person who reconditions the product;

b) when the manufacturer is not established in the United Kingdom:

   i) if a representative has been established in the United Kingdom, the representative, or

   ii) in any other case, the person established in the United Kingdom that places a product from a country outside the United Kingdom on the market;

c) other professionals in the supply chain, insofar as their activities might affect the safety properties of a product.

[SOURCE: PAS 7100-1:2018, **2.14**, modified]

3.1.12 tool

object used to operate a screw, latch or similar fixing

NOTE *Examples of tools include coins, tableware, screwdrivers, and pliers.*

[SOURCE: BS EN IEC 62368-1:2020+A11:2020, **3.3.16.3**, modified]

3.2 Abbreviated terms

ACCC	Australian Competition and Consumer Commission
AS	Australian Standard
BS	British Standard
CAPT	Child Accident Prevention Trust
CPSC	Consumer Product Safety Commission
EN	European Norm (European Standard)
HSIB	Healthcare Safety Investigation Branch
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
OPSS	The Office of Product Safety and Standards
ROSPA	Royal Society for the Prevention of Accidents

4 Requirements for manufacturers of batteries

COMMENTARY ON CLAUSE 4

This clause specifies requirements for manufacturers (and where appropriate producers) of batteries.

4.1 Child-resistant packaging for batteries

The packaging for lithium coin batteries (regardless of size) and button batteries ≥ 16 mm shall conform to, as applicable:

1) AS 5808-2009;
2) BS EN IEC 60086-4:2019;
3) BS EN ISO 8317:2015;
4) BS EN 862; and
5) USA:16 CFR §1700.15.

NOTE 1 *There are several standards available which address the requirements for child resistant packaging. Therefore, more than one option is provided to allow for design variation.*

NOTE 2 *Packaging design for button batteries < 16 mm should also be assessed against these requirements.*

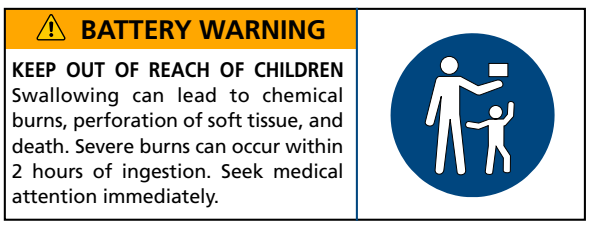
NOTE 3 *Ease of opening and the associated packaging design should be assessed for elderly people and other consumers in accordance with BS EN ISO 17480.*

4.2 Warnings and information for batteries

4.2.1 Marking on packaging for coin or lithium batteries

The packaging of coin or lithium batteries shall include the text, warning and contrasting colours in accordance with Figure 1.

Figure 1 – Warning against swallowing coin batteries



NOTE *BS EN IEC 60086-4:2019, Figure 9, modified.*

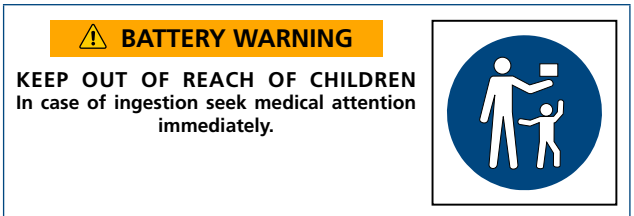
NOTE 1 *If colour is not possible for the sign, black and white can be used (see **4.2.4**, Figure 3).*

NOTE 2 *The warning "KEEP OUT OF REACH OF CHILDREN" provides parents with a mandatory action sign even if intended products are safe in the usual sense for adults. Therefore, the purpose of the warning in Figure 1 is to convey the message that these products should be kept out of reach of children to prevent accidental ingestion. This is an internationally accepted symbol for conveying the message "keep out of reach of children".*

4.2.2 Marking on packaging for button or non-lithium batteries

The packaging of button or non-lithium batteries shall include the warning, text and contrasting colours in accordance with Figure 2.

Figure 2 – Warning against swallowing button batteries



NOTE *BS EN IEC 60086-4:2019, Figure 9, modified.*

NOTE *If colour is not possible for the sign, then black and white can be used (see **4.2.4**, Figure 3).*

4.2.3 Marking on packaging for batteries

The packaging for batteries shall include the following warnings or equivalent:

- "BATTERY WARNING: KEEP OUT OF REACH OF CHILDREN"; and
- "If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention".

NOTE *BS EN IEC 62368-1:2020+A11:2020, **4.8.2**, modified.*

The warnings on the packaging shall be permanent, legible and indelible. They shall not be distorted when a battery is removed, e.g. with a multipack of batteries.

4.2.4 Marking on battery

One of the safety signs shown in Figure 3 shall be applied to batteries ≥ 20 mm in diameter. The safety sign shall be durably and indelibly marked, with no colour required.

