

AS/NZS ISO 8124.3:2021
ISO 8124-3:2020



Australian/New Zealand Standard™

Safety of Toys

Part 3: Migration of certain elements



AS/NZS ISO 8124.3:2021

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee CS-018, Safety Of Childrens Toys. It was approved on behalf of the Council of Standards Australia on 19 January 2021 and by the New Zealand Standards Approval Board on 16 December 2020.

This Standard was published on 12 February 2021.

The following are represented on Committee CS-018:

- Australian Toy Association
- Better Regulation Division — NSW Fair Trading
- CHOICE
- Consumer Affairs Victoria
- Consumers Federation of Australia
- Kidsafe Australia
- National Retail Association Australia
- New Zealand Toy Distributors Association
- Office of Fair Trading, Qld
- Queensland Health
- Safekids Aotearoa (New Zealand)
- Sydney Children’s Hospitals Network

This Standard was issued in draft form for comment as DR AS/NZS ISO 8124.3:2020.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

www.standards.govt.nz

ISBN 978 1 76113 197 4

Australian/New Zealand Standard™

Safety of Toys

Part 3: Migration of certain elements

Originated in Australia as part of AS 1647—1974.
Jointly revised and redesignated as AS/NZS ISO 8124.3:2003.
Previous edition AS/NZS ISO 8124.3:2012.
Third edition AS/NZS ISO 8124.3:2021.

COPYRIGHT

© ISO 2021 — All rights reserved

© Standards Australia Limited/the Crown in right of New Zealand, administered by the New Zealand Standards Executive 2021

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth) or the Copyright Act 1994 (New Zealand).

Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CS-018, Safety of Childrens Toys, to supersede AS/NZS 8124.3—2012, *Safety of toys, Part 3: Migration of certain elements (ISO 8124-3:2010, MOD)* and its Amendment 1 (2016).

The objective of this document is to specify maximum acceptable levels and methods of sampling, extraction and determination for the migration of the elements antimony, arsenic, barium, cadmium, chromium, lead, mercury and selenium from toy materials and from parts of toys.

This document applies to the following toys and toy components of toys and toy materials:

- (a) All intended food and oral contact toys, cosmetic toys and writing instruments categorized as toys, irrespective of any age grading or recommended age labelling.
- (b) All toys intended for or suitable for children under 72 months of age.
- (c) Accessible coatings, irrespective of any age grading or recommended age labelling.
- (d) Accessible liquids pastes and gels (e.g. liquid paints, modelling compounds), irrespective of any age grading or recommended age labelling.

This document does not apply to packaging materials, unless they are intended to be kept, for example boxes and containers, or unless they form part of the toy or have intended play value.

This document is identical with, and has been reproduced from, ISO 8124-3:2020, *Safety of toys — Part 3: Migration of certain elements*.

As this document has been reproduced from an International Standard, a full point substitutes for a comma when referring to a decimal marker. Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Preface	ii
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Maximum acceptable levels	3
4.1 Specific requirements	3
4.2 Interpretation of results	3
5 Principle	4
6 Reagents	4
7 Apparatus	5
8 Selection of test portions	5
9 Preparation and extraction of test portions	6
9.1 Coatings of paint, varnish, lacquer, printing ink, polymer and similar coatings	6
9.1.1 Test portion preparation	6
9.1.2 Extraction procedure	6
9.2 Polymeric and similar material, including laminates, whether textile-reinforced or not, but excluding other textiles	6
9.2.1 Test portion preparation	6
9.2.2 Extraction procedure	7
9.3 Paper and paperboard	7
9.3.1 Test portion preparation	7
9.3.2 Extraction procedure	7
9.4 Natural, artificial or synthetic textiles	7
9.4.1 Test portion preparation	7
9.4.2 Extraction procedure	8
9.5 Glass/ceramic/metallic materials	8
9.5.1 Test portion preparation	8
9.5.2 Extraction procedure	8
9.6 Other materials, whether mass-coloured or not (e.g. wood, fibreboard, bone and leather)	8
9.6.1 Test portion preparation	8
9.6.2 Extraction procedures	9
9.7 Materials intended to leave a trace	9
9.7.1 Test portion preparation for materials in solid form	9
9.7.2 Test portion preparation for materials in liquid form	10
9.7.3 Extraction procedure for samples not containing grease, oil, wax or similar material	10
9.7.4 Extraction procedure for samples containing grease, oil, wax or similar material	10
9.8 Pliable modelling materials, including modelling clays and gels	11
9.8.1 Test portion preparation	11
9.8.2 Extraction procedure for samples not containing grease, oil, wax or similar material	11
9.8.3 Extraction procedure for samples containing grease, oil, wax or similar material	11
9.9 Paints, including finger paints, varnishes, lacquers, glazing powders and similar material in solid or liquid form	12
9.9.1 Test portion preparation for materials in solid form	12

