INTERNATIONAL STANDARD

ISO 8124-1

First edition
2000-04-01

AMENDMENT 2
2007-06-01

Safety of toys —

Part 1: Safety aspects related to mechanical and physical properties

AMENDMENT 2

Sécurité des jouets —

Partie 1: Aspects de sécurité relatifs aux propriétés mécaniques et physiques

AMENDEMENT 2

Reference number
ISO 8124-1:2000/Amd.2:2007(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

Amendment 2 to 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 related to mechanical and physical properties*

— *Part 2: Flammability*

— *Part 3: Migration of certain elements*

Safety of toys —

Part 1:
Safety aspects related to mechanical and physical properties

AMENDMENT 2

2 Normative references

Add the following normative references:

ISO 3746:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane*

ISO 11201, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane*

ISO 11202, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Survey method* in situ

ISO 11204, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Method requiring environmental corrections*

IEC 61672-1:2002, *Electroacoustics — Sound level meters — Part 1: Specifications*

IEC 61672-2:2003, *Electroacoustics — Sound level meters — Part 2: Pattern evaluation tests*

3 Terms and definitions

Add the following terms and definitions:

3.57
close-to-the-ear toy
toy that is intended to be used close to the ear, i.e. the sound-emitting part of such a toy is normally put against the ear of a child

EXAMPLES: Toy cellphones or toy telephones that emit sounds from the handpiece.

3.58
continuous sound
any steady-state sound or group of variable sounds greater than one second in duration

3.59
C-weighted peak sound pressure level ($L_{p\mathrm{Cpeak}}$)
the peak sound pressure level obtained when using standardized C-weighting

3.60
equivalent sound pressure level
$L_{p\mathrm{Aeq}}$
level of a steady-state sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound

3.61
explosive action
the sudden release of energy characterized by the rapid expansion or bursting of a material

3.62
hand-held toy
toy that is intended to be used or operated while being held in the hand

EXAMPLES: Toy tools, small electronic games, stuffed animals, dolls, musical toys and cap-firing toys.

3.63
impulsive sound
any sound that is characterized by a brief excursion of sound pressure significantly exceeding the ambient noise, typically less than one second in duration

3.64
maximum A-weighted sound pressure level
$L_{p\mathrm{Amax}}$
maximum sound pressure level obtained when using standardized A-weighting

3.65
rattle
toy that is clearly designed to emit sound when shaken, typically intended for children that are too young to sit up unaided

3.66
squeeze toy
hand-held pliable toy, usually incorporating a noise-making feature activated by forcing air through an opening when flexed or squeezed and which usually recovers its original shape when released

3.67
table-top, floor and crib toy
toys intended to be played with while attached to or resting on a table top, floor or crib

EXAMPLES: Toy vehicles, stacking toys, large and bulky toys, games and activity toys that attach to crib rails.

Add the following subclauses:

4.28 Acoustic requirements (see E.41)

The requirements in this subclause do not apply to:

— mouth-actuated toys, i.e toys the noise level of which is determined by the blowing action of the child (e.g. whistles and imitation musical instruments such as trumpets, flutes);

— child-actuated toys, i.e. toys the noise level of which is determined by the muscular action of the child (e.g. xylophones, bells, drums, *squeeze toys*). The *continuous sound* pressure requirements do not apply to *rattles*; however, rattles are covered by *impulsive sound* pressure requirements;

— radios, tape players, CD-players and other similar electronic toys;

— toys that are connected to or interfaced with external devices (e.g. televisions, computers) where the sound pressure level is determined by the external device;

— sound emitted from earphones/headphones.

When tested in accordance with 5.25 (determination of sound pressure levels), toys that are designed to emit sound shall conform to the following requirements:

a) The A-weighted *equivalent sound pressure level*, $L_{p\mathrm{Aeq}}$, of *continuous sounds* produced by *close to the-ear toys* shall not exceed 65 dB.

b) The A-weighted *equivalent sound pressure level*, $L_{p\mathrm{Aeq}}$ (*maximum A-weighted sound pressure level,* L_{pAmax}, for pass-by tests), of continuous sounds produced by all other toys except *close-to-the-ear toys* shall not exceed 85 dB.

c) The *C-weighted peak sound pressure level*, $L_{p\mathrm{Cpeak}}$, of *impulsive sounds* produced by *close-to-the-ear toys* shall not exceed 95 dB.