NOTE 1 *Safety signs are specified for batteries with a ≥ 20 mm diameter, as it is not possible to include on smaller batteries. If this does become a feasible option, it should be assessed for all battery sizes.*

NOTE 2 *Engraving, etching, embossing or stamping can also be used.*

The safety sign on batteries shall have a diameter of 6 mm or larger.

Figure 3 – Safety signs for use on batteries

Type 1 Type 2 Type 3

NOTE *BS EN IEC 60086-4:2019, Annex F, Figure F.1.*

4.2.5 Warning criteria for batteries

When the warning signs shown in Figure 1, Figure 2, Figure 3 and Figure 4 are used, the following requirements shall be met:

a) the safety sign shall be on a contrasting background, which covers at least 50% of the area of the pictogram;

b) the diameter of the safety sign shall be 6 mm or larger; and

c) the text "BATTERY WARNING: KEEP OUT OF REACH OF CHILDREN" shall contrast with the background colour on which it is printed.

NOTE *BS EN IEC 60086-4:2019, modified.*

5 Requirements for manufacturers of consumer products containing batteries

COMMENTARY ON CLAUSE 5

This clause specifies requirements for manufacturers of consumer products containing button and coin batteries. The manufacturer requirements should be taken into account for the product design, so that the battery compartment does not inadvertently release batteries.

5.1 Secured battery compartment

The battery compartment door/cover of any consumer product that contains one or more batteries shall be designed to reduce the possibility of inadvertent removal, for example, by vulnerable persons.

NOTE 1 *This can be achieved by one of the following methods:*

- *a tool, such as a screwdriver or coin, is required to open the battery compartment; or*
- *the battery compartment door/cover requires the application of a minimum of two independent movements, applied simultaneously. For example, where one action has to be held in place while the other is carried out.*

NOTE 2 *BS EN IEC 62368-1:2020, **4.8.3**, modified*

The battery compartment door/cover shall conform to:

- BS EN 62115:2020+A11:2020, **13.4.1**; or
- BS EN IEC 62368-1:2020+A11:2020, **4.8.3** and **4.8.5**.

5.2 Battery compartment fasteners

If screws or similar fasteners are used to secure a door or cover providing access to the battery compartment, the screws or similar fasteners shall be captive so that they remain within the door, cover, or equipment.

The screw or similar fastener shall not become loose from the door, cover or equipment under normal conditions of use or reasonably foreseeable use. The battery compartment fastener shall conform to:

- BS EN IEC 62115:2020+A11:2020, **13.4.6**; or
- BS EN 60598-1:2015+A1:2018, **8.2.6**.

NOTE *The presence of technical means for safety should be used, where possible, e.g. by designing consumer products so that they cannot operate if the battery compartment fastener is not present.*

5.3 Nonreplaceable batteries

Batteries not intended for user removal or replacement and accessible without the use of a tool (e.g. batteries that might be found in a greeting card or apparel items) shall conform to UL4200A:2015, **6.4**.

NOTE *Consumer Goods (Products Containing Button/Coin Batteries) Safety Standard 2020, modified [1].*

5.4 Spare or loose batteries

All spare or loose batteries that are supplied with a consumer product (where the batteries are not pre-installed in a secure battery compartment) shall conform to:

- button battery (see **4.2.2**);
- child resistant packaging (see **4.1**);
- coin battery (see **4.2.1**);
- marking on the battery (see **4.2.4**); and
- markings on the packaging (see **4.2.3**).

5.5 Instructions and manuals

The warnings and information specified in **5.6 s**hall be included in any instructions and/or manual that is provided with a product.

The instructions shall include information on the symptoms that might arise because of battery ingestion (see Table 1). These symptoms shall also be included in the manual.

NOTE 1 *Symptoms of battery ingestion and insertion are difficult to diagnose.*

Table 1 – Example information on symptoms from battery ingestion

No obvious symptoms
Unfortunately, it is not obvious when a button or coin battery is stuck in a child's oesophagus (food pipe). There are no specific symptoms associated with this. The child might: • cough, gag or drool a lot; • appear to have a stomach upset or a virus; • be sick; • point to their throat or stomach; • have a pain in their abdomen, chest or throat; • be tired or lethargic; • be quieter or more clingy than usual or otherwise "not themselves"; • lose their appetite or have a reduced appetite; and • not want to eat solid food / be unable to eat solid food. These sorts of symptoms vary or fluctuate, with the pain increasing and then subsiding. A specific symptom to button and coin battery ingestion is vomiting fresh (bright red) blood. If the child does this seek immediate medical help. The lack of clear symptoms is why it is important to be vigilant with "flat" or spare button or coin batteries in the home and the products that contain them.

NOTE 2 *Product reviews should include the elimination of consumer products that do not conform with PAS 7055. Stock audits should be conducted to confirm that product ranges have been cleared of unsafe button or coin battery powered devices.*

NOTE 3 *Suppliers should only procure batteries and consumer products containing batteries that conform to PAS 7055 by referencing it in their product specification documents, pre-shipment inspection protocols and design briefs.*

5.6 Warnings and information for consumer products containing batteries

5.6.1 Marking on consumer products that contain coin or lithium batteries

The packaging of consumer products that contain coin or lithium batteries shall include the text, warning and contrasting colours shown in Figure 1.

