

DIN EN 71-3



ICS 97.200.50

Supersedes
DIN EN 71-3:2019-08

**Safety of toys –
Part 3: Migration of certain elements;
English version EN 71-3:2019+A1:2021,
English translation of DIN EN 71-3:2021-06**

Sicherheit von Spielzeug –
Teil 3: Migration bestimmter Elemente;
Englische Fassung EN 71-3:2019+A1:2021,
Englische Übersetzung von DIN EN 71-3:2021-06

Sécurité des jouets –
Partie 3: Migration de certains éléments;
Version anglaise EN 71-3:2019+A1:2021,
Traduction anglaise de DIN EN 71-3:2021-06

Document comprises 64 pages

Translation by DIN-Sprachendienst.

In case of doubt, the German-language original shall be considered authoritative.

A comma is used as the decimal marker.

National foreword

This standard includes safety requirements.

This document (EN 71-3:2019+A1:2021) has been prepared by Technical Committee CEN/TC 52 "Safety of toys" (Secretariat: DS, Denmark).

The responsible German body involved in its preparation was *DIN-Normenausschuss Sicherheitstechnische Grundsätze* (DIN Standards Committee Safety Design Principles), Working Group NA 095-05-01-02 AK "Safety of toys — Chemical properties".

Once this standard is cited in the Official Journal of the European Union, a manufacturer applying this standard may assume compliance with the requirements of the Toy Safety Directive (Directive 2009/48/EC) ("presumption of conformity"). For further information, users of this standard should refer to the websites of the European Union.

The standard which this document replaces, DIN EN 71-3:2019-08, may be used in parallel with this standard during a specified period where such has been laid down in the Official Journal of the European Union.

The DIN document corresponding to the document referred to in this document is as follows:

ISO 22744 (all parts)	DIN EN ISO 22744 (all parts)
-----------------------	------------------------------

For current information on this document, please go to DIN's website (www.din.de) and search for the document number in question.

Amendments

This standard differs from DIN EN 71-3:2019-08 as follows:

- a) the limits for aluminium in Table 2 have been adapted to the amended legal limits;
- b) Formula (F.2) has been revised;
- c) Annex ZA has been revised;
- d) the Bibliography has been supplemented by reference [19];
- e) the standard has been editorially revised.

Previous editions

DIN 66070-2: 1972-02

DIN EN 71-3: 1983-08, 1989-07, 1995-03, 2000-10, 2002-11, 2013-07, 2014-12, 2017-10, 2018-08, 2019-08

DIN EN 71-3 Corrigendum 1: 2003-05

National Annex NA
(informative)

Bibliography

DIN EN ISO 22744 (all parts), *Textiles and textile products — Determination of organotin compounds*

— This page is intentionally blank —

English Version

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

This European Standard was approved by CEN on 8 April 2019 and includes Amendment 1 approved by CEN on 2 February 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword.....	5
Introduction	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	8
4 Requirements	9
4.1 Toy material categories (see H.4)	9
4.2 Specific requirements.....	10
5 Principle	11
6 Reagents and apparatus	12
6.1 Reagents	12
6.2 Apparatus.....	12
7 Sampling and sample preparation.....	12
7.1 Selection of test portions.....	12
7.2 Sample preparation.....	13
7.2.1 General.....	13
7.2.2 Sampling.....	13
7.2.3 Dewaxing (see H.11)	15
8 Migration methodology	16
8.1 Preparation of test portions before migration testing.....	16
8.1.1 General.....	16
8.1.2 Category I: Dry, brittle, powder like or pliable materials and Category II: Liquid or sticky materials.....	16
8.1.3 Category III: Scraped-off materials.....	16
8.2 pH adjustment (see H.10).....	17
8.2.1 General.....	17
8.2.2 pH adjustment – no buffering effect by toy material.....	17
8.2.3 pH adjustment – buffering effect by toy material.....	17
8.3 Migration procedure.....	18
8.3.1 Migration.....	18
8.3.2 Filtration (see H.8).....	19
9 Stabilization and analysis of migration solutions	19
9.1 General.....	19
9.2 General elements	19
9.3 Chromium (VI)	19
9.4 Organic tin	20
10 Calculation of results	20
10.1 Calculation of migration	20
10.1.1 General.....	20
10.1.2 Calculation of Chromium (III).....	20
10.2 Interpretation of results.....	21
11 Method performance	21

11.1	Repeatability and reproducibility	21
11.2	Estimation of bias	23
11.3	Limit of detection (LOD) and limit of quantification (LOQ)	23
12	Test report	24
Annex A (informative) Significant technical changes between this document and the previous version		25
Annex B (informative) Information on method validation.....		27
B.1	General	27
B.2	Samples of interlaboratory comparison	27
B.3	Selection of material category/element combinations	28
Annex C (informative) Estimation of reproducibility.....		29
Annex D (informative) Toy material visual particle size comparison materials.....		31
Annex E (normative) Method of analysis for general elements.....		33
E.1	Principle.....	33
E.2	Working solutions	33
E.2.1	Stock solution (M_1).....	33
E.2.2	Diluted stock solution (M_2)	34
E.2.3	Working solutions	34
E.2.4	Internal standard stock solution	34
E.3	Procedure	34
E.4	Analysis	34
E.5	Calculation.....	35
E.5.1	Calibration curve	35
E.5.2	Calculation of migration.....	35
Annex F (normative) Method of analysis for Chromium (VI)		36
F.1	Principle.....	36
F.2	Reagents.....	36
F.3	Apparatus	37
F.4	Procedure	38
F.5	Analysis	38
F.5.1	General	38
F.5.2	Chromatographic conditions.....	38
F.5.3	Limit of detection and quantification.....	39
F.6	Calculation.....	39
F.6.1	Calibration curve	39
F.6.2	Calculation of migration.....	40
Annex G (normative) Method of analysis for organic tin (see H.9)		41

G.1	Principle	41
G.2	Reagents	42
G.3	Apparatus.....	45
G.4	Procedure.....	45
G.4.1	Sample derivatisation.....	45
G.4.2	Calibration standards.....	47
G.5	Analysis.....	47
G.5.1	General.....	47
G.5.2	Example of GC conditions.....	49
G.5.3	Example of MS conditions	49
G.5.4	Limit of detection and quantification	49
G.5.5	Example of a GC-MS chromatogram.....	50
G.6	Calculation.....	51
G.6.1	Calibration curve.....	51
G.6.2	Standard addition	51
G.6.3	Calculation of migration of organic tin.....	51
Annex H (informative)	Rationale.....	53
H.1	General.....	53
H.2	Mouthing behaviour of children (see Clause 1)	53
H.3	Skin contact (see Clause 1)	54
H.4	Toy categories (see 4.1)	54
H.5	Test portions (see Clause 7)	54
H.6	Size of test pieces (see 7.2)	54
H.7	Stability of Chromium (VI) in the migration solution (see 9.3).....	55
H.8	Filtration of migration solutions (see 8.3.2)	55
H.9	Organic tin (see Annex G).....	55
H.10	pH value (see 8.2 and 8.3.1.2).....	57
H.11	De-waxing (see 7.2.3)	57
Annex ZA (informative)	 Relationship between this European Standard and the essential requirements of EU Directive 2009/48/EC aimed to be covered.....	58
Bibliography		59