d) The *C-weighted peak sound pressure level*, $L_{p\mathrm{Cpeak}}$, of *impulsive sounds* produced by any type of toy excluding toys using *explosive action* (e.g. percussion caps) shall not exceed 115 dB.

e) The *C-weighted peak sound pressure level*, $L_{p\mathrm{Cpeak}}$, of *impulsive sounds* produced by a toy using percussion caps or other *explosive action* shall not exceed 125 dB.

f) If the *C-weighted peak sound pressure level*, $L_{p\mathrm{Cpeak}}$, of *impulsive sounds* produced by a toy using percussion caps or other *explosive action* exceeds 115 dB, the potential danger to hearing shall be drawn to the attention of the user (see B.2.19).

5.25 Determination of sound pressure levels (see 4.28)

5.25.1 Installation and mounting conditions

5.25.1.1 General

Carry out the measurements on a new toy not already subjected to testing. Test battery toys using new primary batteries or fully charged secondary batteries.

External power supplies should not be used as they will, in many cases, affect the performance of the toy.

5.25.1.2 Test environment

Test environments shall meet the qualification requirements of ISO 3746:1995, Annex A.

NOTE 1 In practice this means that most normally furnished rooms with a volume exceeding 30 m^3 will qualify at measurement distances of 50 cm provided that the largest dimension of the toy does not exceed 50 cm. For distances shorter than 25 cm almost any environment will qualify.

NOTE 2 If the more accurate ISO 11201 is used, the test environment should meet the requirements of ISO 3744.

5.25.1.3 Mounting

Test rigs used for the mounting of toys and/or the operator of the toy shall not affect the sound emission of the toy under test nor cause sound reflections which will increase the sound pressure levels at the measuring points.

NOTE 1 It is often convenient to be able to rotate the test object instead of moving the microphone.

— Mount *close-to-the-ear toys* and *hand-held toys* in a proper test rig at least 100 cm above the reflecting plane or have them operated by an adult operator with the arm outstretched.

NOTE 2 If an operator is used, hearing protectors should be used when testing very loud toys.

— Place stationary *table-top, floor and crib toys* on a standard test table such as described in ISO 11201. The table top should be large enough such that, with the toy resting on and fully over the table top, the side of the measurement box from which the measurement is being made is also above the table top (see 5.25.2.3.6).

— Mount self-propelled table-top and floor toys on the standard test table as described above in a test rig so that they can be operated with full power, but are prevented from moving around.

— Place pull and push toys on the reflecting plane (e.g. concrete, tile or other hard surface) and fix them in a test rig which enables them to be moved with varying speed along a direct line which passes the measuring microphones (“passing-by” test). Make sure that the friction of the reflecting plane prevents wheels from skidding.

— Place hand-actuated wind-up toys, with the wind-up spring fully loaded, on the reflecting plane (e.g. concrete, tile, or other hard surface) so that the front of the toy is 40 cm ± 1 cm along the x-axis from the microphones of the “passing-by” test (see Figure D).

— Mount other types of toy in the most appropriate way using the principles described in previous paragraphs.

5.25.1.4 Operating conditions

Operate the toy under test in that mode of its intended or foreseeable use which produces the highest sound pressure level to the microphone position, i.e. where the maximum noise level is obtained.

In particular:

— Operate a hand-actuated toy manually, excluding *pull* and push *toys*, by applying the force at the point and direction of its intended or foreseeable use giving the maximum sound pressure level. For a toy intended to be shaken, shake at a rate of three times per second. One cycle shall consist of an initial 15 cm stroke followed by a return to the starting point.

— Operate a *rattle* by grasping it where it is meant to be held or, if in doubt, where the longest lever between the hand and the sound emitting part of the *rattle* can be obtained. Make sure that the radiated sound is not affected by the grip of the hand. Strike downwards ten times with hard lashes in a slow tempo. Use the wrist and keep the forearm essentially horizontal. Endeavour to achieve the highest possible sound level. Stand side-face with the microphone and keep the *rattle* at the same height as the microphone at a distance of 50 cm.

— Operate a *pull* and push *toy* at a speed that yields the maximum sound pressure level. Do not exceed 2 m/s.

— Operate a cap-firing toy using percussion caps recommended by the manufacturer and which are available on the market.