5.6.2 Marking on consumer products that contain button or non-lithium batteries

The packaging of consumer products that contain button or non-lithium batteries shall include the warning shown in Figure 2.

5.6.3 Marking on consumer product packaging

The packaging for consumer products that contain batteries shall include the following or equivalent warnings:

a) "BATTERY WARNING: KEEP OUT OF REACH OF CHILDREN";

b) "If the battery compartment (if applicable) does not close securely, stop using the product and keep it away from children"; and

c) "If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention."

NOTE *BS EN IEC 62368-1:2020+A11:2020,* ***4.8.2,*** *modified.*

5.6.4 Marking on consumer products that contain batteries

Products that contain batteries (regardless of chemistry) shall include the warning signs shown in Figure 4 on the product. Where possible this shall be on or near the battery compartment. The warnings on the product shall be permanent, legible and indelible.

Figure 4 – Safety symbols for use on products that contain batteries

NOTE *BS EN 62115:2020+A11:2020,* ***7.2.6****.*

NOTE *If it is not possible to add the warning to the product, or by doing so it makes it illegible, the warning should be added to the packaging.*

5.6.5 Warning criteria for consumer products

When the warning signs shown in Figure 1, Figure 2, Figure 3 and Figure 4 are used, the following requirements shall be met:

a) the safety sign shall be on a contrasting background, which covers at least 50% of the area of the pictogram;

b) the diameter of the safety sign shall be 6 mm, or larger; and

c) the text "BATTERY WARNING: KEEP OUT OF REACH OF CHILDREN" shall contrast with the background colour on which it is printed.

NOTE *BS EN IEC 60086-4:2019, modified.*

6 Requirements for distributors

COMMENTARY ON CLAUSE 6

*This clause specifies requirements for distributors of batteries and consumer products containing batteries. As defined in **3.1.7**, distributor includes wholesalers, retailers, hiring organizations and other businesses that supply products and are not manufacturers or importers. Additionally, this clause is adapted and modified from ACCC, Industry Code for Consumer Goods that contain Button Batteries [10].*

6.1 Point of sale information – in store

Retailers shall alert consumers to battery hazards by offering clear and visible safety information at the points of display in stores.

Information and guidance shall be provided to distributors, retailers and merchandising teams regarding battery packaging and information for consumer products containing batteries displayed in stores.

Retailers shall use the provided battery safety information for online sales. Key messaging shall include:

- "BATTERY WARNING: KEEP OUT OF REACH OF CHILDREN";
- "Store spare batteries securely";
- "Dispose of used batteries immediately and safely"; and
- "If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention".

***NOTE 1** When offering batteries for sale, retailers can select brands of batteries that are supplied in child-resistant packaging and are marked with warnings alerting consumers to the hazards to young children.*

***NOTE 2** The batteries display location and the risk of access by children should also be assessed.*

***NOTE 3** Examples of battery safety information are given in Annex E.*

6.2 Point of sale information – online

When button and coin batteries, or consumer products that use these batteries, are supplied to an online retailer or distributor, battery warnings and information (see Clause **5** and **6**) shall be supplied with the product. Battery warnings and information shall be added to the online description and/or images of the product, and made available prior to the consumer committing to an online purchase.

6.3 Disposal

Distributors and retailers shall assess the position of disposed batteries and the safe disposal of batteries (preventing children gaining access to old batteries), including:

- disposal location and position such that children cannot reach or access;
- means to mitigating access to batteries, e.g., a lid;
- position of the warning information, such as posters (see Annex E);
- recycling units emptied on a regular basis, i.e. not left overflowing;
- use of opaque containers – to keep the batteries out of view; and
- where the recycling units are located (recycling units should be sited in clear view of a member of staff to facilitate ease of monitoring).

Annex A (informative)
Existing definitions for batteries

Table A.1 lists the various definitions for button or coin batteries, demonstrating the challenge faced when determining the most applicable definition for this PAS. The definitions were discussed within the PAS 7055 Steering Group and the most appropriate definitions were agreed (see Clause **3).**

