

Australian/New Zealand Standard™

Safety of toys

Part 1: Safety aspects related to mechanical and physical properties



AS/NZS ISO 8124.1:2019

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 23 April 2019 and by the New Zealand Standards Approval Board on 7 May 2019.

This Standard was published on 31 May 2019.

The following are represented on Committee CS-018:

- Australian Chamber of Commerce and Industry
- Australian Toy Association
- CHOICE
- Consumer Affairs Victoria
- Consumers' Federation of Australia
- Kidsafe Australia
- Ministry of Business, Innovation and Employment (New Zealand)
- National Acoustic Laboratories (Australia)
- National Retail Association Australia
- New Zealand Toy Distributors Association
- NSW Fair Trading
- 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 8124.1:2019.

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 76072 467 2

This is a preview. [Click here to purchase the full publication.](#)

Australian/New Zealand Standard™

Safety of toys

Part 1: Safety aspects related to mechanical and physical properties

Originated in Australia as AS 1647—1974.
Jointly revised and redesignated as AS/NZS ISO 8124.1:2002.
Jointly revised and designated as AS/NZS 8124.1:2016.
Jointly revised and redesignated as AS/NZS ISO 8124.1:2019.

COPYRIGHT

© ISO 2019 — All rights reserved
© Standards Australia Limited/the Crown in right of New Zealand, administered by the New Zealand Standards Executive 2019

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 Children's Toys, to supersede AS/NZS 8124.1:2016, *Safety of toys, Part 1: Safety aspects related to mechanical and physical properties (ISO 8124-1:2014, MOD)*.

The objective of this Standard is to specify safety aspects related to the mechanical and physical properties that are generally applicable to toys for children up to the age of 14 years, taking into account normal use and reasonably foreseeable abuse.

Other Standards in this series provide specifications for additional mechanical and physical properties that apply to specific categories of toys (e.g. domestic activity toys) and for other properties of toys (e.g. flammability and migration of certain elements). Specifications for the electrical properties of toys are provided in AS/NZS 62115.

There are regulated requirements for toys in Australia and New Zealand. Users of this Standard are reminded that regulations may refer to specific versions of the Standard and may also make variations to the requirements stated in the referenced edition. Therefore, conformance with this Standard cannot be relied on to ensure compliance with all legal requirements for the sale of toys. Users of this Standard should familiarize themselves with the regulated requirements for toys. For example, in Australia, Commonwealth product safety laws can be found at www.productsafety.gov.au.

This Standard is identical with, and has been reproduced from, ISO 8124-1:2018, *Safety of toys — Part 1: Safety aspects related to mechanical and physical properties*.

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 | vii |
| Introduction | viii |
| 1 Scope | 1 |
| 2 Normative references | 3 |
| 3 Terms and definitions | 3 |
| 4 Requirements | 15 |
| 4.1 Normal use | 15 |
| 4.2 Reasonably foreseeable abuse | 15 |
| 4.3 Material | 16 |
| 4.3.1 Material quality | 16 |
| 4.3.2 Expanding materials | 16 |
| 4.4 Small parts | 16 |
| 4.4.1 For children under 36 months | 16 |
| 4.4.2 For children 36 months and over but under 72 months | 17 |
| 4.5 Shape, size and strength of certain toys | 17 |
| 4.5.1 Squeeze toys, rattles, fasteners, and certain other toys and components of toys | 17 |
| 4.5.2 Small balls | 20 |
| 4.5.3 Pompoms | 20 |
| 4.5.4 Pre-school play figures | 20 |
| 4.5.5 Toy pacifiers | 21 |
| 4.5.6 Balloons | 21 |
| 4.5.7 Marbles | 21 |
| 4.5.8 Hemispheric-shaped toys | 21 |
| 4.6 Edges | 24 |
| 4.6.1 Accessible sharp edges of glass or metal | 24 |
| 4.6.2 Functional sharp edges | 24 |
| 4.6.3 Edges on metal toys | 25 |
| 4.6.4 Edges on moulded toys | 25 |
| 4.6.5 Edges on exposed bolts or threaded rods | 25 |
| 4.7 Points | 25 |
| 4.7.1 Accessible sharp points | 25 |
| 4.7.2 Functional sharp points | 25 |
| 4.7.3 Wooden toys | 26 |
| 4.8 Projections | 26 |
| 4.8.1 General requirements | 26 |
| 4.8.2 Special considerations for bath toy projections | 26 |
| 4.9 Metal wires and rods | 26 |
| 4.10 Plastic film or plastic bags in packaging and in toys | 27 |
| 4.11 Cords | 28 |
| 4.11.1 General | 28 |
| 4.11.2 Cords in toys intended for children under 18 months | 28 |
| 4.11.3 Cords in toys intended for children 18 months and over but under 36 months | 29 |
| 4.11.4 Fixed loops and nooses intended for children under 36 months | 30 |
| 4.11.5 Cords on pull toys | 30 |
| 4.11.6 Electrical cables | 30 |
| 4.11.7 Diameter of certain cords intended for children under 36 months | 30 |
| 4.11.8 Self-retracting cords intended for children under 36 months | 30 |
| 4.11.9 Toys attached to or intended to be strung across, or otherwise attached to, a cradle, cot, perambulator or carriage | 30 |

