
Safety of toys —
Part 2:
Flammability

Sécurité des jouets —
Partie 2: Inflammabilité

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[ISO 8124-2:2014](https://standards.iteh.ai/catalog/standards/sist/438b18b7-53e1-43f2-bd06-4a7c508546c7/iso-8124-2-2014)

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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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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO 8124-2 was prepared by Technical Committee ISO/TC 181, *Safety of toys*.

This third edition cancels and replaces the second (ISO 8124-2:2007), which has been technically revised.

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ISO 8124 consists of the following parts, under the general title *Safety of toys*:

- *Part 1: Safety aspects related to mechanical and physical properties*
- *Part 2: Flammability*
- *Part 3: Migration of certain elements*
- *Part 4: Swings, slides and similar activity toys for indoor and outdoor family domestic use*
- *Part 5: Determination of total concentration of certain elements in toys*
- *Part 6: Certain phthalate esters in toys and children's products*
- *Part 7: Requirements and test methods for finger paints*
- *Part 8: Age determination guidelines [Technical Report]*

Safety of toys —

Part 2: Flammability

1 Scope

This part of ISO 8124 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 minor 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 part of ISO 8124 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 *hair*, pile or *material that behaves in a similar manner to hair*; masks; hoods; headaddresses, etc.; flowing elements of toys to be worn on the head, but excluding paper novelty hats of the type usually supplied in party crackers (see [A.4](#));
- toy disguise costumes and toys intended to be worn by a child in play (see [A.5](#));
- toys intended to be entered by a child (see [A.6](#));
- *soft-filled toys* (see [A.7](#)).

NOTE 1 Additional requirements for *flammability* of electric toys are specified in IEC 62115.

NOTE 2 There are very few accident data concerning the hazards associated with the *flammability* of toys.

NOTE 3 See [A.2](#).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2431:2011, *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*

ISO 8124-1:2012, *Safety of toys — Part 1: Safety aspects related to mechanical and physical properties*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. Terms defined in this clause appear in italics throughout this part of ISO 8124.

- 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
extremely flammable liquid**
liquid having a flash point $< 23\text{ °C}$ and initial boiling point $\leq 35\text{ °C}$
- 3.3
flaming debris**
material that becomes detached from the sample during the test procedure and continues to flame as it falls
- 3.4
flammability**
ability of a material or a product to burn with a flame under specified test conditions
- 3.5
flammable gas**
gas or gas mixture having a flammable range with air at 20 °C and a standard pressure of $101,3\text{ kPa}$
- 3.6
flammable liquid**
liquid having a flash point $\geq 23\text{ °C}$ and $\leq 60\text{ °C}$
- 3.7
hair**
slender flexible fibres intended to represent human or animal hair
- 3.8
highly flammable liquid**
liquid having a flash point $< 23\text{ °C}$ and initial boiling point $> 35\text{ °C}$
- 3.9
material that behaves in a similar manner to hair**
material having the ability to flow like hair, to hang closely to the head and continue to move on its own after the head is rotated then stopped
- 3.10
molten drips**
falling droplets of molten material
- 3.11
moulded head mask**
mask that is moulded to the contours of the head or face
- 3.12
soft-filled toys**
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 can 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.
- Note 2 to entry: This definition is intended to be consistent with that in ISO 8124-1.
- 3.13
surface flash**
rapid spread of flame over the surface of a material without ignition of its base structure at the same time

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4 Requirements

4.1 General

See [A.3](#).

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;
- materials with the same behaviour in fire as celluloid;

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](#).

- materials with a piled surface which produce *surface flash* when a flame is applied to the tested material under the conditions described in [5.5.1](#) and [5.5.2](#).

Piled surfaces showing non rapid spread of flame to an area remote from the test flame are considered to meet this requirement.