Table A.1 – Battery definitions

Standard	Definition
BS EN 60086-1:2016, *Primary batteries – Part 1 General*	**button** (cell or battery) small round cell or battery where the overall height is less than the diameter **coin** (cell or battery) see button (cell or battery)
BS EN IEC 60086-4:2019, *Primary batteries – Part 4: Safety of lithium batteries*	**coin** (cell or battery) **lithium button** (cell or battery) small round cell or battery where the overall height is less than the diameter, containing non-aqueous electrolyte. ***NOTE** The nominal voltage of lithium batteries is typically greater than 2 volts.*
IEC 60050-482:2004, *International Electrotechnical Vocabulary (IEV) – Part 482: Primary and secondary cells and batteries*	**button cell coin cell** cell with cylindrical shape in which the overall height is less than the diamater, e.g. in the shape of a button or coin
BS EN 60086-5:2016, *Primary batteries – Part 5: Safety of batteries with aqueous electrolyte*	**button (cell or battery)** small round cell or battery where the overall height is less than the diameter. ***NOTE** In English, the term "button (cell or battery)" is only used for non-lithium batteries while the term "coin (cell or battery)" is used for lithium batteries only. In languages other than English, the terms "coin" and "button" are often used interchangeably, regardless of the electrochemical system.*
BS EN IEC 62115:2020+A11:2020, *Electric toys – Safety*	**button battery** small round battery where the overall height is less than the diameter and having an electrochemical system that does not contain lithium. **coin battery** small round battery where the overall height is less than the diameter and having an electrochemical system that does contain lithium.
BS EN 62368-1:2020+A11:2020, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*	**coin/button cell battery** small, single **cell battery** having a diameter greater than its height (also contains definitions for cell and battery)

Table A.1 – Battery definitions *(continued)*

Standard	Definition
UL4200A, *Standard for Products Incorporating Button or Coin Cell Batteries of Lithium Technologies*	**button/coin cell battery** single cell battery having a diameter of 32 mm (1.25 in) maximum, and diameter greater than its height
ASTM F963-17, *Standard Consumer Safety Specification for Toy Safety*	**battery, button cell** small round non-lithium battery, in which the overall height is less than the diameter **battery, coin cell** small round lithium battery in which the overall height is less than the diameter.
ACCC, *Industry Code for Consumer Goods that Contain Button Batteries*, July 2016 [10]	**button cell** the term typically used for batteries with alkaline or other (non-lithium) chemistries with a 1.5-volt or lower electrical output. They are button shaped and generally less than 16 mm in diameter. Ingested button cells typically pass through the gastrointestinal tract without causing significant problems. However, if a button cell is ingested and remains undetected in the oesophagus for quite some time, it can produce a comparable risk to that posed by coin cells, particularly if the button cell is relatively new and is ingested by a very young child. Button cells can also be inserted in body orifices, such as ears and noses, damaging delicate tissues and causing serious injuries if undetected for some time. **coin cell** the term typically used for button batteries having lithium chemistry with a 3-volt electrical output. The roughly coin-sized lithium batteries (16-25 mm diameter) have the highest risk associated with them due to their higher voltage and because they are more likely to become stuck in a child's oesophagus if ingested. This leads to the most serious internal burns, which can result in chronic health problems or death unless there is rapid medical intervention.

Annex B (informative)
Existing warnings for batteries

Table B.1 contains the various warnings for batteries, demonstrating the challenge faced when determining the correct warning.

***NOTE** The various warnings available were discussed within PAS 7055 Steering Group and the warnings listed in BS EN IEC 60086-4:2019 and BS EN IEC 62115:2020+A11:2020 were deemed to be the most appropriate.*

Table B.1 – Battery warnings

Standard	Warning
BS EN IEC 60086-4:2019, *Primary batteries – Part 4: Safety of lithium batteries*	Warnings noted in subclause 7.2; Figure 9. Table D.1; Annex F PAS 7055: Similar warnings used in Figure 1 - Figure 3
BS EN 60086-5:2016, *Primary batteries – Part 5: Safety of batteries with aqueous electrolyte*	Warnings noted in Annex C. These warnings are different to BS EN IEC 60086-4:2019; however, amendments are expected to align with BE EN IEC 60086-4:2019
BS EN IEC 62115:2020+A11:2020, *Electric toys – Safety*	subclause 7.2.6 (symbol); subclause 7.3.3.2 (warning symbol and text for coin batteries); subclause 7.3.3.3 (warning text for button batteries) PAS 7055: Symbol used (see Figure 4) for consumer products
BS EN 62368-1:2020+A11:2020, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*	No specific warning symbol given but examples provided. Warning text referred to in subclause 4.8.2 PAS 7055: Similar text used
UL 4200A, *Standard for Products Incorporating Button or Coin Cell Batteries of Lithium Technologies*	Warnings refer to the symbol (exclamation point within a triangle), as used in BS EN IEC 622115 PAS 7055: Symbol used (see Figure 4) for consumer products
ASTM F963-17, *Standard Consumer Safety Specification for Toy Safety*	Warnings noted in subclause 5.15.12, including text and that "graphical warnings can be used" but does not specify which one PAS 7055: Similar text used
Consumer Goods (Button/Coin Batteries) Information standard 2020 [4]	Warnings noted in this Information Standard refer to warnings noted in BS EN IEC 60086-4:2019, and the symbol (exclamation point within a triangle) used in BS EN IEC 62115 PAS 7055: This is similar to the warnings in Figure 1 - Figure 4
Consumer Goods (Products Containing Button/Coin Batteries) Information standard 2020 [2]	Warnings noted in this Information Standard refer to the warning in BS EN 62115 PAS 7055: Symbol used for Figure 4

Annex C (informative)
Existing test requirements for batteries

Table C.1 contains the various test requirements for button batteries.

