
Safety of toys —

Part 1:

**Safety aspects related to mechanical and
physical properties**

Sécurité des jouets —
iTeh STANDARD PREVIEW
Partie 1: Aspects de sécurité relatifs aux propriétés mécaniques et
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physiques

ISO 8124-1:2000

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 8124 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 8124-1 was prepared by Technical Committee ISO/TC 181, *Safety of toys*.

ISO 8124 consists of the following parts, under the general title *Safety of toys*:

Part 1: Safety aspects of mechanical and physical properties

Part 2: Flammability

Part 3: Migration of certain elements

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Annex A forms a normative part of this part of ISO 8124. Annexes B, C, D, E and F are for information only.

Introduction

This part of ISO 8124 is largely based upon existing standards in the European Union (EN 71-1) and in the United States (ASTM F963).

However, it should not be construed that a toy manufactured in compliance with this part of ISO 8124 will be in full compliance with relevant national toy safety requirements in the market where the product is intended to be distributed. The user of this part of ISO 8124 is therefore advised to be aware of relevant national requirements.

Compliance with the requirements of this part of ISO 8124 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 part of ISO 8124 will not, nor is it intended to, eliminate parental responsibility in the appropriate selection of toys. In addition, this part of ISO 8124 will not eliminate the need for parental supervision in situations where children of various ages may have access to the same toy(s).

This part of ISO 8124 includes normative annex A, Battery-operated toys. When IEC 62115 [14] is published, consideration will be given to replacing annex A by a reference to it. Annexes B, C, D, E and F are for information only but are crucial for the correct interpretation of the standard.

Pending approval of additional acoustic requirements and test methods in the ASTM standard F963 (expected first half of year 2000) and experience gained from application of EN 71-1, including further validation of the test methods, the acoustic requirements and test methods in EN 71-1 are given as information in annex F. When the levels in the requirements and test methods have been evaluated and validated, the acoustic requirements will be added, as a normative part, to this part of ISO 8124 as soon as possible.

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Safety of toys —

Part 1:

Safety aspects related to mechanical and physical properties

1 Scope

The requirements in this part of ISO 8124 apply to all toys, i.e. any product or material designed or clearly intended for use in play by children under 14 years of age. They are applicable to a toy as it is initially received by the consumer and, in addition, they apply after a toy is subjected to reasonably foreseeable conditions of normal use and abuse unless specifically noted otherwise.

The requirements of this part of ISO 8124 specify acceptable criteria for structural characteristics of toys, such as shape, size, contour, spacing (e.g. rattles, small parts, sharp points and edges, hinge-line clearances) as well as acceptable criteria for properties peculiar to certain categories of toy (e.g. maximum kinetic energy values for non-resilient-tipped projectiles, minimum tip angles for certain ride-on toys).

This part of ISO 8124 specifies requirements and test methods for toys intended for use by children in various age groups from birth to 14 years. The requirements vary according to the age group for which a particular toy is intended. The requirements for a particular age group reflect the nature of the hazards and the expected mental and/or physical abilities of the child to cope with them.

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This part of ISO 8124 also requires that appropriate warnings and/or instructions for use be given on certain toys or their packaging. Due to linguistic problems that may occur in different countries, the wording of these warnings and instructions is not specified but given as general information in annex C. It should be noted that different legal requirements exist in many countries with regard to such marking.

This part of ISO 8124 does not purport to cover or include every conceivable potential hazard of a particular toy or toy category. Except for labelling requirements indicating the functional hazards and the age range for which the toy is intended, this part of ISO 8124 has no requirements for those characteristics of toys that represent an inherent and recognized hazard that is integral to the function of the toy.

NOTE An example of such a hazard is the sharp point necessary for the proper function of a needle. The needle is a hazard that is well understood by the purchaser of a toy sewing kit, and the functional sharp point hazard is communicated to the user as part of the normal educational process as well as at the point of purchase by means of cautionary labelling on the product's packaging.

