INTERNATIONAL STANDARD

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Fourth edition
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Safety of toys —

Part 2: **Flammability**

Sécurité des jouets —

Partie 2: Inflammabilité

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 181, *Safety of toys*.

This fourth edition cancels and replaces the third edition (ISO 8124-2:2014), which has been technically revised.

A list of the main technical changes between this document and the previous edition is given in Annex B.

A list of all parts in the ISO 8124 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document is largely based upon an existing European standard (EN 71-2).

Conformity with the requirements of this document will minimize potential hazards associated with toys resulting from their use in their intended play modes (normal use) as well as unintended play modes (reasonably foreseeable abuse).

This document will not, nor is it intended to, eliminate parental responsibility in the appropriate selection of toys. In addition, this document will not eliminate the need for parental supervision in situations where children of various ages can have access to the same toy(s).

Although Annex A is for information purposes only, it is crucial for the correct interpretation of this document.

A list of the main technical changes between this document and the previous edition is given in Annex B.

Additional requirements for the flammability of electric toys are described in IEC 62115.

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Safety of toys —

Part 2: Flammability

1 Scope

This document specifies the categories of flammable materials that are prohibited in all toys, and requirements concerning flammability of certain toys when they are subjected to a small source of ignition.

The test methods described in Clause 5 are used for the purposes of determining the flammability of toys under the particular test conditions specified. The test results thus obtained cannot be considered as providing an overall indication of the potential fire hazard of toys or materials when subjected to other sources of ignition.

This document includes general requirements relating to all toys and specific requirements and test methods relating to the following toys, which are considered as being those presenting the greatest hazard:

— toys intended to be worn on the head, such as beards, moustaches and wigs made from pile or flowing elements, masks, hoods and headdresses; however, paper and paperboard hats without embellishments or attachments are excluded;

— toy disguise costumes and toys intended to be worn by a child in play;

— toys intended to be entered by a child and constructed from textiles and/or polymer sheets and films;

— soft-filled toys (see A.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 requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2431, *Paints and varnishes — Determination of flow time by use of flow cups*

ISO 6941:2003, *Textile fabrics — Burning behaviour — Measurement of flame spread properties of vertically oriented specimens*

EN 71-13, *Safety of toys - Part 13: Olfactory board games, cosmetic kits and gustative games*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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3.1
chemical toy
toy intended for the direct handling of chemical substances and mixtures, and which is used in a manner appropriate to a given age group and under the supervision of an adult

3.2
cleansing
wiping with a dry or damp cloth to remove surface soiling

3.3
extremely flammable liquid
liquid having a flash point <23 °C and initial boiling point ≤35 °C

3.4
flaming debris
material that becomes detached from the specimen during the test procedure and continues to flame as it falls

3.5
flammability
ability of a material or a product to burn with a flame under specified test conditions

3.6
flammable gas
gas or gas mixture having a flammable range with air at 20 °C and a standard pressure of 101,3 kPa

3.7
flammable liquid
liquid having a flash point ≥23 °C and ≤60 °C

3.8
flowing elements
loosely hanging elements having the ability to flow like hair, to hang closely to the shape of the head and continue to move on their own after the head is rotated then stopped

EXAMPLE Imitation hair, free-hanging ribbons and paper or cloth strands.

3.9
highly flammable liquid
liquid having a flash point <23 °C and initial boiling point >35 °C

3.10
highly flammable solid
material with similar behaviour in fire to celluloid (cellulose nitrate), i.e. ignites instantaneously as a result of a brief contact with a flame and proceeds to burn very rapidly

3.11
molten drips
falling droplets of molten material

3.12
moulded head mask
mask that is moulded to the contours of the head or face

3.13
soft-filled toy
toy, clothed or unclothed, with soft body surfaces and filled with soft materials or a combination of soft and non-soft materials (e.g. pellets), allowing compression of the main part readily with the hand

Note 1 to entry: A soft-filled toy may only be filled with a combination of soft and non-soft material if the main part of the toy can still be readily compressed with the hand.

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[SOURCE: ISO 8124-1:2022, 3.71]

3.14
surface flash
rapid spread of flame over the surface of a material without ignition of its base structure at the same time

3.15
toy disguise costume
costume intended to be worn by a child to facilitate imaginative play where the child pretends to be a character

Note 1 to entry: Costumes and garments for children less than 12 months old are not regarded as toy disguise costumes since such children are unable to engage in character role-play (see A.4).

Note 2 to entry: A toy disguise costume can be a single article or a clothing ensemble with multiple articles. A wizard's cloak or a princess's dress are examples of single article toy disguise costumes. A superhero's cape and bodice and gloves are examples of a clothing ensemble with multiple articles.

3.16
toys intended to be entered by a child
toys constructed from fabric and/or polymer sheets and films that are intended to fully or almost fully enclose a child

Note 1 to entry: Tents, puppet theatres, wigwams, tepees and play tunnels are examples of toys intended to be entered by a child (see A.5).

3.17
washing
process designed to clean textile articles in an aqueous bath

Note 1 to entry: Washing includes all or some of the following operations in relevant combinations:

— soaking, pre-washing and main washing – carried out usually with heating, mechanical action and in the presence of detergents or other products – and rinsing;

— water extraction, i.e. spinning or wringing performed during and/or at the end of the operations mentioned above.

These operations may be carried out by machine or by hand.

[SOURCE: ISO 3758:2012, 2.2]

4 Requirements

4.1 General

See A.2.

The following materials shall not be present in toys:

— celluloid (cellulose nitrate), except when used in varnish, paint or glue, or in balls of the type used for table tennis or similar games;

— highly flammable solids;

— materials with a piled surface which produce surface flash when a flame is applied to the tested material under the conditions described in 5.5 (test for soft-filled toys); piled surfaces showing no momentary area of flame over the area of the piled surface remote from the test flame are considered to meet this requirement.

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Specific materials to which the test flame is applied in order to check conformity of the toy to the requirements in 4.2 to 4.5 are considered to conform to this requirement if the toy meets its appropriate requirements in 4.2 to 4.5.

In addition, toys shall not contain flammable gases, extremely flammable liquids, highly flammable liquids, flammable liquids or flammable gels, except as follows:

— flammable liquids and flammable gels supplied in sealed containers having a maximum volume of 15 ml per container;

— highly flammable liquids and flammable liquids being entirely retained within a porous material in capillary channels of writing instruments;

— flammable liquids with a viscosity greater than 260×10^{-6} m^2/s corresponding to a flow time of more than 38 s when determined in accordance with ISO 2431 using cup no. 6;

— highly flammable liquids contained in chemical toys and in olfactory board games, cosmetic kits and gustative games that conform to EN 71-13.