NOTE *These requirements were discussed within the PAS 7055 Steering Group and the test requirements chosen were deemed to be the most appropriate.*

Table C.1 – Battery test requirements

Standard	Test requirements
BS EN 60086-1:2016, *Primary batteries – Part 1 General*	**ANNEX B** **B.2.1** Design compartments so that batteries are easily inserted and do not fall out. **B.2.2 Limiting access by children** Apparatus should be designed to prevent children from removing the battery by one of the following methods: • A tool, such as a screwdriver or coin, is required to open the battery compartment; **or** • The battery compartment door/cover requires the application of a minimum of two independent and simultaneous movements of the securing mechanism to open by hand. If screws or similar fasteners are used to secure the door/cover providing access to the battery compartment, the fasteners should be captive so that they remain with the door/cover. This does not apply to side panel doors on larger devices which are necessary for the functioning of the equipment and which are not likely to be discarded or left off the equipment."
BS EN IEC 60086-4:2019, *Primary batteries – Part 4: Safety of lithium batteries*	**ANNEX E** Testing for "child resistant packaging of coin cells" includes the following to be completed by hand: • bending test; • torsion test; • tearing test; and • pushing test.
BS EN IEC 62115:2020+A11:2020, *Electric toys – Safety*	**12.** Mechanical strength Spring hammer test (IEC 60068-2-75) Then tension test **13.4.1** Batteries that fit in SPC shall not be removable without the aid of a tool. Compliance is checked with a test outlined.

Table C.1 – Battery test requirements *(continued)*

Standard	Test requirements
BS EN IEC 62368-1:2020+A11:2020, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*	**4.8.3** Construction A tool required to open OR Application of a minimum of two independent and simultaneous movements **4.8.4** Tests. Includes test details for: **4.8.4.2** Stress relief test **4.8.4.3** Battery replacement test **4.8.4.4** Drop test **4.8.4.5** Impact test **4.8.4.6** Crush test
UL4200A, *Standard for Products Incorporating Button or Coin Cell Batteries of Lithium Technologies*	A tool required to open OR Application of a minimum of two independent and simultaneous movements Fasteners captive in door. Requirements for products that use button/coin cells and batteries not intended for removal Performance testing includes: **6.2** Pre-conditioning **6.3** Abuse testing **6.4** Secureness test
ASTM F963-17, *Standard Consumer Safety Specification for Toy Safety*	Use and abuse: • drop; • torque; • tension; • compression; and • flexure.

Annex D (informative)
Historical information about button and coin batteries

While developing this PAS it became clear that there has been a lot of valuable work globally in this area, however incidents still occur, and the information is sometimes inconsistent. Therefore, the development of this PAS is very much needed for the UK market.

A lot of data are available on the injuries and fatalities that have occurred because of button and coin battery ingestion. A summary of reported fatal incidents is provided by the National Capital Poison Center [7]. This center is an independent, private, not-for-profit organization and is accredited by the American Association of Poison Control Centers. Their website contains records of 65 reported global fatal button battery ingestions. For clarity, the term button battery refers to both button and coin.

47 of these fatal cases note the diameter (mm). Lithium coin batteries 20 mm in diameter were the most common, accounting for 60% of the cases. Batteries ≥ 20 mm accounted for 42 of the cases (approximately 90% of the cases where size is known). Batteries ≤ 16 mm accounted for four incidents (8% of the cases where size is known). This information, in addition to the requirements in existing standards, provides the rationale for the requirements in this PAS. Specifically, the differentiation between button and coin batteries.

NOTE *The American Association of Poison Control Centers also provides details on severe cases [11]. This information highlights that fact that the majority of severe injuries are associated with batteries ≥ 20 mm in diameter.*

The warning in BS EN IEC 60086-4 has been subjected to "comprehension testing in accordance with ISO 9186-1 in Japan and the United States" [12]. This is one of the reasons why this PAS references this warning. Alignment with existing requirements is imperative for the uptake and sustainability of this PAS, providing clear and consistent messaging to consumers.

The challenge of medical devices has also been considered. There are physical requirements for batteries specified in BS EN IEC 60601-1-11 for medical electrical equipment and specifically for hearing aids under BS EN IEC 60601-2-66. There are no requirements for warnings in these standards and warnings should be considered where possible for all items that contain button or coin batteries. The ACCC has been very active in this area and in December 2020, the Australian Government published four mandatory standards for button and coin batteries [1] to [4]. The ACCC were also consulted during the development of this PAS.