9.9.2	Test portion preparation for materials in liquid form.....	12
9.9.3	Extraction procedure for samples not containing grease, oil, wax or similar material.....	13
9.9.4	Extraction procedure for samples containing grease, oil, wax or similar material.....	13
10	Elemental analysis	13
10.1	Methods of analysis.....	13
10.2	Method detection limit (MDL).....	13
10.3	Calculation of results.....	14
11	Test report	14
Annex A	(normative) Sieve requirements	15
Annex B	(informative) Selection of procedure	16
Annex C	(informative) Methods for analysis of elements	17
Annex D	(informative) Background and rationale	23
Bibliography	29

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 181, *Safety of toys*.

This third edition cancels and replaces the second edition (ISO 8124-3:2010), which has been technically revised. It also incorporates the Amendments ISO 8124-3:2010/Amd.1:2014 and ISO 8124-3:2010/Amd.2:2018. The main changes to the previous edition are as follows:

- two detailed dewaxing methods have been introduced to replace the original one;
- an ICP-OES method for determination of the elements is given in [Annex C](#) as informative content.

A list of all parts in the ISO 8124 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The requirements of this document are based on the bioavailability of certain elements resulting from the use of toys, which should not, as an objective, exceed the following levels per day:

- 0,2 µg for antimony;
- 0,1 µg for arsenic;
- 25,0 µg for barium;
- 0,6 µg for cadmium;
- 0,3 µg for chromium;
- 0,7 µg for lead;
- 0,5 µg for mercury;
- 5,0 µg for selenium.

For the interpretation of these values, it has been necessary to identify an upper limit for the ingestion of toy material. Very limited data have been available for identifying this upper limit. As a working hypothesis, a summed average daily intake of the various toy materials has been gauged at the currently accepted value of 8 mg/d, in the knowledge that in certain individual cases these values might be exceeded.

By combining the daily intake with the bioavailability values listed above, limits have been obtained for various toxic elements in micrograms per gram of toy material (milligrams per kilogram) and are detailed in [Table 1](#). The values obtained have been adjusted to minimize children's exposure to toxic elements in toys and to ensure analytical feasibility, taking into account limits achievable under current manufacturing conditions (see [Annex D](#)).

Australian/New Zealand Standard

Safety of Toys

Part 3: Migration of certain elements

WARNING — Persons applying this document should be familiar with laboratory practice for chemical analysis. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

IMPORTANT — It is essential that the laboratory ensures that personnel have the competence to perform laboratory activities for which they are responsible.

1 Scope

1.1 This document specifies maximum acceptable levels and methods of sampling, extraction and determination for the migration of the elements antimony, arsenic, barium, cadmium, chromium, lead, mercury and selenium from toy materials and from parts of toys.

1.2 Maximum acceptable levels are specified for the migration of the elements listed in [1.1](#) from the following toy materials:

- coatings of paints, varnishes, lacquers, printing inks, polymers and similar coatings (see [9.1](#));
- polymeric and similar material, including laminates, whether textile-reinforced or not, but excluding other textiles and non-woven textiles (see [9.2](#));
- paper and paperboard (see [9.3](#));
- natural, artificial or synthetic textiles (see [9.4](#));
- glass/ceramic/metallic materials, excepting lead solder when used for electrical connections (see [9.5](#));
- other materials, whether mass-coloured or not (e.g. wood, fibreboard, hardboard, bone and leather) (see [9.6](#));
- materials intended to leave a trace (e.g. the graphite materials in pencils and liquid ink in pens) (see [9.7](#));
- pliable modelling materials, including modelling clays and gels (see [9.8](#));
- paints to be used as such in the toy, including finger paints, varnishes, lacquers, glazing powders and similar material in solid or liquid form (see [9.9](#)).

1.3 The requirements in this document apply to the following toys and toy components of toys and toy materials (see [D.2.1](#)):

- all intended food and oral contact toys, cosmetic toys and writing instruments categorized as toys, irrespective of any age grading or recommended age labelling;
- all toys intended for or suitable for children under 72 months of age;
- accessible coatings, irrespective of any age grading or recommended age labelling;
- accessible liquids, pastes and gels (e.g. liquid paints, modelling compounds), irrespective of any age grading or recommended age labelling.

1.4 Packaging materials are not included, unless they are intended to be kept, for example boxes and containers, or unless they form part of the toy or have intended play value (see [D.2.2](#)).