5.25.2 Measurement procedure

5.25.2.1 Basic International Standards to be used

The minimum requirement is to determine sound pressure levels at the specified positions around the toy in accordance with ISO 11202 and ISO 11204, which are survey methods. In case of dispute, the more accurate ISO 11201 shall be used.

NOTE 1 Because of fewer reflections from the room boundaries, ISO 11201 will tend to give slightly lower values than ISO 11202 and ISO 11204.

NOTE 2 In certain cases, ISO 11204 can have the accuracy of an engineering method.

5.25.2.2 Instrumentation

The instrumentation system, including the microphone and cable, shall meet the requirements of a class 1 or class 2 instrument specified in IEC 61672-1:2002 and 61672-2:2003. When measuring high peak sound pressure levels, e.g. from toys using percussion caps, the microphone and the entire instrumentation system

shall have the capability of handling linear peak levels, exceeding the C-weighted peak levels, by at least 10 dB.

NOTE When ISO 11201 is used, a class 1 instrument is required.

5.25.2.3 Microphone positions

5.25.2.3.1 General

Several microphone positions shall be used. In practice this often means that one microphone is moved from position to position. Whenever it is practicable, it is always an alternative to rotate the test object instead. Attention must be paid to maintaining the correct measuring distance.

5.25.2.3.2 Close-to-the-ear toys

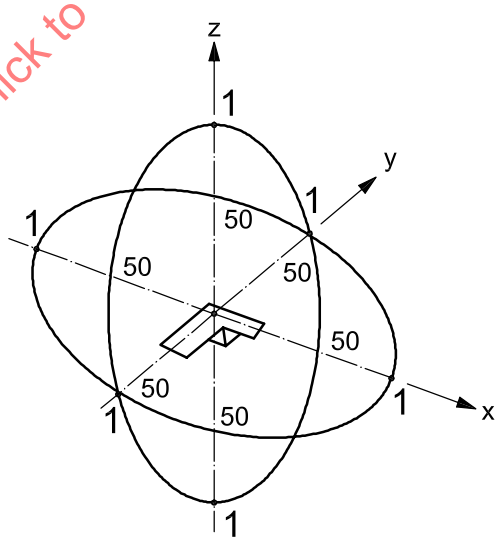
Locate the position of the maximum sound pressure level of a *close-to-the-ear toy* by moving the toy or the measuring microphone so that the measuring distance is 50 cm ± 0,5 cm from that surface of the toy where the main sound source exists. This position is the microphone position for measurements.

5.25.2.3.3 Cap-firing toys

Use six microphone positions around the toy. Place the main sound-emitting part of the toy at the origin of the measuring coordinate system in its normal operating orientation, in such a way that the main axes of the toy coincide with the axes of the measuring coordinate system (see Figure A). If the length of the toy exceeds 50 cm, rotate the toy in the xy-plane 45° around the z-axis without changing the microphone positions.

Select two microphone positions along each axis at a distance of 50 cm ± 1 cm to both directions from the origin as shown in Figure A.

Dimensions in centimetres



Key

1 microphone

Figure A — Microphone positions for the measurement of sound pressure levels of cap firing toys

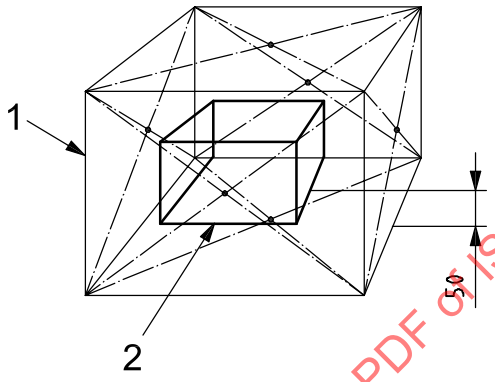
5.25.2.3.4 Rattles

Mount the microphone 1,2 m above the floor and at a distance of 0,5 m from the sound source in a room either large enough or sound absorbing enough to make all sound reflections negligible.

5.25.2.3.5 Other hand-held toys

Select six microphone positions on a box-shaped measurement surface at the measuring distance of 50 cm from the reference box of the toy, as defined in ISO 3746, as specified in Figure B. The positions are at the centres of the sides of the measurement surface at the distance 50 cm from the reference box.