4.2 Toys to be worn on the head (see A.3)

4.2.1 General

The requirements of 4.2 apply to:

— beards, moustaches, wigs, etc. made from pile or flowing elements;

— masks;

— hats, hoods, headdresses, etc.;

but not to paper or paperboard hats unless they have embellishments or attachments that form flowing elements.

When a product incorporates several features, for example a hat with an attached mask and hair, each part shall be tested separately according to the applicable clause relevant to that particular part of the toy.

Attachments which are used for the purpose of securing a mask, hat or similar object on the head (e.g. string, elastic, plastic strap) shall not be tested.

4.2.2 Beards, moustaches, wigs, etc. made from pile or flowing elements which protrude 50 mm or more from the surface of the toy

When tested in accordance with 5.2, the duration of flaming shall not be more than 2 s after the removal of the test flame.

In addition, if ignition occurs, the maximum burnt length of pile or flowing elements shall not be:

a) more than 50 % of the greatest initial length, when the initial length was 150 mm or more; or

b) more than 75 % of the greatest initial length, when the initial length was less than 150 mm.

When determining whether materials are required to be tested under 4.2.2, the distance by which the material protrudes shall be measured without applying tension to the protruding part, for example curly hair is not straightened. Plaits or braided hair shall be fully released and combed, where possible, before testing.

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4.2.3 Beards, moustaches, wigs, etc. made from pile or flowing elements which protrude less than 50 mm from the surface of the toy

Beards, moustaches, wigs, etc. made from pile or flowing elements which protrude 5 mm or less from the surface of the toy are regarded as headdresses and are covered by 4.2.5.

When tested in accordance with 5.3, the duration of flaming shall not be more than 2 s after the removal of the test flame, and the maximum distance between the upper edge of the burnt area and the point of application of the test flame shall not be more than 70 mm.

4.2.4 Full or partial moulded head masks

When tested in accordance with 5.3, the duration of flaming shall not be more than 2 s after the removal of the test flame. The maximum distance between the upper edge of the burnt area and the point of application of the test flame shall not be more than 70 mm.

This requirement does not apply to moulded eye masks nor face masks that neither cover the chin nor a cheek, as they are covered by 4.2.5.

4.2.5 Toys to be worn on the head (except those covered by 4.2.2 and 4.2.3), hoods and headdresses, including upward-protruding items and masks not covered by 4.2.4 which partially or fully cover the head (e.g. fabric and paperboard masks, eye masks, face masks), but excluding those items covered by 4.3

When tested in accordance with 5.4, the rate of spread of flame of the test specimen shall not exceed 10 mm/s or the test specimen shall self-extinguish.

4.3 Toy disguise costumes and toys intended to be worn by a child in play

See A.4.

This requirement does not apply to separate toys to be worn on the head, which are supplied with a toy disguise costume.

Parts of toy disguise costumes and toys intended to be worn by a child in play which contain loose stuffing which would fall out if prepared in accordance with 5.4.1.2 shall be tested in accordance with 5.5, and the rate of spread of flame of the test specimen shall not exceed 30 mm/s or the test specimen shall self-extinguish.

This requirement does not apply to soft-filled parts which, when positioned in accordance with 5.5.3, present a maximum unhindered vertical soft-filled height of 150 mm or less.

All other toy disguise costumes and toys intended to be worn by a child in play (and parts thereof) shall be tested in accordance with 5.4, and the rate of spread of flame of the test specimen shall not exceed 30 mm/s or the test specimen shall self-extinguish.

In all cases, if the rate of spread of flame is between 10 mm/s and 30 mm/s, the appropriate part(s) of the toy and the packaging shall be permanently marked with the following warning:

“Warning! Keep away from fire.”

See ISO 8124-1:2022, B.2.1, for guidance.

NOTE Suggestions to help reduce the rate of spread of flame for toy disguise costumes are provided in A.8.

4.4 Toys intended to be entered by a child

See A.5.

These include, for example, toy tents, puppet theatres, wigwams, tepees and play tunnels.

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When tested in accordance with 5.4, the rate of spread of flame of the test specimen shall not exceed 30 mm/s or the test specimen shall self-extinguish.

If the test specimen has a rate of spread of flame greater than 20 mm/s when tested in accordance with 5.4, there shall be no flaming debris or molten drips.

If the material has non-identical surfaces, both sides shall be tested.

If the rate of spread of flame is between 10 mm/s and 30 mm/s, the appropriate component(s) of the toy and the packaging shall be permanently marked with the following warning:

"Warning! Keep away from fire."

See ISO 8124-1:2022, B.2.1, for guidance.

4.5 Soft-filled toys

See A.6.

This requirement does not apply to

— soft-filled toys or soft-filled parts of a toy that cannot be cuddled or hugged by a child during play;

— toys which, when positioned in accordance with 5.5.3, present a maximum unhindered vertical soft-filled height of 150 mm or less.

When tested in accordance with 5.5, the rate of spread of flame on the surface of the toy shall not be more than 30 mm/s or the toy shall be self-extinguishing.

5 Test methods

5.1 General

5.1.1 Test burner

The test flame shall be obtained from a burner as described in ISO 6941:2003, Annex A, and shall be operated with butane or propane gas.

5.1.2 Conditioning and test chamber

Before each test, the toys or test specimens shall be conditioned for at least 7 h in an atmosphere having a temperature of (20 ± 5) °C and a relative humidity of (65 ± 5) %.

Carry out the tests in a test chamber in which the movement of air is less than 0,2 m/s at the start of the test and is not affected by operation of mechanical apparatus during the test. It is essential that the volume of air in the test chamber is not affected by a reduction in the level of oxygen concentration. When an open-fronted chamber is used for the test, ensure that the test specimen is at least 300 mm from the walls of the chamber. Maintain the chamber at 10 °C to 30 °C and at a relative humidity of 15 % to 80 % prior to the test being carried out.

The toys or test specimens shall be tested within 5 min of removal from the conditioning atmosphere.

5.1.3 Test flame

Light the burner described in 5.1.1 and pre-heat for a minimum of 2 min.

The required height of the flame shall be measured from the end of the burner tube to the top of the flame with the burner in the vertical position.

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5.2 Test relating to beards, moustaches, wigs, etc. made from pile or flowing elements which protrude 50 mm or more from the surface of the toy

5.2.1 Test flame

Adjust the flame height to (20 ± 2) mm.

