SLOVENSKI STANDARD
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Varnost igrač - 3. del: Migracija določenih elementov

Safety of toys - Part 3: Migration of certain elements

Sicherheit von Spielzeug - Teil 3: Migration bestimmter Elemente

Sécurité des jouets - Partie 3: Migration de certains éléments

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Safety of toys - Part 3: Migration of certain elements

Sécurité des jouets - Partie 3: Migration de certains éléments

Sicherheit von Spielzeug - Teil 3: Migration bestimmter Elemente

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 71-3:2019) has been prepared by Technical Committee CEN/TC 52 “Safety of toys”, the secretariat of which is held by DS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2019, and conflicting national standards shall be withdrawn at the latest by October 2019.

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

This document supersedes EN 71-3:2013+A3:2018.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2009/48/EC.

For relationship with EU Directive 2009/48/EC, see informative Annex ZA, which is an integral part of this document.

The significant changes from the previous edition of this standard are detailed in Annex A.

EN 71, *Safety of toys*, consists of the following parts:

— *Part 1: Mechanical and physical properties;*

— *Part 2: Flammability;*

— *Part 3: Migration of certain elements* (this document);

— *Part 4: Experimental sets for chemistry and related activities;*

— *Part 5: Chemical toys (sets) other than experimental sets;*

— *Part 7: Finger paints — Requirements and test methods;*

— *Part 8: Activity toys for domestic use;*

— *Part 9: Organic chemical compounds — Requirements;*

— *Part 10: Organic chemical compounds — Sample preparation and extraction;*

— *Part 11: Organic chemical compounds — Methods of analysis;*

— *Part 12: N-Nitrosamines and N-nitrosatable substances;*

— *Part 13: Olfactory board games, cosmetic kits and gustative games;*

— *Part 14: Trampolines for domestic use.*

NOTE 1 In addition to the above parts of EN 71, the following guidance documents have been published: CEN/TR 15071, *Safety of toys — National translations of warnings and instructions for use in EN 71*, and CEN/TR 15371 (all parts), *Safety of toys — Interpretations*.

NOTE 2 Words in *italics* are defined in Clause 3 (Terms and definitions).

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The Toy Safety Directive (2009/48/EC) [1] specifies maximum migration limits for three categories of *toy materials*. Certain limit values have been amended (see [4, 5, 6, 7]). The limits for the migration of certain elements are expressed in milligram per kilogram *toy material* and are detailed in Table 2. The purpose of the limits is to minimize children's exposure to certain potentially toxic elements.

1 Scope

This document specifies requirements and test methods for the migration of aluminium, antimony, arsenic, barium, boron, cadmium, Chromium (III), Chromium (VI), cobalt, copper, lead, manganese, mercury, nickel, selenium, strontium, tin, organic tin and zinc from *toy materials* and from parts of toys.

Packaging materials are not considered to be part of the toy unless they have intended play value.

NOTE 1 See the European Commission guidance document no. 12 on the application of the Directive on the safety of toys – packaging [2].

The standard contains requirements for the migration of certain elements from the following categories of *toy materials*:

— Category I: Dry, brittle, powder like or pliable materials;

— Category II: Liquid or sticky materials;

— Category III: Scraped-off materials.

The requirements of this document do not apply to toys or parts of toys which, due to their accessibility, function, volume or mass, clearly exclude any hazard due to sucking, licking or swallowing or prolonged skin contact when the toy or part of toy is used as intended or in a foreseeable way, bearing in mind the behaviour of children.

NOTE 2 For the purposes of this document, for the following toys and parts of toys the likelihood of sucking, licking or swallowing toys is considered significant (see H.2 and H.3):

— All toys intended to be put in the mouth or to the mouth, cosmetics toys and writing instruments categorized as toys can be considered to be sucked, licked or swallowed;

— All the accessible parts and components of toys intended for children up to 6 years of age can be considered to come into contact with the mouth. The likelihood of mouth contact with parts of toys intended for older children is not considered significant in most cases (see H.2).

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.

