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Safety of toys —

Part 2: Flammability

Sécurité des jouets —

Partie 2: Inflammabilité

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Contents

	Page
Foreword.....	v
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Requirements.....	3
4.1 General.....	3
4.2 Toys to be worn on the head (See A.3).....	4
4.2.1 General.....	4
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.....	4
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.....	5
4.2.4 Full or partial moulded head masks.....	5
4.2.5 Toys to be worn on the head (except those covered by 4.2.2 and 4.2.3), hoods, 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	5
4.3 Toy disguise costumes and toys intended to be worn by a child in play.....	5
4.4 Toys intended to be entered by a child.....	5
4.5 Soft-filled toys.....	6
5 Test methods.....	6
5.1 General.....	6
5.1.1 Test burner.....	6
5.1.2 Conditioning and test chamber.....	6
5.1.3 Test flame.....	6
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.....	7
5.2.1 Test flame.....	7
5.2.2 Test burner position.....	7
5.2.3 Test performance.....	7
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 (See A.7).....	7
5.3.1 Test flame.....	7
5.3.2 Test burner position.....	7
5.3.3 Test performance.....	7
5.4 Test relating to toys to be worn on the head (4.2.5) , hoods, 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.8).....	8
5.4.1 Preparation of test specimen.....	8
5.4.2 Holding and positioning the test specimen.....	11
5.4.3 Test flame.....	12
5.4.4 Test burner position.....	12
5.4.5 Test performance.....	13
5.4.6 Results.....	13
5.5 Test for soft-filled toys and certain soft-filled parts of toy disguise costumes.....	14
5.5.1 Test flame.....	14
5.5.2 Test burner position.....	14

5.5.3 Test performance.....	14
Annex A (informative) Background and rationale for this document.....	15
Annex B (informative) Significant technical changes between this document and the previous version.....	27
Bibliography.....	29

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 documents 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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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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). A list of the main technical changes between this version and the previous one 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.

Introduction

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

Compliance 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 may 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.

Additional requirements for the flammability of electric toys are described in IEC 62115^[1].

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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: beards, moustaches, wigs, etc. made from pile or flowing elements; masks; hoods, headdresses, etc.; 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 2431:2019, *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*

3 Terms and definitions

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

ISO and IEC maintain terminological 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/>

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
wipe with dry or damp cloth to remove surface soiling

3.3
extremely flammable liquid
liquid having a flash point $< 23\text{ °C}$ and initial boiling point $\leq 35\text{ °C}$

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 $101,3\text{ kPa}$

3.7
flammable liquid
liquid having a flash point $\geq 23\text{ °C}$ and $\leq 60\text{ °C}$

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

Note 1 to entry: Imitation hair, free hanging ribbons and paper or cloth strands are examples of flowing elements

3.9
highly flammable liquid
liquid having a flash point $< 23\text{ °C}$ and initial boiling point $> 35\text{ °C}$

3.10
highly flammable solid
material with similar behaviour in fire as 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.

[SOURCE: ISO 8124-1:2018 3.62]

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, 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

Specific materials to which the test flame is applied in order to check compliance of the toy with requirements in 4.2 to 4.5 are considered to comply with 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, and flammable gels except as provided for below:

- 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 $260 \times 10^{-6} \text{ m}^2/\text{s}$ corresponding to a flow time of more than 38 s when determined in accordance with ISO 2431:2019 using cup No. 6
- highly flammable liquids contained in chemical toys, and in olfactory board games, cometic kits and gustative games that conform to EN 71-13^[4]

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 to the applicable clause relevant to that particular part of the toy.

Attachments which are used for the purpose of securing a mask, hat, etc. 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, e.g. curly hair is not straightened. Plaits or braided hair shall be fully released and combed, where possible, before testing.

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, 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 8124-1:2018, B.2.1, for guidance.

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.

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 8124-1:2018, 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

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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.