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**Safety of toys —**  
**Part 2:**  
**Flammability**

*Sécurité des jouets —*  
*Partie 2: Inflammabilité*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

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

This second edition cancels and replaces the first edition (ISO 8124-2:1994) which has been technically revised.

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*

# Safety of toys —

## Part 2: Flammability

### 1 Scope

(See A.2)

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 methods of test relating to the following toys, which are considered as being those presenting the greatest hazard:

- toys to be worn on the head: beards, moustaches, wigs, etc., made from *hair*, pile or material with similar features; molded and fabric masks; hoods, head-dresses, etc.; flowing elements of toys to be worn on the head, but excluding paper novelty hats of the type usually supplied in party crackers;
- toy disguise costumes and toys intended to be worn by a child in a play;
- toys intended to be entered by a child;
- *soft-filled* toys (animals and dolls, etc.) with a piled surface or textile surface.

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

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

### 2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2431:1993, *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 8124-1:2000, *Safety of toys — Part 1: Safety aspects related to mechanical and physical properties*

ISO 8124-1/Amd.1, *Safety of toys — Part 1: Safety aspects related to mechanical and physical properties — Amendment 1*

ISO 8124-1/Amd.2, *Safety of toys — Part 1: Safety aspects related to mechanical and physical properties — Amendment 2*

EN 71-5:1993, *Safety of toys — Part 5: Chemical toys (sets) other than experimental sets*

### 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  
flammability**  
ability of a material or a product to burn with a flame under specified test conditions
- 3.2  
flaming debris**  
material that becomes detached from the sample during the test procedure and continues to flame as it falls
- 3.3  
hair**  
slender flexible fibres intended to represent *hair* (see 4.2)
- 3.4  
soft-filled toys**  
toy, clothed or unclothed, with primarily soft body surfaces and filled with soft substance(s), allowing compression of the main part of the toy readily with the hand
- See ISO 8124-1.
- NOTE Toys with part of their body surfaces made from hard materials, e.g. plastic face, hands or feet, are included.
- 3.5  
surface flash**  
rapid spread of flame over the surface of a material without ignition of its base structure at the same time
- [EN 1103:2005] <https://standards.iteh.ai/catalog/standards/sist/21f2b506-26b7-470e-a472-fac8b6ecd7a1/iso-8124-2-2007>
- 3.6  
molten drips**  
falling droplets of molten material
- 3.7  
flammable gases**  
any substance that is gaseous and flammable at room temperature
- 3.8  
flammable liquids**  
preparations having a flash point equal to or greater than 21 °C and less than or equal to 55 °C
- 3.9  
highly flammable liquids**  
preparations having a flash point below 21 °C
- 3.10  
highly flammable solids**  
solids that readily catch fire after brief contact with a source of ignition and that continue to burn or to be consumed after removal of the ignition source

## 4 Requirements

### 4.1 General (see A.3)

The following materials shall not be used in the manufacture of 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, and 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* on the approach of a flame. 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.
- *Highly flammable solids*.

In addition, toys shall not contain *flammable gases*, *highly flammable liquids*, *flammable liquids*, flammable gels except as provided for below.

- *Flammable liquids*, flammable gels and preparations 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 2431:1993 using cup No. 6.
- *Highly flammable liquids* contained in toys covered in EN 71-5.

### 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 with similar features;
- molded and fabric masks;
- hoods, head-dresses, 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 (see A.4).

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 are 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 with similar features (e.g. free-hanging ribbons, paper or cloth strands), which protrude more than or equal to 50 mm from the surface of the toy**

These materials may or may not be attached to masks, hats or other products worn on the head.

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 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 *hair*, pile, or material with similar features shall be:

- a) not more than 50 % of the greatest initial length, when the initial length was 150 mm or more;
- b) not 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 with similar features (e.g. free-hanging ribbons, paper or cloth strands), which protrude less than 50 mm from the surface of the toy**

These materials may or may not be attached to masks, hats or other products worn on the head.

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 molded head masks** ISO 8124-2:2007

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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. Cardboard partial masks with no *hair*, pile or other attachments (other than those for securing the toys) are excluded.

**4.2.5 Flowing elements of toys to be worn on the head**

These include hoods, head-dresses, etc., and fabric masks which partially or fully cover the head, but exclude those items covered by 4.3.

When tested in accordance with 5.4, the rate of spread of flame of the material shall not exceed 10 mm/s or shall self-extinguish before the second marker thread is severed.

This requirement does not apply if it is not possible to obtain the test sample from a single toy.