5.2.2 Test burner position

Position the burner at (90 ± 2) ° to the horizontal.

5.2.3 Test performance

Measure the length of the pile or flowing elements and position the toy so that the largest dimension of the pile or flowing elements hangs vertically or as near vertically as possible.

Apply the test flame for (2 ± 0,5) s to the lower edge or ends of the specimen material so that the flame penetrates the element by approximately 10 mm.

If ignition occurs, measure the duration of flaming and the maximum burnt length, i.e. the maximum length of the pile or flowing element that has been burnt.

5.3 Test relating to beards, moustaches, wigs, etc. made from pile or flowing elements which protrude less than 50 mm from the surface of the toy, and full or partial moulded head masks

5.3.1 Test flame

Adjust the flame height to (20 ± 2) mm.

5.3.2 Test burner position

Move the burner to an angle of (45 ± 2) ° to the horizontal.

5.3.3 Test performance

Position the toy vertically.

Apply the test flame to the toy for (5 ± 0,5) s, so that the test flame makes contact between 20 mm and 30 mm above the lower edge of the toy and/or attachment and at a distance of (5 ± 2) mm measured horizontally from the closest point of the burner tube to the surface of the toy.

NOTE The lower edge of the toy is considered to be the bottom of the toy when placed on the head.

If ignition occurs, measure the duration of flaming and the maximum distance between the upper edge of the burnt area and the point of application of the flame.

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5.4 Test relating to toys to be worn on the head (4.2.5), hoods and headdresses, including upward-protruding items and masks not covered by 4.2.4 which partially or fully cover the head (e.g. fabric and paperboard masks, eye masks, face masks), toy disguise costumes and toys intended to be worn or toys intended to be entered by a child (See A.7)

5.4.1 Preparation of test specimen

5.4.1.1 General

Each test shall be carried out on material taken from a new toy prepared as described in this subclause. It is acceptable to wash test specimens prepared in accordance with 5.4.1.2 rather than the whole toy.

Toy disguise costumes shall be subjected to testing before and after one cycle of washing in accordance with any care instructions from the manufacturer or, if there are no care instructions, an instruction not to wash or an instruction to cleanse the surface of the toy only, then after treatment in accordance with 5.4.1.1 c).

For other toys, if the advice given to the consumer (e.g. a care label on the toy or its packaging):

a) indicates that the toy is not intended to be washed or cleansed, it shall not be washed or cleansed before testing;

b) recommends a method of washing or cleansing, the toy shall be treated once in accordance with these recommendations;

c) gives no information relating to washing or cleansing the toy, and if it is likely to be washed during its life, the test specimen(s) shall be treated, before testing, in accordance with the following instructions:

   Immerse the test specimen(s) in water under the following conditions:

   — water temperature: (20 ± 3) °C;

   — water calcium hardness: 8 dH to 14 dH (equivalent to 80 mg/l CaO to 140 mg/l CaO);

   — water volume at least 20 times the mass of the test specimen(s).

   Allow the test specimen(s) to stand for (10 ± 1) min. Drain and repeat twice. Rinse by immersing the test specimen(s) in demineralized water for (2 ± 0,5) min. Drain and dry by a method appropriate to the test specimen(s) and, where appropriate, restore the pile to as near as possible its original condition.

5.4.1.2 Test specimens from toy disguise costumes (see A.9)

5.4.1.2.1 General

Take a test specimen or a combined test specimen from each different material and, where possible, ensure the lower edge of the test specimen includes the lower edge of the costume material.

NOTE Textile materials of the same fabric but different colours are regarded as the same material.

Where there is sufficient material, cut the test specimen with the length corresponding to the vertical direction when the toy is worn. Where there is insufficient material, priority shall be given to making combined test specimens taken in the vertical direction, rather than full-size or half-size test specimens taken in the horizontal direction.

When preparing pieces for a combined test specimen, ensure the longer piece is taken in the vertical direction if this is possible; in any case, locate the longer piece in the lower half of the combined test specimen. If a combined test specimen is formed from two pieces of similar size and cut in different

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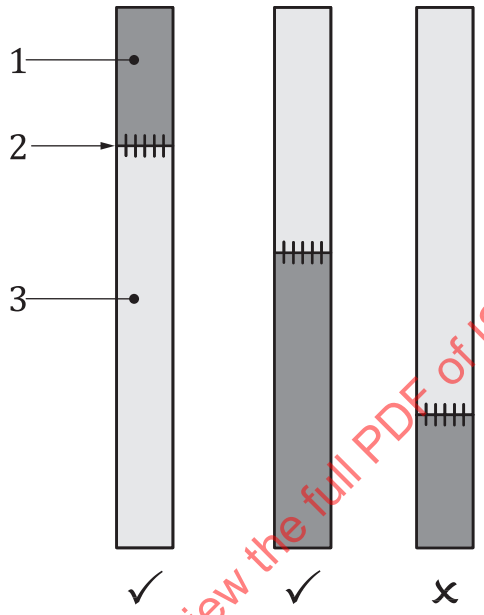
directions, the piece from the vertical direction shall be located in the lower half of the combined test specimen.

When forming a combined test specimen, in order to ensure that there is no gap at the overlap, the two pieces shall be overlapped by (10 ± 2) mm and joined using vertically orientated metal staples of sufficient gauge to maintain the integrity of the joint when handing the test specimen (e.g. 22/6) spaced at five equidistant points from the edge of the test specimen holder specified in 5.4.2.

Figure 1 shows the correct orientation of combined test specimen pieces.



Key

1 piece taken in vertical orientation from the toy
2 overlap join using five vertical staples
3 piece taken in horizontal orientation
√ correct orientation
× incorrect orientation

Figure 1 — Orientation of combined test specimen pieces

Filling materials (e.g. fibre wadding, foam fillings) which do not drop out of the test specimen shall be regarded as a single material for the purpose of test specimen preparation (i.e. fabric plus filling). Test specimens that include filling materials shall be prepared in accordance with 5.4.1.2.6 or 5.4.1.2.7.

Seams, decorative trims, embellishments or similar components, with the exception of finished lowest edges of the costume or the cuff edges of sleeves, shall not be included in test specimens that are prepared in accordance with 5.4.1.2.2 to 5.4.1.2.5.

