

DIN EN 71-3:2025-02 (E)

Safety of toys - Part 3: Migration of certain elements (includes Amendment A2:2024)

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
8 Migration methodology	15
8.1 Preparation of test portions before migration testing.....	15
8.1.1 General.....	15
8.1.2 [A₂] Category I: Dry, brittle, powder like or pliable materials and Category II: Liquid or sticky materials ^(A₂)	15
8.1.3 Category III: Scraped-off materials	16
8.2 pH adjustment (see H.10).....	16
8.2.1 General.....	16
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).....	18
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	19
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.....	20
11 Method performance	20
11.1 Repeatability and reproducibility	20

11.2	Estimation of bias	23
11.3	Limit of detection (LOD) and limit of quantification (LOQ)	23
12	Test report	23
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)	55
H.7	Ⓐ Chromium (VI) (see 9.3 and Annex F) Ⓐ	55
H.8	Filtration of migration solutions (see 8.3.2)	55
H.9	Organic tin (see Annex G).....	56
H.10	pH value (see 8.2 and 8.3.1.2).....	58
H.11	Ⓐ Deletion of de-waxing procedure Ⓐ	58
Annex ZA	(informative) Ⓐ Relationship between this European Standard and the essential requirements of Directive 2009/48/EC aimed to be covered Ⓐ	60
Bibliography	61