As a further example, a toy scooter has inherent and recognized hazards associated with its use (e.g. instability during use, especially whilst learning). The potential hazards associated with its structural characteristics (sharp edges, pinch hazards, etc.) will be minimized by compliance with the requirements of this part of ISO 8124.

Products not included within the scope of this part of ISO 8124 are

- a) bicycles, except for those considered to be toys, i.e. those having a maximum saddle height of 435 mm (see E.1);
- b) slingshots;

NOTE "Slingshots" are also known as "catapults"

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- c) darts with metal points;
- d) home and public playground equipment;
- e) compressed air and gas operated guns and pistols (see E.1);
- f) kites (except for the electric resistance of their strings, which is included);
- g) model kits, hobby and craft items in which the finished item is not primarily of play value;
- h) sporting goods and equipment, camping goods, athletic equipment, musical instruments and furniture; however, toys that are their counterparts are included.

It is recognized that there is often a fine distinction between, for example, a musical instrument or a sporting item and its toy counterpart. The intention of the manufacturer or distributor, as well as normal use and reasonably foreseeable abuse, determines whether the item is a toy counterpart or not;

- i) models of aircraft, rockets, boats and land vehicles powered by combustion engines; however, toys that are their counterparts are included (see E.1);
- j) collectible products not intended for children under 14 years of age;
- k) holiday decorations that are primarily intended for ornamental purposes;
- l) aquatic equipment intended to be used in deep water;
- m) toys installed in public places (e.g. arcades and shopping centres);
- n) puzzles having more than 500 pieces or without a picture, for specialists;
- o) fireworks including percussion caps, except percussion caps specifically designed for toys;
- p) products containing heating elements intended for use under the supervision of an adult in a teaching context;
- q) steam engines;
- r) video toys that can be connected to a video screen and operated at a nominal voltage greater than 24 V;
- s) babies' pacifiers (dummies);
- t) faithful reproduction of firearms;
- u) electric ovens, irons or other functional products operated at a nominal voltage greater than 24 V;
- v) bows for archery with an overall relaxed length exceeding 120 cm;
- w) fashion jewellery for children (see E.1).

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 8124. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 8124 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 868:1985, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)*.

ISO 4287-2:1997, *Surface roughness — Terminology — Part 2: Measurement of surface roughness parameters*.

ISO 4593:1993, *Plastics — Film and sheeting — Determination of thickness by mechanical scanning*.

ISO 6508-1:1999, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*.

3 Terms and definitions

NOTE Whenever the term “months” is used in this part of ISO 8124, it denotes that the designated number of months is completed (i.e. 18 months means up to and including 18 full months of age).

For the purposes of this part of ISO 8124, the following terms and definitions apply.

3.1

accessible

(part or component) describing any area of the toy that can be contacted by any portion forward of the collar of the accessibility probe as described in 5.7

3.2

aquatic toy

article, whether inflatable or not, intended to bear the mass of a child and used as an instrument of play in shallow water

NOTE Bathroom toys and beach balls are not considered aquatic toys.

3.3

ball

spherical, ovoid, or ellipsoidal object designed or intended to be thrown, hit, kicked, rolled, dropped or bounced

NOTE 1 This definition includes balls attached to a toy or article by a string, elastic cord or similar tether and also any multi-sided object formed by connecting planes into, and any novelty item of, a generally spherical ovoid or ellipsoidal shape designed or intended to be used as a ball.

NOTE 2 This definition does not include dice, or balls permanently enclosed inside pinball machines, mazes, or similar outer containers. A ball is permanently enclosed if, when tested according to 5.24 (reasonably foreseeable abuse), it is not removed from the outer container.

3.4

backing

material adhering to flexible plastic sheeting

3.5

battery-operated toy

toy having at least one function dependent on electricity and powered by batteries

3.6

burr

roughness caused by not cleanly severing or finishing the material

3.7

collapse

sudden or unexpected folding of a structure

3.8

cord

length of slender, flexible material

EXAMPLES Monofilaments, woven and twisted cord, rope, plastic textile tapes, ribbon and those fibrous materials known as string.