Obtain test specimens in the following order:

a) Where possible, take a full-size test specimen (5.4.1.2.2); if there is insufficient material, make up a combined full-size test specimen (5.4.1.2.3). Where there is insufficient material to make up a combined full-size test specimen, take a half-size test specimen (5.4.1.2.4); if that is not possible, make up a combined half-size test specimen (5.4.1.2.5).

b) When all test specimens have been taken in accordance with 5.4.1.2.1 a), further test specimens are taken in accordance with 5.4.1.2.6, provided there is sufficient material.

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c) When all test specimens have been taken in accordance with 5.4.1.2.1 b), further test specimens are taken in accordance with 5.4.1.2.7, provided there is sufficient material and the material was not previously prepared in accordance with 5.4.1.2.1 a) and b).

d) Where there is insufficient material to make up a test specimen in accordance with 5.4.1.2.1 a) to c), no test is performed.

5.4.1.2.2 Full-size test specimen

Take a single piece test specimen with dimensions of at least 610 mm × 100 mm.

5.4.1.2.3 Combined full-size test specimen

Where there is insufficient material to prepare a test specimen in accordance with 5.4.1.2.2, make up a test specimen with dimensions of at least 610 mm × 100 mm from two separate pieces of the same material. The two pieces shall be orientated and joined using metal staples as described in 5.4.1.2.1.

5.4.1.2.4 Half-size test specimen

Where there is insufficient material to prepare a test specimen in accordance with 5.4.1.2.3, take a test specimen with dimensions of at least 310 mm × 100 mm.

5.4.1.2.5 Combined half-size test specimen

Where there is insufficient material to prepare a test specimen in accordance with 5.4.1.2.4, make up a test specimen with dimensions of at least 310 mm × 100 mm from two separate pieces of the same material of dimensions at least 160 mm x 100 mm. The two pieces shall be orientated and joined using metal staples as described in 5.4.1.2.1.

5.4.1.2.6 Test specimens that include fillings or features such as seams, trims and embellishments

Prepare full-size test specimens of materials that contain fillings or features (e.g. prints, appliques, trims, embellishments, patchwork material, vertically orientated seams) from a single piece of material with dimensions of at least 610 mm × 100 mm.

Where there is insufficient material to prepare a full-size test specimen, prepare a half-size test specimen with dimensions of at least 310 mm × 100 mm.

The test specimens are only taken in the vertical direction when the toy is in use. The lower edge of the test specimen (to which the test flame will be applied) shall be representative of the lowest edge of the costume or the cuff edge of a sleeve. If the lowest edge or sleeve cuff is not an even length (e.g. zig-zagged) then trim the bottom edge to produce a straight edge to aid measurement and testing.

If the specimen includes a vertically orientated seam, take the test specimen so that the seam will be located approximately in the centre of the test specimen holder specified in 5.4.2.

If the toy disguise costume has to be cut to form the test specimen, the filling or feature should be placed approximately in the centre of the test specimen.

NOTE This can mean that the trimmed bottom edge of the test specimen is not necessarily the lowest point on the bottom edge of the toy disguise costume.

5.4.1.2.7 Test specimens of narrow materials

For materials that cannot be prepared in accordance with 5.4.1.2.2 to 5.4.1.2.6, cut a single half-size test specimen at least 310 mm × 40 mm, provided there is sufficient material. Seams, trims, embellishments and similar components shall not be included in the test specimen but fillings are permitted.

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Cut the test specimen with the greater dimension corresponding to the vertical direction when the toy is worn.

5.4.1.3 Test specimens from toys worn on the head with flowing elements (4.2.5), hoods and headdresses, including upward-protruding items and masks not covered by 4.2.4 which partially or fully cover the head (e.g. fabric and paperboard masks, eye masks, face masks), and toys intended to be worn (4.3) or toys intended to be entered by a child (4.4)

Cut test specimens with dimensions of at least 610 mm × 100 mm from each material available on the toy. Each test specimen shall be made of one material. Where there is enough material, cut the test specimen with the length corresponding to the vertical direction of the toy when in use. Where possible, the test specimen should not include seamed edges. As seams can modify the rate of spread of flame, they shall be placed in the upper part of the specimen holder specified in 5.4.2.

Where there is insufficient material to prepare a full-size test specimen as described, it is permissible to use a test specimen made up of two separate pieces of the same material measuring at least 310 mm × 100 mm each which, when fitted together with an overlap of 10 mm, will constitute a test specimen of at least 610 mm × 100 mm. The two pieces shall be joined using metal staples as described in 5.4.1.2.1.

In the case of toys to be entered by a child (4.4), if the material has non-identical surfaces, both sides shall be tested.

5.4.2 Holding and positioning the test specimen

Mount the test specimen on the test specimen holder as shown in Figure 2.

For narrow materials prepared in accordance with 5.4.1.2.7, the test specimen shall be supported in the holder by a stainless-steel wire mesh of (18 +4/-0) mm × (18 +4/-0) mm grid size with a wire diameter of (1 ± 0,4) mm. See Figure 2 b).

The specimens shall be secured under slight tension to avoid creases, waving or curling by suitable means that do not affect ignition or flame spread.

For toys corresponding to 4.2.5 and 4.3, the outside surface of the material, when in use, shall be positioned with their outer surface uppermost.

Attach 100 % cotton marker threads as per Figure 2 a) across the specimen at no more than 2 mm from the surface of the test specimen, with a device to indicate when the marker thread is severed. In the case of full-size test specimens, use marker thread A and C. For half-size test specimens, use marker thread B and C.

Position the specimen holder at (45 ± 1) ° to the horizontal.