The CPSC has also developed numerous button battery campaigns aiming to raise awareness on the issue:

- https://www.cpsc.gov/Safety-Education/Neighborhood-Safety-Network/Posters/Button-Battery-Dangers
- https://www.cpsc.gov/s3fs-public/buttonbattery.pdf

In the UK, there have been a number of initiatives to raise awareness of this issue, including OPSS (Office for Product Safety and Standards), RoSPA (Royal Society for the Prevention of Accidents) and CAPT (The Child Accident Prevention Trust). Further information is provided in Annex E. CAPT also have a very poignant film on their website where a father discusses the details surrounding the death of his daughter who died after swallowing a spare button battery from TV 3D glasses.

After a separate death in 2017, the HSIB (Healthcare Safety Investigation Branch) investigated this issue. In 2019 they published an independent report on undetected button and coin cell battery ingestion in children [8]. The report references an event related to a three-year-old girl who ingested a 23 mm diameter lithium battery, which became lodged in her oesophagus (foodpipe). This was thought to have come from "*an infrequently used remote control*" [8].

The above incidents and vast information that is available illustrates the importance of this issue. A key recommendation of the HSIB investigation was the development of this PAS.

Annex E (informative)
Examples of consumer information

Examples of consumer information have already been developed by the Button Battery Industry Working Group (Australia) ACCC, CAPT, and OPSS. For reference, these are provided in this Annex.

ACCC

An Industry Code for consumer goods that contain button batteries has been developed by retailers, associations, and product safety consultants with input from the Australian Competition and Consumer Commission (ACCC). The code includes Figure E.1.

Figure E.1 – Example of consumer information from ACCC

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CAPT

CAPT provides information and printable consumer information (see Figure E.2 to Figure E.3) on their website. Available from: https://www.capt.org.uk/button-battery-resources

Figure E.2 – Example of consumer information from CAPT (p.1)

I might swallow a button battery

child accident prevention trust

+BIPBA–
British and Irish Portable Battery Association

Now I'm a toddler

I like to explore things with my mouth

Aims and objectives	Resources	Activity/Session	Outcomes
Recognise how toddlers explore with their mouths and the dangers of swallowing button batteries.	• Resource flash card • Button battery flyer • Ham, 3V button battery (CR2025 or CR2032), container with lid (for safe keeping) • Objects with button batteries.	Group discussion of how toddlers like to explore the home environment, the risk of button batteries, the range of products with them in and battery compartment security.	Learners able to: Understand early development, to recognise dangers of button batteries and how easily toddlers could find them. Risk reduction and what to do if swallowing occurs.

Session notes

Before your session starts

Two hours before, place a 3V button battery on a slice of ham in a container, spit on it, then close the lid and put it somewhere safe. Use it to show what happens when a battery gets stuck.

Why are button batteries so dangerous for toddlers?

- Button batteries, especially big, powerful lithium coin cell batteries, can badly hurt or kill a child if they are swallowed and get stuck in the throat or gullet.
- Toddlers are at risk because they like to explore taste and texture by mouth. They are increasingly dextrous so can get into battery compartments or drawers to find spare or 'flat' batteries.
- Button batteries are in many household items such as car key fobs, small remote controls, gaming headsets, kitchen and bathroom scales, calculators, children's toys, children's thermometers and musical books and cards.
- Even 'flat' button batteries still have enough charge to badly hurt a child.
- Button batteries can burn a hole through the throat or gullet and cause catastrophic internal bleeding within 2 hours.

How do I reduce the risk?

- Store spare batteries in sealed containers in a high cupboard.
- Keep objects out of reach if the battery compartment isn't secured with a screw.
- Take care buying on-line or from markets or discount stores, as cheap toys may not follow safety regulations.
- Put 'flat' batteries out of reach straight away and recycle or dispose of them safely.

What do you do if you suspect swallowing has occurred?

- There may be no obvious symptoms.
- Don't delay, take them to A&E immediately or dial 999 for an ambulance
- Tell the doctor you think they have swallowed a button battery and take any packaging with you.
- Don't let your child eat or drink anything and do not make them sick.