| | | |
|---------|--|----|
| 4.11.10 | Cords on toy bags..... | 31 |
| 4.11.11 | Cords, strings and lines for flying toys..... | 31 |
| 4.12 | Folding mechanisms..... | 31 |
| 4.12.1 | Toy pushchairs, perambulators and similar toys..... | 31 |
| 4.12.2 | Other toys with folding mechanisms..... | 32 |
| 4.12.3 | Hinge-line clearance..... | 33 |
| 4.13 | Holes, clearances and accessibility of mechanisms..... | 33 |
| 4.13.1 | Circular holes in rigid materials..... | 33 |
| 4.13.2 | Accessible clearances for movable segments..... | 33 |
| 4.13.3 | Chains or belts in ride-on toys..... | 33 |
| 4.13.4 | Other driving mechanisms..... | 34 |
| 4.13.5 | Winding keys..... | 34 |
| 4.14 | Springs..... | 35 |
| 4.15 | Stability and overload requirements..... | 35 |
| 4.15.1 | Stability of ride-on toys and seats..... | 35 |
| 4.15.2 | Overload requirements for ride-on toys and seats..... | 36 |
| 4.15.3 | Stability of stationary floor toys..... | 36 |
| 4.16 | Enclosures..... | 36 |
| 4.16.1 | Ventilation..... | 36 |
| 4.16.2 | Closures..... | 37 |
| 4.16.3 | Toys that enclose the head..... | 38 |
| 4.17 | Simulated protective equipment, such as helmets, hats and goggles..... | 38 |
| 4.18 | Projectile toys..... | 38 |
| 4.18.1 | General..... | 38 |
| 4.18.2 | Projectiles..... | 39 |
| 4.18.3 | Projectile toys with stored energy..... | 40 |
| 4.18.4 | Projectile toys without stored energy..... | 42 |
| 4.19 | Rotors and propellers..... | 44 |
| 4.20 | Aquatic toys..... | 44 |
| 4.21 | Braking..... | 44 |
| 4.22 | Toy bicycles..... | 45 |
| 4.22.1 | Instructions for use..... | 45 |
| 4.22.2 | Determination of maximum saddle height..... | 45 |
| 4.22.3 | Braking requirements..... | 45 |
| 4.23 | Speed limitation of electrically driven ride-on toys..... | 46 |
| 4.24 | Toys containing a heat source..... | 46 |
| 4.25 | Liquid-filled toys..... | 47 |
| 4.26 | Mouth-actuated toys..... | 47 |
| 4.27 | Toy roller skates, toy inline skates and toy skateboards..... | 47 |
| 4.28 | Percussion caps specifically designed for use in toys..... | 47 |
| 4.29 | Acoustic requirements..... | 47 |
| 4.30 | Toy scooters..... | 48 |
| 4.30.1 | General..... | 48 |
| 4.30.2 | Warnings and instructions for use..... | 49 |
| 4.30.3 | Strength..... | 49 |
| 4.30.4 | Stability..... | 49 |
| 4.30.5 | Adjustable and folding steering tubes and handlebars..... | 49 |
| 4.30.6 | Braking..... | 50 |
| 4.30.7 | Wheel size..... | 50 |
| 4.30.8 | Projections..... | 50 |
| 4.31 | Magnets and magnetic components..... | 50 |
| 4.31.1 | Magnetic/electrical experimental sets intended for children 8 years and over..... | 50 |
| 4.31.2 | All other toys with magnets and magnetic components..... | 50 |
| 4.32 | Yo-yo balls..... | 51 |
| 4.33 | Straps intended to be worn fully or partially around the neck..... | 51 |
| 4.34 | Sledges and toboggans with cords for pulling..... | 52 |
| 4.35 | Jaw entrapment in handles and steering wheels..... | 52 |