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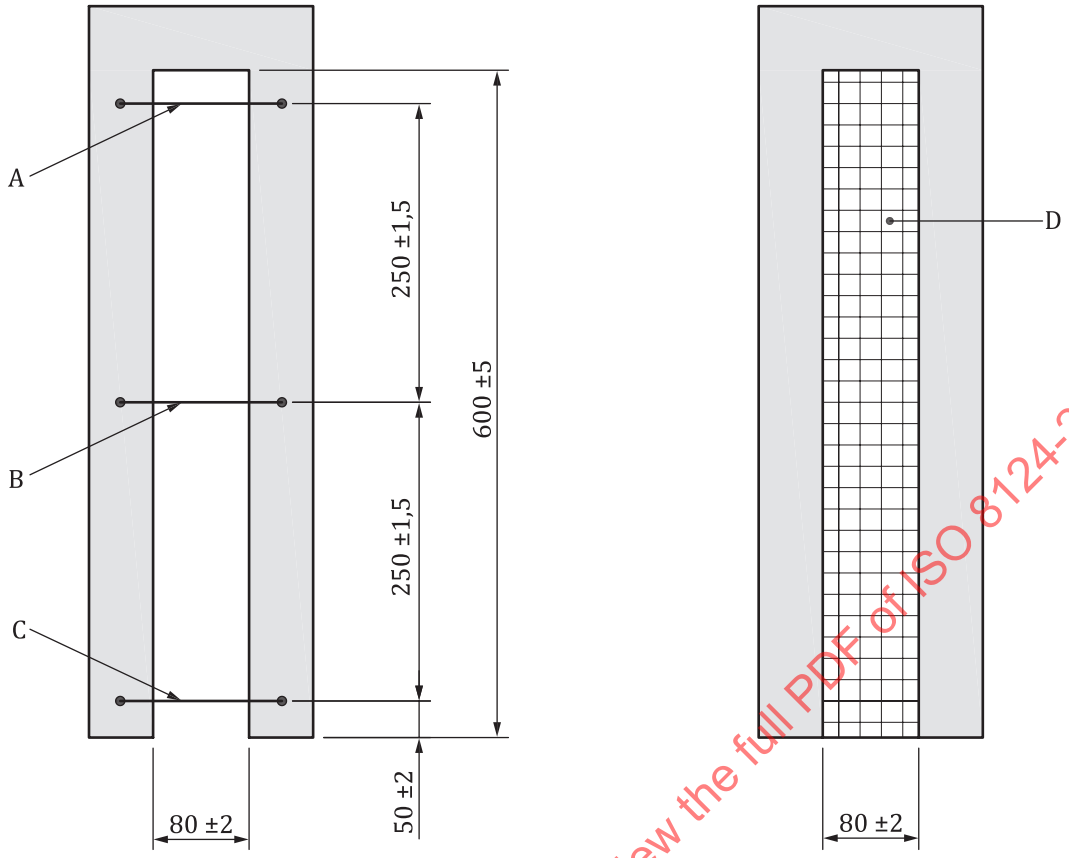
Dimensions in millimetres



a) Test specimen holder

b) Test specimen holder with wire mesh support

Key

A, B and C location of 100 % cotton marker threads

D wire mesh support

Figure 2 — Test specimen holders

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5.4.3 Test flame

Adjust the flame height to (40 ± 3) mm.

5.4.4 Test burner position

Position the burner vertically (90 ± 2) ° to the horizontal in order to have a distance of (30 ± 2) mm between the centre of the lower edge of the test specimen and the top of the burner (see Figure 3).

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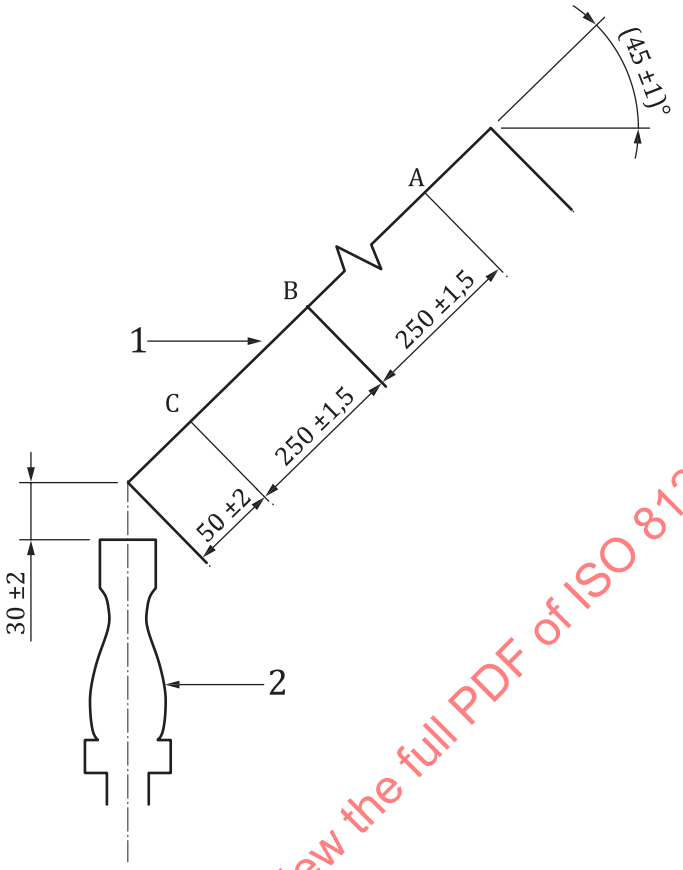
Dimensions in millimetres



Key

A, B and C	location of 100 % cotton marker threads
1	test specimen
2	burner

Figure 3 — Gas burner position

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5.4.5 Test performance

Apply the test flame to the centre of the lower edge of the test specimen as shown in Figure 3 for (10 ± 1) s.

If flaming occurs, start the timing device when the first marker thread is severed by the flame and stop it when the second marker thread is severed.

5.4.6 Results

If, after applying the flame, the test specimen fails to ignite, record the result as “Did not ignite”.

If the test specimen ignites but the first marker thread is not severed, record the result as “Self-extinguished within 50 mm of flame application”.

If flaming occurs, the first marker thread is severed and the flame extinguishes before severing the second marker thread, record the result as “Self-extinguishing”.

If the second marker thread is severed, note the time and calculate the rate of spread of flame in mm/s. Round the resulting value to the nearest whole number value in mm/s.

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5.5 Test for soft-filled toys and certain soft-filled parts of toy disguise costumes

5.5.1 Test flame

Adjust the flame height to (20 ± 2) mm.

5.5.2 Test burner position

Position the burner at an angle of (45 ± 2) ° to the horizontal.

5.5.3 Test performance

Determine the maximum unhindered soft-filled dimension of the toy; if this is greater than 150 mm, position the toy so that this dimension is vertically orientated in a suitable clamp.

Soft-filled toys shall be tested as supplied, including any clothing or cover present with the toy and, if considered to be more onerous, with the clothes or cover removed if removal can be accomplished without damage to the clothes, cover or toy.

Applicable soft-filled parts of toy disguise costumes shall be prepared in accordance with 5.4.1.1.

Apply the test flame to the toy for (3 ± 0,5) s so that the distance between the edge of the burner tube and the toy is (5 ± 2) mm and the test flame makes contact between 20 mm and 50 mm above the lower edge of the most flammable soft-filled material of the toy, as predetermined, and is not less than 120 mm from the top of the maximum soft-filled dimension of the toy.