EN 71-1:2014+A1:2018, *Safety of toys — Part 1: Mechanical and physical properties*

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:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
base material
material upon which *coatings* can be formed or deposited

3.2
coating
layer of material formed or deposited on a *base material* which can be removed by *scraping*

Note 1 to entry: *Coatings* can include paints, varnishes, lacquers, inks, polymeric *coatings* or other substances of a similar nature, whether they contain metallic particles or not, and irrespective of the manner of application.

3.3
paper
sheet formed by irregularly intervened fibres with a mass per unit area of 400 g/m^2 or less

3.4
paper board
sheet formed by irregularly intervened fibres with a mass per unit area over 400 g/m^2

Note 1 to entry: The term *paper board* also includes materials commonly referred to as card or cardboard with a mass per unit area over 400 g/m^2.

3.5
scraping
mechanical removal of *coatings* down to but not including the *base material*

3.6
toy material
material present in toys and accessible as determined in accordance with EN 71-1:2014+A1:2018, 8.10

3.7
sample
toy or material subject to testing

3.8
laboratory sample
material taken from a *sample*

4 Requirements

4.1 Toy material categories (see H.4)

Table 1 contains a list of common *toy materials* and their respective categories. *Toy materials* not specifically listed in Table 1 shall be assigned to one of the categories.

Table 1 — Cross-reference table for determining category

Toy Material	Category I	Category II	Category III
Coatings of paints, varnishes, lacquers, printing inks, polymers, foams and similar *coatings*			X
Polymeric and similar materials, including laminates, whether textile reinforced or not, but excluding other textiles			X
Paper and *paper board*			X
Textiles, whether natural or synthetic			X
Glass, ceramic, metallic materials			X
Wood, fibre board, hard board, bone, leather and other solid materials			X
Compressed paint tablets, materials intended to leave a trace or similar materials in solid form appearing as such in the toy (e.g. the cores of colouring pencils, chalk, crayons)	X		
Pliable modelling materials, including modelling clays and plaster	X		
Liquid paints, including finger paints, varnishes, lacquers, liquid ink in pens and similar materials in liquid form appearing as such in the toy (e.g. slimes, bubble solution)		X	
Glue sticks		X	

4.2 Specific requirements

The migration of elements from *toy materials* categorized in accordance with 4.1 shall not exceed the migration limits given in Table 2 when tested in accordance with Clause 7 (sampling and sample preparation), Clause 8 (migration procedure) and Clause 9 (stabilization and analysis of migration solutions).

Table 2 — Migration limits from toy materials

Element	Migration limit		
	Category I mg/kg	Category II mg/kg	Category III mg/kg
Aluminium	5 625	1 406	70 000
Antimony	45	11,3	560
Arsenic	3,8	0,9	47
Barium	1 500	375	18 750
Boron	1 200	300	15 000
Cadmium	1,3	0,3	17
Chromium (III)	37,5	9,4	460
Chromium (VI)	0,02	0,005	0,2 / 0,053 [a]
Cobalt	10,5	2,6	130
Copper	622,5	156	7 700
Lead	2,0	0,5	23
Manganese	1 200	300	15 000
Mercury	7,5	1,9	94
Nickel	75	18,8	930
Selenium	37,5	9,4	460
Strontium	4 500	1 125	56 000
Tin	15 000	3 750	180 000
Organic tin	0,9	0,2	12
Zinc	3 750	938	46 000

[a] The migration limit for Chromium (VI) for Category III toy material (scraped-off toy material) has been amended by Commission Directive (EU) 2018/725 [7]. The new limit value (0,053 mg/kg) applies from 2019-11-18. Before this date the limit value 0,2 mg/kg applies.

5 Principle

Soluble elements are extracted from *toy materials* using conditions which simulate the material remaining in contact with gastric juices for a period of time after swallowing. The concentrations of the soluble elements are determined quantitatively by three different methods:

— method for determining general elements: Aluminium, Antimony, Arsenic, Barium, Boron, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Strontium, Tin and Zinc;

— method for determining Chromium (VI);

— method for determining organic tin.

6 Reagents and apparatus

6.1 Reagents

All reagents, including water, used for analysis shall be of analytical grade or, if unavailable, technical grade reagents which have been determined to have acceptably low levels of impurity to allow the analysis to be performed.