| | | |
|----------|---|-----------|
| 5 | Test methods | 52 |
| 5.1 | General | 52 |
| 5.2 | Small parts test | 53 |
| 5.3 | Test for shape and size of certain toys | 54 |
| 5.4 | Small balls test | 55 |
| 5.5 | Test for pompoms | 55 |
| 5.6 | Test for pre-school play figures | 56 |
| 5.7 | Accessibility of a part or component | 56 |
| 5.7.1 | Principle | 56 |
| 5.7.2 | Apparatus | 56 |
| 5.7.3 | Procedure | 57 |
| 5.8 | Sharp-edge test | 58 |
| 5.8.1 | Principle | 58 |
| 5.8.2 | Apparatus | 58 |
| 5.8.3 | Procedure | 59 |
| 5.9 | Sharp-point test | 60 |
| 5.9.1 | Principle | 60 |
| 5.9.2 | Apparatus | 60 |
| 5.9.3 | Procedure | 61 |
| 5.10 | Determination of thickness of plastic film and sheeting | 61 |
| 5.10.1 | General | 61 |
| 5.10.2 | Apparatus | 61 |
| 5.10.3 | Procedure | 61 |
| 5.11 | Test for cords | 62 |
| 5.11.1 | Cord cross-sectional dimension | 62 |
| 5.11.2 | Length of cords and electrical cables | 62 |
| 5.11.3 | Breakaway feature separation test | 63 |
| 5.11.4 | Test for fixed loops and nooses | 63 |
| 5.11.5 | Self-retracting cords | 67 |
| 5.11.6 | Electrical resistance of cords | 68 |
| 5.12 | Stability and overload tests | 68 |
| 5.12.1 | General | 68 |
| 5.12.2 | Sideways stability test, feet available for stabilization | 68 |
| 5.12.3 | Sideways stability test, feet unavailable for stabilization | 68 |
| 5.12.4 | Fore and aft stability test | 69 |
| 5.12.5 | Overload test for ride-on toys and seats | 69 |
| 5.12.6 | Stability test of stationary floor toys | 69 |
| 5.13 | Test for closures and toy chest lids | 69 |
| 5.13.1 | Closures | 70 |
| 5.13.2 | Toy chest lids | 70 |
| 5.14 | Impact test for toys that cover the face | 70 |
| 5.15 | Kinetic energy and wall impact test | 70 |
| 5.15.1 | Kinetic energy of projectiles | 71 |
| 5.15.2 | Wall impact test for projectiles | 73 |
| 5.16 | Free-wheeling facility and brake performance test | 74 |
| 5.16.1 | Determination of free-wheeling facility | 74 |
| 5.16.2 | Brake performance for mechanically or electrically powered ride-on toys other than toy bicycles | 74 |
| 5.16.3 | Brake performance for toy bicycles | 75 |
| 5.17 | Determination of speed of electrically driven ride-on toys | 75 |
| 5.18 | Determination of temperature increases | 75 |
| 5.19 | Leakage of liquid-filled toys | 75 |
| 5.20 | Durability of mouth-actuated toys | 76 |
| 5.21 | Expanding materials | 76 |
| 5.22 | Folding or sliding mechanisms | 76 |
| 5.22.1 | Loads | 76 |
| 5.22.2 | Toy pushchairs and perambulators | 77 |
| 5.22.3 | Other toys with folding mechanisms | 77 |