3.9

crushing

injury to part of the body resulting from compression between two rigid surfaces

3.10

discharge mechanism

inanimate system for releasing and propelling a projectile

3.11

driving mechanism

assembly of linked parts or components (e.g. gears, belts, winding mechanisms), at least one of which moves, powered by a source (e.g. electrical or mechanical means) independent of the child

3.12

edge

line, formed at the junction of two surfaces, whose length exceeds 2,0 mm

3.12.1

curled edge

edge in which the portion of the sheet adjacent to the edge is bent into an arc and forms an angle of less than 90° with the base sheet

See Figure 1.

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3.12.2

hemmed edge

edge in which the portion of the sheet adjacent to the edge is folded back on the sheet itself through an angle of approximately 180°, so that the portion of the sheet adjacent to the edge is approximately parallel to the main sheet

See Figure 1.

3.12.3

rolled edge

edge in which the portion of the sheet adjacent to the edge is bent into an arc and forms an angle between 90° and 120° with the main sheet

See Figure 1.

3.13

expanding material

material whose volume expands when exposed to water

3.14

fastener

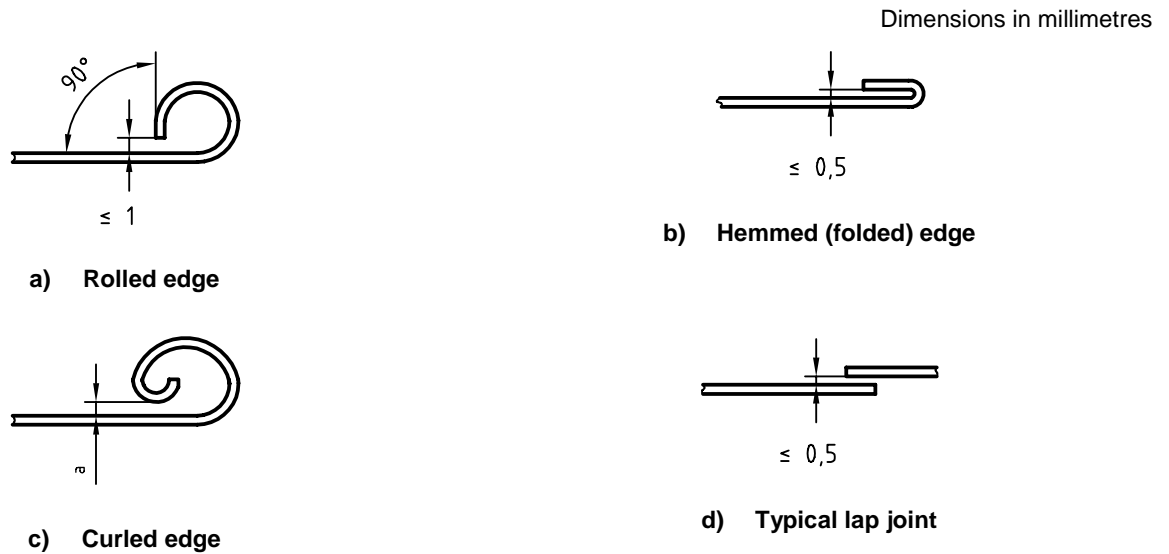
mechanical device which attaches two or more elements together

EXAMPLE Screws, rivets, staples.

3.15

feathering

beveling of an edge (or decrease in thickness moving toward the edge) caused during shearing or cutting of material



a No limit.

Figure 1 — Edges

3.16

flash

excess material that escapes between the mating parts of a mould assembly

3.17

folding mechanism

hinged, pivoted, folding or sliding assembly that could crush, scissor, pinch or shear during operation

EXAMPLE Toy ironing boards, toy pushchairs

3.18

functional toy

toy which performs and is used in the same way as, and is often a scale model of, a certain product, appliance or installation intended for adults

EXAMPLE Stove with heating properties.