If the test flame application point for the most flammable soft-filled material cannot be located at a distance 120 mm or more from the top of the maximum soft-filled dimension of the toy, the next most flammable soft-filled material located 120 mm or more from the top of the maximum soft-filled dimension of the toy shall be chosen for the application of the test flame.

In general, predetermination of the most flammable soft-filled material should be carried out by observation of the flame spread while the specimen is burning during the first test. Specimens that self-extinguish with little damage occurring may be tested using a test flame application point on a different material higher up the specimen, provided that the self-extinguishing flame has been remote from the area of new material.

After removal of the test flame, measure the time taken for the flame to spread on the surface of the toy until the top of the flames first reach the top of the maximum soft-filled dimension of the toy.

If flaming occurs and the flame extinguishes before reaching the top of the maximum soft-filled dimension of the toy, the tested toy is considered as self-extinguishing.

If the vertical distance between the point of application of the flame and the top of the soft-filled dimension is 500 mm or more, the test may be stopped when the top of the flames reaches a height of 500 mm from the point of application of the test flame. The rate of spread of flame is then calculated using the time elapsed to reach this point.

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Annex A
(informative)

Background and rationale for this document

A.1 General

This document sets safety requirements for those toys that could pose a significant risk of injury to a child from the hazards presented by their potential to catch fire.

Several databases were consulted during the preparation of the first edition, including those of the United Kingdom's Home Accident Surveillance System and the United States' Consumer Product Safety Commission. There was no indication from these sources that accidents were occurring due to direct contact of children with burning material in toys. It could be argued that this document has, over the years, resulted in safer toy products with respect to flammability.

A.2 General requirements

See 4.1.

Highly flammable solids are defined as materials with similar behaviour in fire to celluloid. Such materials readily catch fire after brief contact with a source of ignition and continue to burn or to be consumed after removal of the ignition source. In this case, only materials that ignite instantaneously (at the time of contact with a source of ignition) and are very rapidly consumed should fall into this category. Plastics, paper and textiles will all burn, but should normally not be considered as materials with the same behaviour in fire as celluloid.

In the context of the requirement for highly flammable solids, no validated test method has been established. However, some evaluations made on a strip of celluloid material (8 cm long) coming from a table tennis ball have shown that when a flame is applied under the conditions described in 5.5.1 and 5.5.2 to the lower edge of the strip placed vertically, it ignites instantaneously and shows a rate of spread of flame of approximately 400 mm/s.

A piece of paper with a mass per unit area of 80 g/m^2 and a dimension of 21 cm by 29,7 cm tested under the same conditions has shown a rate of spread of flame of approximately 110 mm/s. These values should be taken into consideration if further assessment of the material is required.

A.3 Toys to be worn on the head

See 4.2.

Subclause 4.2 is intended to cover those articles with elements that could become ignited without the child's knowledge, for example when blowing out candles on a birthday cake. Flowing elements (e.g. hair) would present the highest flammability hazard in this respect. Therefore, specific requirements have been set for these materials, based on their protruding length (length of the material measured from the surface of the toy to the end of the material).

Attachments made from elastic or string which serve a functional purpose, for example to secure a mask or hat on the head or articulate a facial feature, are not tested. Functional strings and elastic of this type fit closely to the surface of the head.

In addition to the duration of flaming, 4.2.2 establishes requirements regarding the maximum burnt length of pile or flowing elements and 4.2.3 establishes requirements for the maximum burnt area measured at the surface of a toy.

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As the rate of spread of flame can be different depending on the direction of the fabric, preference is given to cutting the test specimen with the length corresponding to the vertical direction of the toy when in use.

Beards, moustaches, wigs, etc. made from pile or flowing elements which protrude 5 mm or less from the surface of the toy are regarded as presenting a flammability hazard similar to headdresses and have therefore been considered as such.

The categories of toys covered by 4.2.5 are those not already covered by 4.2.1 to 4.2.4. However, if toys incorporate several features, such as hair, each part shall be tested according to the applicable clause relevant to that particular part of the toy.

As it is impossible to describe all types of toys in this category, Table A.1 has been provided to aid assessments. Table A.1 is a non-exhaustive list of pictorial examples indicating the applicability of 4.1 to 4.2.5 and is based upon CEN/TR 15371-1.

Table A.1 — Pictorial examples of toys and their application to 4.1 to 4.2.5

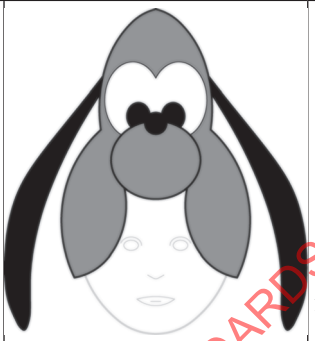
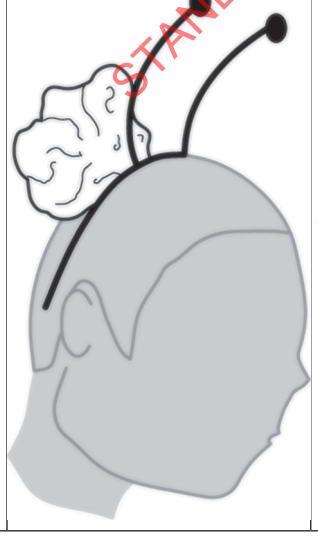
Ref.	Picture	Brief description of the toy to be worn on the head and comments	4.1	4.2.2	4.2.3	4.2.4	4.2.5
1		This toy is made of textile material. The side elements do not flow and shall not be regarded as flowing elements or pile. It is regarded as a headdress.	x				x
2		This toy is made of pile material protruding less than 5 mm from the surface of the toy; it is therefore considered as a headdress. (If it was protruding more than 5 mm, but less than 50 mm, 4.2.3 would have been applicable). The black ears are regarded as flowing elements as they hang close to the head and continue to move on their own after the head is rotated then stopped. They protrude more than 50 mm from the surface of the toy.	x	x Ears			x Head-dress
3		The antennae are made of plastic material and the flower material is textile. Both elements are regarded as a headdress.	x				x