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; **(standards.iteh.ai)**
- *highly flammable liquids* and *flammable liquids* being entirely retained within a porous material in capillary channels of writing [instruments](#); <https://standards.iteh.ai/catalog/standards/sist/438b18b7-53e1-43f2-bd06-4a7c308840c7/iso-8124-2-2014>
- *flammable liquids* with a viscosity greater than $260 \times 10^{-6} \text{ m}^2/\text{s}$ when determined in accordance with ISO 2431:2011, 5.1.4, Figure 1, using cup No. 6;
- *highly flammable liquids* contained in *chemical toys*.

4.2 Toys to be worn on the head

See [A.4](#).

4.2.1 General

The requirements of [4.2](#) apply to:

- beards, moustaches, wigs, etc. made from *hair*, pile, or *material that behaves in a similar manner to hair*;
- moulded and fabric masks;
- hoods, headdresses, etc.;
- flowing elements of toys to be worn on the head;

but not to paper novelty hats of the type usually supplied in party crackers.

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 sub-clause relevant to that particular part of the toy.

Attachments made from elastic or string, which is used for the purpose of securing a mask, hat, etc. on the head shall not be tested.

4.2.2 Beards, moustaches, wigs, etc. made from *hair*, pile, or material that behaves in a similar manner to hair (e.g. free-hanging ribbons, paper, cloth strands, or other flowing elements), which protrude 50 mm or more from the surface of the toy

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.

When tested according to [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 *hair*, pile, or material that behaves in a similar manner to *hair* 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.

4.2.3 Beards, moustaches, wigs, etc. made from *hair*, pile, or material that behaves in a similar manner to hair (e.g. free-hanging ribbons, paper, cloth strands, or other flowing elements), which protrude less than 50 mm and more than 5 mm from the surface of the toy

Beards, moustaches, wigs, etc. made from *hair*, pile, or material that behaves in a similar manner to *hair* which protrude 5 mm or less from the surface of the toy are regarded as headdresses and are covered by [4.2.5](#).

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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.

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4.2.4 Full or partial moulded head masks

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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 Flowing elements of toys to be worn on the head (except those covered by [4.2.2](#) and [4.2.3](#)), hoods, headdresses, etc. and masks not covered by [4.2.4](#) which partially or fully cover the head (e.g. fabric and cardboard 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 sample shall not exceed 10 mm/s or the test sample shall self-extinguish.

This requirement does not apply if it is not possible to obtain a sample from a single toy as described in [5.4.1](#).

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

See [A.5](#).

This requirement does not apply if it is not possible to obtain a sample from a single toy as described in [5.4.1](#).

When tested in accordance with [5.4](#), the rate of spread of flame of the test sample shall not exceed 30 mm/s or the test sample shall self-extinguish.

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 a statement similar to the following:

“Warning! Keep away from fire.”

See ISO 8124-1:2012, B.2.1, for guidance.

4.4 Toys intended to be entered by a child

See [A.6](#).

These are toys that at least partially enclose a child and include e.g. toy tents, wigwams and play tunnels, but do not include open canopies. The requirements apply to toys made of flexible materials such as fabric and vinyl. They do not apply to rigid materials.

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

When tested in accordance with [5.4](#), the rate of spread of flame of the test sample shall not exceed 30 mm/s or the test sample shall self-extinguish.

If the test sample 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 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 a statement similar to the following:

“Warning! Keep away from open flame.”

See ISO 8124-1:2012, B.2.1, for guidance.

This requirement does not apply if it is not possible to obtain a sample from a single toy as described in [5.4.1](#).

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4.5 Soft-filled toys

See [A.7](#).

The requirements of this subclause do not apply to soft-filled toys or soft-filled parts of a toy that cannot be cuddled or hugged by a child during play.

The requirements of this clause do not apply to toys which, when positioned in accordance with [5.5.3](#), present a maximum unhindered vertical soft-filled height of 150 mm or less. *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.