For more information, visit CAPT's website: www.capt.org.uk/button-batteries

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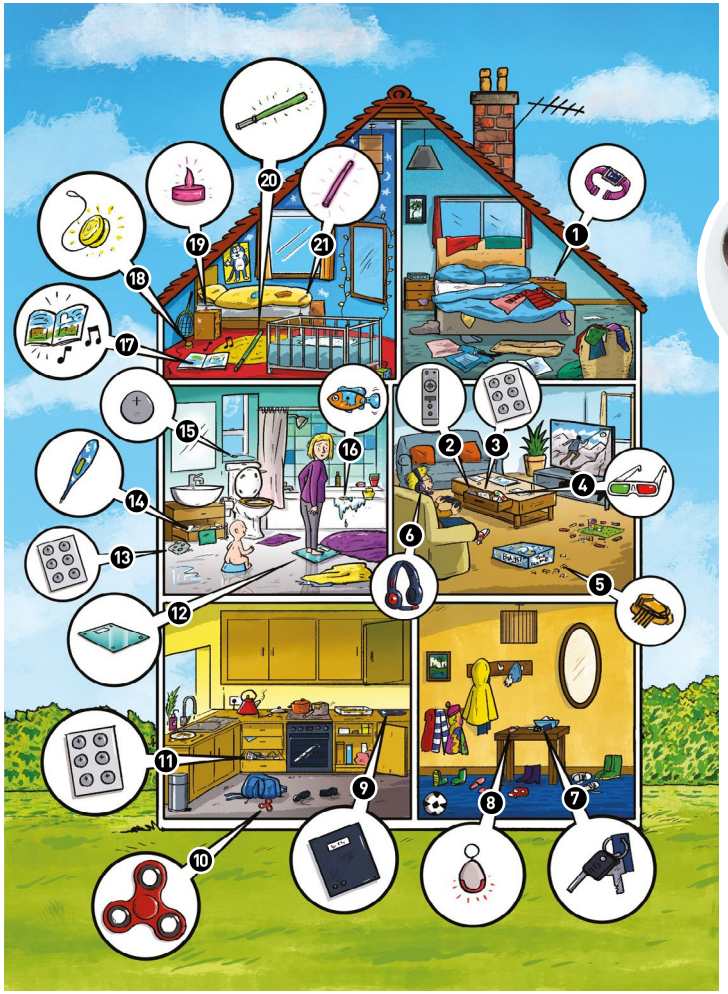
Figure E.3 – Example of consumer information from CAPT (p.2)



Button batteries – where are yours?

child accident prevention trust

Button batteries, particularly big, powerful lithium coin cell batteries, can badly hurt or kill a small child within two hours, if they get stuck in the food pipe. Know where yours are, so you can keep your children safe.

Five top tips

- Look round your home for lithium coin cell batteries – in products as well as spare and 'flat' batteries.
- Keep products well out of children's reach if the battery compartment isn't secured.
- Store spare button batteries in sealed containers in a high cupboard.
- Remember that 'flat' or 'dead' batteries still hold enough power to badly hurt a child. So put them out of children's reach straight away and recycle them safely and as quickly as possible.
- If you think your child has swallowed a button battery, don't delay, take them to A&E straight away or call 999 for an ambulance. Don't let them eat or drink and don't make them sick.

1. Fitness tracker
2. Remote control
3. Spare batteries
4. 3D glasses
5. Robot bug toy
6. Gaming headset
7. Car key
8. Key finder
9. Kitchen scales
10. Light up fidget spinner
11. Spare batteries
12. Bathroom scales
13. Spare batteries
14. Thermometer
15. Flat battery
16. Robo fish
17. Musical greeting card
18. Light-up yo-yo
19. Tea light
20. Light saber
21. Flashing wand

For more advice

www.capt.org.uk/button-batteries

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OPSS

OPSS provides information and printable consumer information (see Figure E.4 and Figure E.7) on their website: https://www.gov.uk/government/news/new-button-battery-safety-campaign.

Figure E.4 – Example of consumer information from OPSS (p.1)

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Figure E.5 – Example of consumer information from OPSS (p.2.)

The dangers of button batteries

Button batteries react with saliva to create caustic soda – the chemical often used to unblock drains. If a child swallows a button battery and it gets stuck in their food pipe (oesophagus), it can burn a hole and cause internal bleeding, or even death.

Larger lithium 'coin cell' batteries (about the size of a five pence piece) are the most dangerous, but it is best to keep all button batteries out of a child's reach. Smaller batteries can be inserted into places such as ears and noses, causing serious injuries if undetected.

How to keep children safe

Store spare batteries securely
Store spare button batteries securely and out of children's reach. Don't leave them loose in drawers or on surfaces. Watch out when opening multipacks of button batteries in case they fall on the floor.

Know which toys and gadgets use button batteries
These include everyday toys and gadgets, such as: kitchen or bathroom scales, thermometers, gaming headsets, slim remote controls, car key fobs, key finders, flameless nightlights, novelty items like flashing wands or light-up headbands, robot bug or fish toys, fidget spinners with LED lights, calculators, watches and hearing aids.

Under product safety regulations, button battery compartments in toys are required to be secured.

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Figure E.6 – Example of consumer information from OPSS (p.3.)

Check your home

If you find things powered by button batteries where the battery compartment isn't secured, move them out of reach of small children. If the item is faulty, get it fixed or get rid of it safely. You can also report faulty toys to your local Trading Standards.

Get rid of 'dead' button batteries immediately

Children often find discarded button batteries lying around or under sofa cushions. 'Dead' button batteries can still have enough power to badly hurt a small child. When you remove one, store it securely and recycle it properly and promptly.

Teach older children the dangers

Tell older children why button batteries are dangerous, and why they shouldn't play with them or give them to young children.

Figure E.7 – Example of consumer information from OPSS (p.4.)

If you suspect your child has swallowed a button battery

Symptoms may not be obvious. Your child might be coughing, gagging or drooling, or pointing to their throat or tummy. Unclear or fluctuating symptoms mean it's important to be vigilant.