3.19

fuzz

bits of fibrous-type material that can be readily removed from toys with a pile surface

3.20

glass

hard, brittle, amorphous substance produced by fusion, usually consisting of mutually dissolved silica and silicates that also contain soda and lime

3.21

harm

physical injury or damage to the health of people or damage to property or the environment

3.22

hazard

potential source of harm

NOTE The term hazard can be qualified in order to define its origin or the nature of the expected harm (i.e. electric shock hazard, crushing hazard, cutting hazard, toxic hazard, fire hazard, drowning hazard).

3.23 hazardous projection

projection that, because of its material or configuration or both, may present a puncture hazard should a child step on or fall onto it

NOTE 1 Excluded from this definition are puncture hazards to the eyes and/or mouth, because of the impossibility of eliminating puncture hazards to those areas of the body by product design.

NOTE 2 If the projection is on a small toy which topples over when pressure is applied to the end of the projection, it is unlikely to present a hazard.

3.24 hazardous sharp edge

accessible edge of a toy that presents an unreasonable risk of injury during normal use and reasonably foreseeable abuse

3.25 hazardous sharp point

accessible point of a toy that presents an unreasonable risk of injury during normal use or reasonably foreseeable abuse

3.26 hinge-line clearance

distance between the stationary portion of a toy and the movable portion along or adjacent to a line projected through the axis of rotation

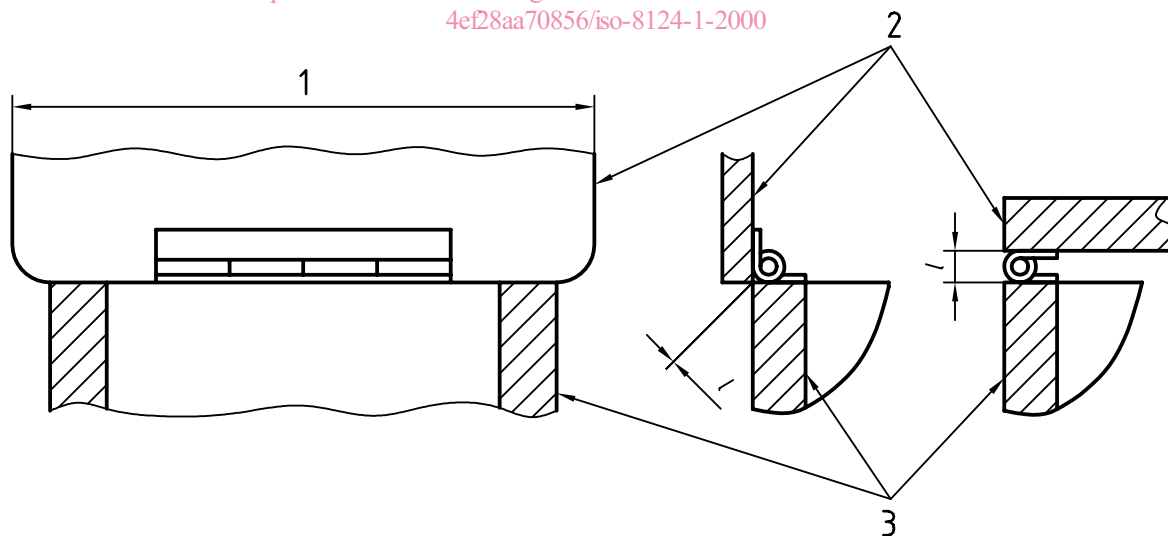
See Figure 2.

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3.27 intended use

use of a product, process or service in accordance with information provided by the supplier

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Key

- 1 Hinge line
- 2 Lid
- 3 Box

l = Hinge-line clearance

Figure 2 — Hinge-line clearance

3.28**lap joint**

joint in which an edge overlaps a parallel surface but is not necessarily mechanically attached to it at all points along the length

See Figure 1.