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

5 Test methods

5.1 General

5.1.1 Precautionary information

It is the responsibility of those using these test methods to do so in a safe manner. Burning materials can produce smoke and toxic gases and therefore protective measures are required for the safety of operators. Fire extinguishers should be readily available to hand.

5.1.2 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.

The type of gas used shall be specified in the results, for the sake of consistency.

5.1.3 Conditioning and test chamber

Before each test, the toys or samples shall be conditioned for at least 7 h in an atmosphere having a temperature of (21 ± 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 sample 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 samples shall be tested within 5 min of removal from the conditioning atmosphere.

5.1.4 Test flame

Light the burner described in 5.1.2 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.

5.2 Test relating to beards, moustaches, wigs, etc. made from *hair*, pile, or *material that behaves in a similar manner to hair* (e.g. free-hanging ribbons, paper, cloth strands, or other 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 vertically.

5.2.3 Test performance

Measure the length of the *hair*, pile, or *material that behaves in a similar manner to hair* and position the toy so that the largest dimension of the *hair*, pile, or *material that behaves in a similar manner to hair* hangs vertically or as near vertically as possible.

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

If ignition occurs, measure the duration of flaming and the burnt length, i.e. the maximum length of the *hair*, pile, or *material that behaves in a similar manner to hair* that has been burnt.

5.3 Test relating to beards, moustaches, wigs, etc. made from *hair*, pile, or *material that behaves in a similar manner to hair* (e.g. free-hanging ribbons, paper, cloth strands, or other flowing elements), which protrude less than 50 mm from the surface of the toy, and full or partial moulded head masks

See [A.8](#).

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° .

5.3.3 Test performance

Position the toy vertically.

Apply the test flame to the toy for $(5 \pm 0,5)$ 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 approximately 5 mm measured horizontally from the closest point of the burner tube, to the surface of the toy.

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.

5.4 Test relating to flowing elements of toys to be worn on the head (except those covered by 4.2.2 and 4.2.3), hoods, headdresses, etc. and masks not covered by 4.2.4 which partially or fully cover the head (e.g. fabric and cardboard masks, eye masks, face masks), toy disguise costumes and toys intended to be entered or worn by a child

See [A.9](#).

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5.4.1 Preparation of sample (standards.iteh.ai)

Each test shall be carried out on a single new toy.

If advice to the consumer (e.g. a care label on the toy or its packaging)

- indicates that the toy is not intended to be washed, it shall not be washed or soaked before testing,
- recommends a method of washing or cleaning, the toy shall be treated before testing in accordance with these recommendations which are regarded as instructions from the manufacturer, and
- gives no information relating to washing or cleaning the toy, if it is likely to be washed during its life or exposed to rain shall be treated, before testing, in accordance with the following instructions,

immerse the test sample(s) in tap water (at approximately 20°C) at a ratio of at least 1:20 mass of test sample(s) to volume of water, and allow it/them to stand for 10 min. Drain and repeat twice. Rinse by immersing the test sample(s) in demineralized water for 2 min. Drain and dry by a method appropriate to the test sample(s) and, where appropriate, restore the pile as near as possible to its original condition.

Cut test samples with dimensions of at least $610\text{ mm} \times 100\text{ mm}$ from each material available on the toy. Each test sample shall be made from one material. Where possible, the sample should not include seamed edges or edges decorated with lace trimmings. As seams modify the rate of spread of flame, they shall be placed in the upper part of the sample holder.

Where there is insufficient material to prepare a full sample as described above, two equal pieces of the same material from the same single toy with dimensions of $310\text{ mm} \times 100\text{ mm}$ can be used so that when they overlap, a full sample of at least $610\text{ mm} \times 100\text{ mm}$ is obtained. In order to ensure that there is no gap at the overlap, staples can be used to secure the join.

As the rate of spread of flame can be different with the direction of the fabric, where there is enough material, cut the test sample with the length corresponding to the vertical direction of the toy when in use.