If you think your child has swallowed a battery, take them straight to the nearest A&E department or call 999 for an ambulance.

Do:

- take the battery packaging, toy or gadget – if you can – to help staff identify the battery
- trust your instincts and act fast, even if there are no symptoms

Don't:

- let your child eat or drink
- make your child be sick

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM F963-17, *Standard consumer safety specification for toy safety*

BS EN 60086-1:2016, *Primary batteries – Part 1: General*

BS EN 60086-5:2016, *Primary batteries – Part 5: Safety of batteries with aqueous electrolyte*

BS EN 60601-1-11:2015, *Medical electrical equipment – Part 1-11: General requirements for basic safety and essential performance – Collateral Standard: Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment*

BS EN IEC 60601-2-66:2020, *Medical electrical equipment – Part 2-66: Particular requirements for the basic safety and essential performance of hearing aids and hearing aid systems*

BS EN ISO 17480:2018, *Packaging – Accessible design – Ease of opening*

BS EN ISO 7010:2020+A1:2020, *Graphical symbols – Safety colours and safety signs – Registered safety signs*

BS ISO 9186-1:2014, *Graphical symbols – Test methods – Part 1: Method for testing comprehensibility*

IEC 60050-482:2004, *International Electrotechnical Vocabulary (IEV) – Part 482: Primary and secondary cells and batteries*

PAS 7100-1:2018, *Code of practice on consumer product safety related recalls and other corrective actions – Part 1: Business*

PD ISO/IEC Guide 51:2014, *Safety aspects – Guidelines for their inclusion in standards*

Other publications

[1] AUSTRALIA. Consumer Goods (Products Containing Button/Coin Batteries) Safety Standard 2020. Canberra: Office of Parliamentary Counsel. Available from https://www.legislation.gov.au/Details/F2020L01656

[2] AUSTRALIA. Consumer Goods (Products Containing Button/Coin Batteries) Information Standard 2020. Canberra: Office of Parliamentary Counsel. Available from https://www.legislation.gov.au/Details/F2020L01657

[3] AUSTRALIA. Consumer Goods (Button/Coin Batteries) Safety Standard 2020. Canberra: Office of Parliamentary Counsel. Available from https://www.legislation.gov.au/Details/F2020L01658

[4] AUSTRALIA. Consumer Goods (Button/Coin Batteries) Information Standard 2020. Canberra: Office of Parliamentary Counsel. Available from https://www.legislation.gov.au/Details/F2020L01659

[5] GREAT BRITAIN. The General Product Safety Regulations 2005. London: Stationery Office. Available from https://www.legislation.gov.uk/uksi/2005/1803/contents/made

[6] AUSTRALIAN COMPETITION AND CONSUMER COMMISSION. *Button Battery Safety Issues Paper, August 2019.* Available from https://consultation.accc.gov.au/product-safety/button-battery-safety-issues-paper/supporting_documents/Button%20Batteries%20%20Issues%20Paper.PDF

[7] NATIONAL CAPITAL POISON CENTRE, 2020. *Fatal Button Battery Ingestions: 65 Reports.* Available from https://www.poison.org/battery/fatalcases

[8] HEALTHCARE SAFETY INVESTIGATION BRANCH. *Undetected button and coin cell battery ingestion in children,* 2019. Available from https://www.hsib.org.uk/investigations-cases/undetected-button-battery-ingestion-children/final-report/

[9] LITOVITZ T, WHITAKER N, CLARK L., 2010. *Preventing Battery Ingestions: An Analysis of 8648 Cases. Pediatrics.* 2010;125(6):1178-1183. doi: 10.1542/peds.2009-3038

[10] AUSTRALIAN COMPETITION AND CONSUMER COMMISSION. *Industry Code for Consumer Goods that Contain Button Batteries*, July 2016. Available from https://www.productsafety.gov.au/system/files/INDUSTRY%20CODE%20on%20Consumer%20Goods%20that%20contain%20BUTTON%20BATTERIES%20VERSION%201%20....pdf

[11] NATIONAL CAPITAL POISON CENTRE. *Nonfatal Button Battery Ingestions with Severe Esophageal or Airway Injury: 251 Cases,* 2020. Available from https://www.poison.org/battery/severecases

[12] ISO (2019) ISO/TC 145/SC 2/WG 1 *Maintenance of ISO 7010-ISO/CS 7010-M055pr-Comprehension testing*

Further reading

AUSTRALIAN COMPETITION AND CONSUMER COMMISSION. Button Batteries. Available from https://www.productsafety.gov.au/products/electronics-technology/button-batteries

CONSUMER PRODUCT SAFETY COMMISSION (CPSC). National Electronic Injury Surveillance System. Available from https://www.cpsc.gov/Research--Statistics/NEISS-Injury-Data

ROYAL SOCIETY FOR THE PREVENTION OF ACCIDENTS (ROSPA). Button batteries advice and information. Available from https://www.rospa.com/home-safety/Advice/Product/Button-Batteries.

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