Dimensions in centimetres



Key

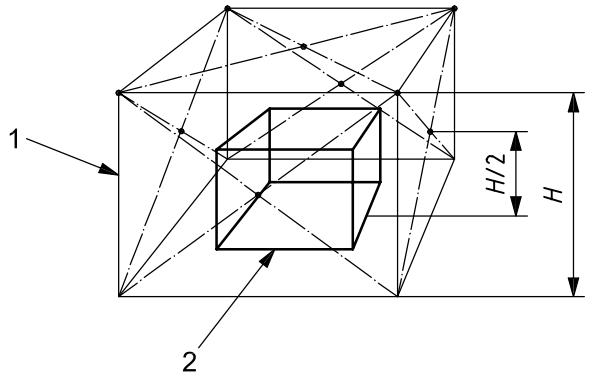
1 measurement box

2 reference box

Figure B — Microphone positions for all other hand-held toys

5.25.2.3.6 Stationary and self-propelled table-top, floor and crib toys

Select five, or if the length or width of the toy is larger than 100 cm, nine microphone positions on a box-shaped measurement surface at the measuring distance of 50 cm from the reference box of the toy as specified in Figure C. The sides of the measurement box with height H are always 50 cm from the sides of the reference box, except for the bottom of the boxes, which lie in the same plane. All microphone positions are on the measurement box.



Key

1 measurement box

2 reference box

Figure C — Microphone positions for the measurement of stationary and self-propelled *table-top, floor and crib toys*

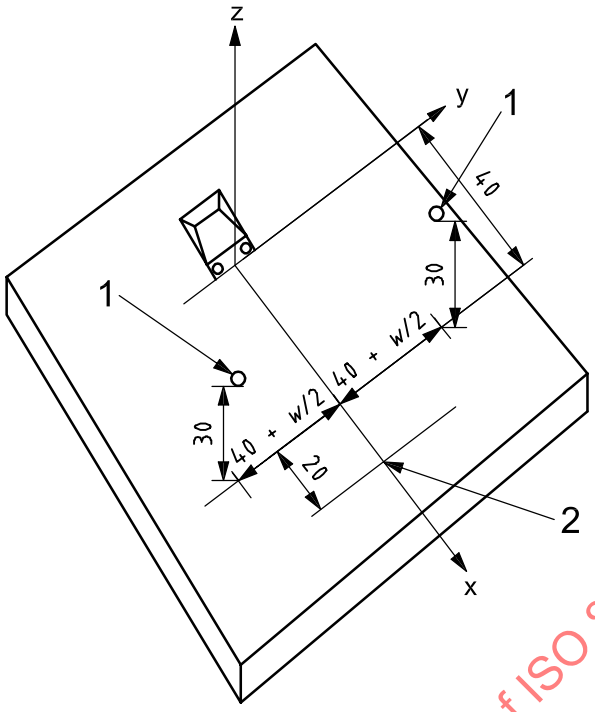
5.25.2.3.7 Pull and push toys and hand-activated spring-propelled toys

For toys with a width, w, of 25 cm or less, use two microphones at distances, d, 50 cm from the x-axis of the measuring coordinate system as shown in Figure D.

For toys with a width, w, of more than 25 cm, use two microphone at distances, d, 40 cm plus half the width of the toy from the x-axis (40 + w/2) as shown in Figure D.

Place the toy on a test rig or on the reflecting plane in its normal operating orientation in such a way that movement of the toy is possible along the x-axis passing the microphone positions.

Dimensions in centimetres



Key

1 microphone

2 end of measurement

w width of toy

Figure D — Microphone positions for the measurements of pull and push toys and for hand-actuated spring-propelled toys ("pass-by" test)

5.25.2.4 Measurements

5.25.2.4.1 General

Normal operating mode(s) shall be reached before the tests are performed.

5.25.2.4.2 Measurements of continuous sounds

If the toy under test has a clearly-defined operating cycle, measure the *equivalent sound pressure level* in each microphone position during at least one whole cycle. Quiet periods longer than 15 s shall be excluded from the measurement period. Perform a total of three measurements.

If the toy under test does not have a clearly-defined operating cycle, measure the *equivalent sound pressure level* in each microphone position for at least 15 s during the operational mode where the noise level is highest. Perform a total of three measurements.

For pass-by tests, measure the *maximum A-weighted sound pressure level*. Measure twice on each side.

5.25.2.4.3 Measurements of impulsive sounds

Measure the *C-weighted peak sound pressure level*, $L_{p\mathrm{Cpeak}}$, of *impulsive sounds* in each microphone position. Perform a total of three measurements.