**4.3 Toy disguise costumes and toys intended to be worn by a child in a play (see A.5)**

These include e.g. cowboy suits, nurses' outfits, etc., and long flowing capes, etc., not attached to headwear covered by 4.2.5.

When tested in accordance with 5.4, the rate of spread of flame shall not exceed 30 mm/s or shall self-extinguish before the second marker thread is severed.

If the rate of spread of flame is between 10 mm/s and 30 mm/s, both the toy and the packaging shall be permanently marked with the following warning: **“Warning! Keep away from fire”**. (See ISO 8124-1:2000, C.2.1, for guidance).



The requirements of this clause do not apply if it is not possible to obtain the test sample from a single toy.

If the costume is intended to be reversible and the material has non-identical surfaces, both sides shall be tested.

#### 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 shall not exceed 30 mm/s or shall self-extinguish before the second marker thread is severed.

When tested in accordance with 5.4, if the sample has a rate of spread of flame greater than 20 mm/s, 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, both the toy and the packaging shall be permanently marked with the following warning: **“Warning! Keep away from fire”**. (See ISO 8124-1:2000, C.2.1, for guidance).

The requirements of this clause do not apply if it is not possible to obtain the test sample from a single toy.

#### 4.5 Soft-filled toys (animals and dolls, etc.) with a piled or textile surface (standards.iteh.ai)

##### 4.5.1 General

The requirements of this clause do not apply to toys with a maximum dimension of 150 mm or less. A toy shall be tested as supplied, including any clothing present with the toy and, if considered to be more onerous, with the clothes removed if removal can be accomplished without damage to the clothes or toy.

##### 4.5.2 Soft-filled toys with a maximum dimension of 520 mm or less

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

##### 4.5.3 Soft-filled toys with a maximum dimension greater than 520 mm

When tested in accordance with 5.6, the rate of spread of flame on the surface shall not be more than 30 mm/s.

## 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 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  $(20 \pm 5) ^\circ\text{C}$  and a relative humidity of  $(65 \pm 5) \%$ .

Carry out the tests in a draught-free test chamber in which the movement of air 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  $10 ^\circ\text{C}$  to  $30 ^\circ\text{C}$  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 with the burner in the vertical position from the end of the burner tube to the top of the flame.

## 5.2 Test relating to beards, moustaches, wigs, etc., made from *hair*, pile or material with similar features (e.g. free-hanging ribbons, paper or cloth strands), which protrude more than or equal to 50 mm from the surface of the toy

### 5.2.1 Test flame

Adjust the flame height to  $(20 \pm 2)$  mm.

### 5.2.2 Test burner position

Vertical.

### 5.2.3 Test performance

Measure the length of the *hair*, pile or material with similar features and position the toy so that the largest dimension of the *hair*, pile or material with similar features 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 maximum length of the *hair*, pile or material with similar features that has been burnt.

### 5.3 Test relating to beards, moustaches, wigs, etc., made from *hair*, pile or material with similar features (e.g. free-hanging ribbons, paper or cloth strands), which protrude less than 50 mm from the surface of the toy, and full or partial molded head masks

#### 5.3.1 Test flame

Adjust the flame height to  $(20 \pm 2)$  mm.

#### 5.3.2 Test burner position

Move the burner to an angle of  $45^\circ$ .

#### 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 at least 20 mm above the lower edge of the toy and/or attachment and with a distance measured from the closest point of the burner tube, horizontally to the surface of the toy of approximately 5 mm.

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, head-dresses, etc., fabric masks which partially or fully cover the head, toy disguise costumes, toys intended to be worn by a child in a play and toys intended to be entered by a child

#### 5.4.1 Preparation of sample

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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 article shall be treated in accordance with these recommendations which are regarded as instructions from the manufacturer;
- gives no information relating to washing or cleaning, articles likely to be washed or exposed to rain shall be treated, before testing, in accordance with the following instructions.

Immerse the toy in tap water (at approximately  $20^\circ\text{C}$ ) at a ratio of at least 1:20 mass of toy:volume of water, and allow it to stand for 10 min. Drain and repeat twice. Rinse by immersing the toy in demineralized water for 2 min. Drain and dry by a method appropriate to the toy 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.

If the material dimensions are such that it is not possible to obtain a test sample of at least  $610\text{ mm} \times 100\text{ mm}$ , it is permissible to use a test sample made up of two separate pieces of material from the same toy, each measuring  $310\text{ mm} \times 100\text{ mm}$ , which – when fitted together with an overlap of 10 mm – will constitute a test sample of  $610\text{ mm} \times 100\text{ mm}$ . Staples may be used to secure the join in order to ensure that there is no gap at the overlap.