6.1.1 Hydrochloric acid solution, c(HCl) = (0,07 ± 0,005) mol/l.

6.1.2 Hydrochloric acid solution, c(HCl) = (0,14 ± 0,010) mol/l.

6.1.3 Hydrochloric acid solution, c(HCl) = approximately 1 mol/l.

6.1.4 Hydrochloric acid solution, c(HCl) = approximately 2 mol/l.

6.1.5 Hydrochloric acid solution, c(HCl) = approximately 6 mol/l.

6.1.6 Isooctane, (C_8H_{18}), 99 %.

6.2 Apparatus

Standard laboratory equipment and the following shall be used.

6.2.1 Equipment for measuring pH, calibrated and sufficiently accurate for the purposes of this European Standard.

NOTE H.10 contains additional information on equipment for measuring pH.

6.2.2 Centrifuge, capable of centrifuging at high speed to separate the solids (see H.8).

6.2.3 A means to agitate the mixture, at a temperature of (37 ± 2) °C.

An orbital or linear shaker or shaking water bath capable of maintaining the migration solution in constant motion relative to the *sample*.

6.2.4 Plastic containers of gross volume, between 1,6 times and 5,0 times the volume of hydrochloric acid extract.

6.2.5 High retention filter-paper, ashless filter paper, particle retention in liquids 2,5 µm.

6.2.6 Membrane filters with pore sizes of 0,45 µm and 0,02 µm.

Syringe filters made with a cellulose acetate membrane are recommended for the 0,45 µm filter.

7 Sampling and sample preparation

7.1 Selection of test portions

A *sample* for testing shall consist of one toy in the form in which it will be marketed. Test portions shall be taken from *toy materials* of the single toy *sample*. Identical materials in the toy may be combined and treated as a single test portion but additional toy *samples* shall not be used to prepare larger test portions. Test portions are taken from each colour of each *toy material*. Test portions may be composed of more than one *toy material* or colour only when discrete specimens cannot be separated physically, e.g. dot printing, patterned textiles, multi-coloured printed surfaces etc. Such test portions shall be representative of the whole material.

NOTE This requirement does not preclude the preparation of test portions which represent the material and any *base material* upon which it is deposited.

Analysis of *toy materials* present in amounts less than 0,010 g is not required (see H.5).

The above does not preclude the testing of *toy materials* before they are used to manufacture a toy (raw materials). In these cases, the manufacturing process shall be assessed in order to ensure that it does not influence the migration of elements from the *toy materials*.

7.2 Sample preparation

7.2.1 General

Appropriate blank solutions shall be analysed so that appropriate corrections can be made when necessary (e.g. contamination of reagents and materials). If the blank result exceeds half of the lowest value the laboratory intends to report (laboratory's reporting limit) at least two blank solutions shall be analysed and the analytical result shall be corrected by the average value of the blank solutions.

7.2.2 Sampling

Whenever possible obtain a test portion of not less than 0,100 g of each *toy material* of the *laboratory sample* using the appropriate sampling method specified in Table 3.

Table 3 — Sampling methods

Toy material	Category (Table 1)	Sampling method
Liquid paints, including finger paints, varnishes, lacquers, liquid ink in pens and similar materials in liquid form appearing as such in the toy (e.g. slimes, bubble solutions)	II	Mix the *laboratory sample*. Ink in pens should be removed from the pen's refill before mixing.
Coatings of paints, varnishes, lacquers, printing ink, polymers, foams and similar *coatings*	III	NOTE 1 *Paper or paper board samples* with paint, varnish, lacquer, printing ink, adhesive or similar material applied to their surfaces are not subjected to this sampling method but are treated according to the sampling method for *paper or paper board*. Remove the *coating* from the *laboratory sample* by *scraping* at room temperature, taking care to avoid the inclusion of the *base material*. Obtain particles of approximately 0,5 mm. The use of pre-prepared materials for visual size comparison is recommended (see Annex D). In case of a thick layer or one which is difficult to remove (e.g. pliable or plasticised layers), the *coating* can be cut off and tested as polymeric material. For *coatings* deposited on a non-polymeric *base material*, it is permissible to add a few drops of solvent, such as acetone/ethanol (1:1) mixture, methylene chloride or tetrahydrofuran to soften the *coating* and assist in its removal from the *base material*. If