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Table A.1 *(continued)*

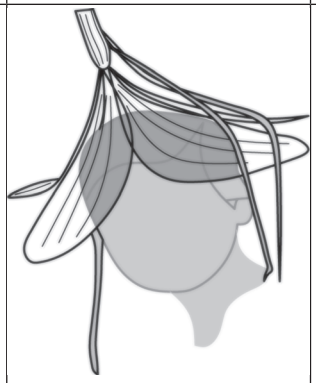
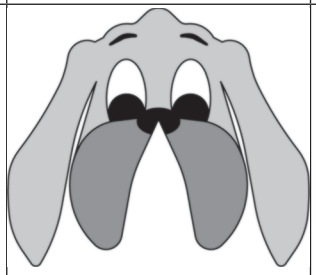
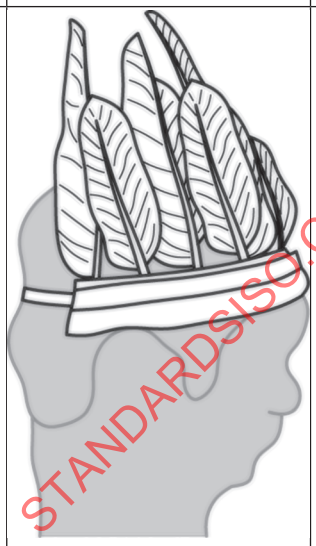
Ref.	Picture	Brief description of the toy to be worn on the head and comments	4.1	4.2.2	4.2.3	4.2.4	4.2.5
4		Head and ear materials are textile. They are regarded as a hood or headdress.	x				x
5		Translucent textile surrounded by metallic frame. It is regarded as a headdress. The ribbons are made of textile. These ribbons are regarded as flowing elements as they hang close to the head and continue to move on their own after the head is rotated then stopped. They protrude more than 50 mm from the surface of the toy.	x	x Ribbons			x Headdress
6		This mask is made of ethylene vinyl acetate (EVA) material. It is not moulded to the contours of the face. The ears are not flowing elements which hang close to the head and continue to move on their own after the head is rotated then stopped.	x				x
7		This headband is made of textile material and feathers. Feathers are upright and do not hang or flow and shall not be regarded as flowing elements or pile material according to 4.2.2 or 4.2.3. The whole toy is regarded as a headdress.	x				x
8		This headband is made of textile material and feathers. Upright feathers do not hang or flow and shall not be regarded as flowing element according to 4.2.2 or 4.2.3. The feathers hanging on the back of the head hang or flow like hair. They protrude more than 50 mm from the surface of the toy and so are regarded as flowing elements covered by 4.2.2.	x	x Hanging feathers			x Headband and upright feathers

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Table A.1 *(continued)*

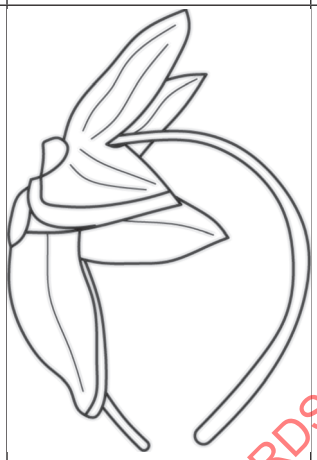
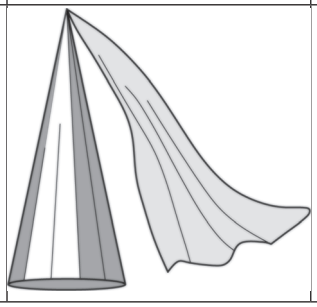
Ref.	Picture	Brief description of the toy to be worn on the head and comments	4.1	4.2.2	4.2.3	4.2.4	4.2.5
9		This toy is intended to be placed on the head. The child's face is not covered. It is entirely made of textile material with pile protruding less than 5 mm from the surface of the toy. The protruding parts are not flowing elements which hang close to the head and continue to move on their own after the head is rotated then stopped. The whole toy is regarded as a hood or headdress.	x				x
10		The mask is made of plastic material and is moulded to the contours of the face. The hair is protruding more than 50 mm from the surface of the toy.	x	x Hair		x Mask	
11		The band to attach the toy to the head is made of plastic material and the flower is textile. The elements hanging down are not regarded as flowing elements as they do not hang close to the head and continue to move on their own after the head is rotated then stopped. The whole toy is regarded as a headdress.	x				x
12		The hat is made of felt and is surrounded with pile material. The pile material is not regarded as a flowing element as it does not hang close to the head. It is covered by 4.2.5 and regarded as a headdress.	x				x Felt and pile materials
13		The hat is made of paperboard material. As such it is excluded from testing. The attachment or embellishment on top is made of textile material and regarded as a flowing element. It hangs close to the head and moves when the head is rotated. It protrudes more than 50 mm from the surface of the toy.	x	x Textile material			

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Table A.1 *(continued)*

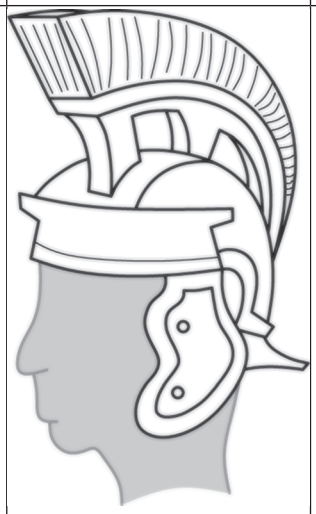
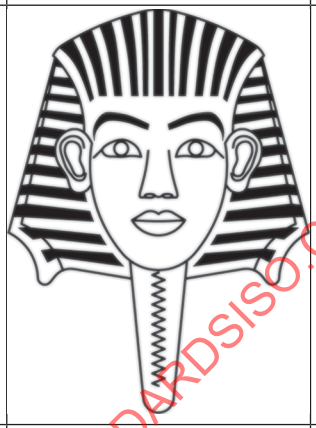
Ref.	Picture	Brief description of the toy to be worn on the head and comments	4.1	4.2.2	4.2.3	4.2.4	4.2.5
14		The mask is made of plastic material and is moulded to the contours of the face. It is regarded as a full moulded head mask.	x			x	
15		This helmet is made of plastic material with hair on top which does not flow like hair. It shall not be regarded as a wig with hair or pile material according to 4.2.2 or 4.2.3. The whole toy is regarded as a headdress with flowing elements (hair) not covered by 4.2.2 or 4.2.3.	x				x
16		The mask is made of plastic material and is moulded to the contours of the face. It is regarded as a partial moulded head mask.	x			x	
17		Hat and eye patch are made of textile material. They are both regarded as a headdress.	x				x