3.29**large and bulky toy**

toy that has a projected base area of more than 0,26 m² or a volume of more than 0,08 m³ calculated without regard to minor appendages

NOTE The base area for toys having permanently attached legs is measured by calculating the area enclosed by straight lines connecting the outermost edge of each leg of the perimeter.

3.30**marble**

sphere made of hard material, such as glass, agate, marble or plastic, that is used in various children's games, generally as a playing piece or marker

3.31**metal**

material comprising elemental metal and/or metal alloys

3.32**normal use**

play modes that conform to the instructions that accompany the toy, that have been established by tradition or custom, or that are evident from an examination of the toy

3.33**packaging**

material accompanying the toy when purchased, but having no intended play function

3.34**paper**

material, marketed as either paper or paperboard, with a maximum areic mass of 400 g/m²

3.35**play furniture**

furniture intended for use by a child and intended to, or likely to, support the mass of a child

3.36**pompom**

lengths or strands of fibre, yarns or threads clamped or secured and tied in the centre, and brushed up to form a spherical shape

NOTE 1 This definition includes spherical-shaped attachments made of stuffed materials (see Figure 3).

NOTE 2 Tassels with long strands are not considered pompoms (see Figure 4).



Figure 3 — Regular and rounded pompoms



Figure 4 — Tassel with long strands

3.37

projectile

object intended to be launched into free flight, or a trajectory, in the air

3.38

projectile toy with stored energy

toy with a projectile propelled by means of a discharge mechanism capable of storing and releasing energy

3.39

projectile toy without stored energy

projectile discharged by the energy imparted by a child

3.40

protective cap or cover

component that is attached to a potentially hazardous edge or projection to reduce the risk of injury

3.41

pull toy

toy that is intended to be pulled along the floor or ground

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NOTE Toys intended for children aged 36 months or more are not regarded as pull toys.

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3.42

reasonably foreseeable abuse

use of a toy under conditions or for purposes not intended by the supplier, but which can happen, induced by the toy in combination with, or as a result of, common behaviour in a child

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EXAMPLES Deliberate disassembly, dropping or using a toy for a purpose for which it was not intended.

NOTE Tests simulating reasonably foreseeable abuse are given in 5.24.

3.43

removable component

part or component which is intended to be removed from the toy without the use of tools

3.44

rigidity

hardness of material exceeding 70 Shore A scale durometer as measured in accordance with ISO 868

3.45

risk

combination of the probability of occurrence of harm and the severity of that harm

3.46

simulated protective equipment

toys designed to mimic products that infer some sort of physical protection to the wearer

EXAMPLES Protective helmets, visors.

3.47**soft-filled toy
stuffed toy**

toy, clothed or unclothed, with soft body surfaces and filled with soft materials, allowing compression of the torso readily with the hand

3.48**splinter**

sharp pointed fragment

3.49 springs**3.49.1****helical spring**

spring in the form of a coil

See Figure 5.

3.49.1.1**compression spring**

helical spring which essentially returns to its initial state after compression

3.49.1.2**extension spring**

helical spring which essentially returns to its initial state after tension

3.49.2**spiral spring**

clockwork-type spring

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See Figure 6.

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3.50**teether**

toy designed for oral use and intended primarily for symptomatic relief of teething discomfort

3.51**tool**

screwdriver, coin or other object which may be used to operate a screw, clip or similar fixing device

3.52**toy**

any product or material designed or clearly intended for use in play by children less than 14 years of age

3.53**toy bicycle**

two-wheeled vehicle, with or without stabilizers, with a maximum saddle height of 435 mm and which is propelled solely by the muscular energy of the child on that vehicle, in particular by means of pedals

3.54**toy chest**

container with a hinged lid enclosing a volume greater than 0,03 m³, specifically designed for storing toys

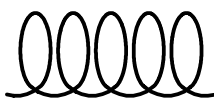


Figure 5 — Helical spring



Figure 6 — Spiral spring