| | | |
|---------------------|---|------------|
| 5.23 | Washable toys..... | 77 |
| 5.24 | Reasonably foreseeable abuse tests..... | 78 |
| 5.24.1 | General..... | 78 |
| 5.24.2 | Drop test..... | 78 |
| 5.24.3 | Tip-over test for large and bulky toys..... | 79 |
| 5.24.4 | Dynamic strength test for wheeled ride-on toys other than toy scooters..... | 80 |
| 5.24.5 | Torque test..... | 81 |
| 5.24.6 | Tension test..... | 81 |
| 5.24.7 | Compression test..... | 84 |
| 5.24.8 | Flexure test..... | 85 |
| 5.25 | Determination of sound pressure levels..... | 85 |
| 5.25.1 | General test conditions..... | 85 |
| 5.25.2 | Specific test methods..... | 87 |
| 5.26 | Static strength for toy scooters..... | 91 |
| 5.27 | Dynamic strength for toy scooters..... | 93 |
| 5.27.1 | Principle..... | 93 |
| 5.27.2 | Load..... | 93 |
| 5.27.3 | Procedure..... | 95 |
| 5.28 | Brake performance for toy scooters..... | 95 |
| 5.28.1 | Toy scooters with handbrake..... | 95 |
| 5.28.2 | Toy scooters with foot brake..... | 95 |
| 5.29 | Strength of toy scooter steering tubes..... | 96 |
| 5.29.1 | Resistance to downward forces..... | 96 |
| 5.29.2 | Resistance to upward forces..... | 97 |
| 5.30 | Resistance to separation of handlebar..... | 97 |
| 5.31 | Tension test for magnets..... | 98 |
| 5.31.1 | Principle..... | 98 |
| 5.31.2 | Toys with magnets or magnetic components..... | 98 |
| 5.31.3 | Toys that contain one magnet only and a mating metal component..... | 99 |
| 5.31.4 | Toys that contain one magnet only and no mating metal component..... | 99 |
| 5.32 | Magnetic flux index..... | 99 |
| 5.32.1 | General..... | 99 |
| 5.32.2 | Principle..... | 99 |
| 5.32.3 | Apparatus..... | 99 |
| 5.32.4 | Procedure..... | 99 |
| 5.32.5 | Calculation of magnetic flux index..... | 100 |
| 5.33 | Impact test for magnets..... | 100 |
| 5.34 | Soaking test for magnets..... | 100 |
| 5.35 | Determination of projectile range..... | 101 |
| 5.36 | Tip assessment of rigid projectiles..... | 102 |
| 5.37 | Length of suction cup projectiles..... | 102 |
| 5.38 | Yo-yo ball measurements..... | 103 |
| 5.38.1 | Measurement of elastic constant, k | 103 |
| 5.38.2 | Measurement of initial length, l_0 | 104 |
| Annex A | (informative) Age-grading guidelines | 107 |
| Annex B | (informative) Safety-labelling guidelines and manufacturer's markings | 111 |
| Annex C | (informative) Design guidelines for toys attached to cribs or playpens | 119 |
| Annex D | (informative) Toy gun marking | 120 |
| Annex E | (informative) Rationale | 121 |
| Annex F | (informative) Bath toy projection design guidelines | 147 |
| Annex G | (informative) Significant technical changes between this document and the previous version | 148 |
| Bibliography | | 150 |

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 on 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 the following URL: www.iso.org/iso/foreword.html.

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

This fifth edition cancels and replaces the fourth edition (ISO 8124-1:2014). A list of the main technical changes made to the previous edition is given in [Annex G](#).

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

Introduction

This document is largely based upon existing standards in the European Union (EN 71-1) and in the United States of America (ASTM F963).

Compliance with the requirements of this document will minimize potential hazards associated with toys resulting from their use in their intended play modes (normal use) as well as unintended play modes (reasonably foreseeable abuse).

This document will not, nor is it intended to, eliminate parental responsibility in the appropriate selection of toys. In addition, this document will not eliminate the need for parental supervision in situations where children of various ages may have access to the same toy(s).

Although [Annexes A, B, C, D, E](#) and [F](#) are for information purposes only, they are crucial for the correct interpretation of this document.

The safety of electric toys is described in IEC 62115.

When age indications are required for safety labelling purposes, they may be given in either months or years.