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Table A.1 *(continued)*

Ref.	Picture	Brief description of the toy to be worn on the head and comments	4.1	4.2.2	4.2.3	4.2.4	4.2.5
18		The headband and the shroud are made of textile material. The shroud textile material is not regarded as a flowing element as it is not made of cloth strands, is continuously surrounding the head and is covering the shoulders. The whole toy is regarded as a hood or headdress.	x				x Headband and shroud
19		This eye mask is made of paperboard material and is moulded to the contours of the face. It is excluded from 4.2.4 and is covered by 4.2.5.	x				x
20		This headband is made of textile material and a feather. The feather is upright, does not hang or flow and is not regarded as a flowing element according to 4.2.1 or 4.2.2. The whole toy is regarded as a headdress.	x				x
21		Textile hood based on a unicorn. The mane is made of textile loops. The loops are free-hanging but are not considered as flowing elements as they do not hang closely to the shape of the head.	x				x
22		Hairband constructed from real (natural) feathers attached to a hard plastic band. The feathers are not regarded as flowing elements as they do not hang closely to the shape of the head.	x				x

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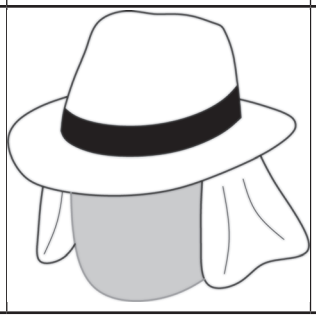
Table A.1 *(continued)*

Ref.	Picture	Brief description of the toy to be worn on the head and comments	4.1	4.2.2	4.2.3	4.2.4	4.2.5
23		Felt hat with felt side panels. The side panels protrude more than 50 mm from the hat. The side panels are not regarded as flowing elements as they do not flow like hair or continue to move on their own after the head is rotated then stopped.	x				x

A.4 Toy disguise costumes and toys intended to be worn by a child in play

See 4.3.

Toy disguise costumes include, for example, cowboy suits, nurses' outfits and long, flowing capes not attached to headwear covered by 4.2.5. Costumes for children under the age of 12 months are not considered to be toy disguise costumes because children of this age do not have any concept of the character they are dressed as and so would not be able to engage in imaginative role-play.[6]

To ensure a wider range of testing, principally to cover small sizes of costumes, the test specimen may be constructed from two pieces of the same material, either as a full-size combined test specimen or as a half-size combined test specimen.

There are no specified dimensions for the two pieces of the combined full-size test specimens, but they shall have the specified combined length (610 mm) and the longer piece shall be located in the lower part of the test specimen holder so that it is ignited first. This ensures the longest uninterrupted burn before the staples are reached by the flame front.

There are practical difficulties in preparing and testing toys that have seamed edges, edges decorated with trims or contain filling or wadding materials. Unlike earlier editions, this document now intentionally aims to test materials that contain features like seams, trims, appliques and similar embellishments, provided there is sufficient material available in the test specimen. Materials that contain wadding or fillings are also tested together with the filling or wadding, provided it does not fall out of the material when the test specimen is prepared.

Components of toy disguise costumes with loose stuffing that does fall out if prepared in accordance with 5.4.1.2 are tested as per the soft-filled toy method. This is to ensure those soft-filled parts are tested appropriately in the form they present.

This document also permits narrower strips of material to be tested (greater than 40 mm in width) by allowing the test specimen to be supported on a wire mesh within the specimen holder. Narrow strips are taken in the vertical direction and do not include seams or other features, but they may include any wadding or filling that remains attached to the test specimen.

Materials where there is insufficient material for a test specimen to be made are not subject to testing in accordance with 5.4 but would still be assessed under the general requirements of 4.1.

As it is impossible to describe all types of toys in this category, Table A.2 has been provided to aid assessments. Table A.2 is a non-exhaustive list of pictorial examples indicating the applicability of 4.1, 4.3, 5.4 and 5.5.

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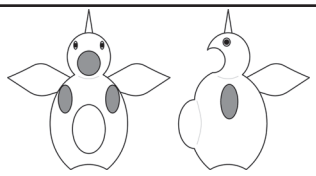
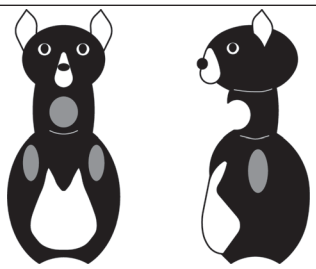
Table A.2 — Pictorial examples of toys and their application to 4.1, 4.3, 5.4 and 5.5

Ref.	Picture	Brief description of the toy disguise costumes	4.1	4.3/5.4	4.3/5.5
1		One-piece unicorn body and head made of textile. The child's head and arms protrude from the grey areas. The child's legs protrude from the bottom of the body. The head and the belly are filled with fibrous loose stuffing which would fall out if tested in accordance with 5.4.1.2.	x	x All parts other than head and belly	x Head and belly
2		One-piece animal body and head made of textile. The child's head and arms protrude from the grey areas. The child's legs protrude from the bottom of the body. The head and the belly are filled with fibrous loose stuffing which would fall out if tested in accordance with 5.4.1.2.	x	x All parts other than head and belly	x Head and belly

A.5 Toys intended to be entered by a child

See 4.4.

These include, for example, toy tents, puppet theatres, wigwams, teepees and play tunnels.

It is thought unlikely that any such toy would escape testing because of insufficient specimen size. The flaming debris requirement has been limited to those materials that have a rate of flame spread greater than 20 mm/s. Products produced from nylon and other synthetic materials can produce flaming debris and yet are extensively used in the production of children's clothing because they have a relatively slow rate of flame spread. This has led to the use of more hazardous materials that meet the flaming debris requirement but have a more rapid spread of flame.

In case of difficulties assessing whether toys or element of toys are to be entered by a child, the following may be used: draw a virtual cube containing the children; if a minimum of four sides of the toy or toy element, including the ground side, are fully or almost fully enclosing the child during normal and foreseeable use, then the toy or toy element is considered to be entered by a child.

A.6 Soft-filled toys

See 4.5.

These requirements are aimed at soft-filled toys or soft-filled parts of toys which would normally be cuddled or hugged by a child during play.

Typical examples of these toys are soft-filled teddy bears, animals, balls and soft bodied dolls.

These requirements are not aimed at soft-filled parts of toys that would not be cuddled or hugged during foreseeable play by children, for example the soft-filled rim of a pushchair, a non-removable soft-filled mattress of a toy cot or soft-filled components (nappies, padded dolls clothes) of a doll's playset.

A.7 Test relating to toy disguise costumes and toys intended to be entered by a child

See 5.4.

Toy disguise costumes are frequently worn before and after washing and so are tested for both circumstances irrespective of a manufacturer's care instruction advising not to wash or to wash before

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