INTERNATIONAL STANDARD

ISO 31110

First edition
2020-12

Wheeled child conveyances — Pushchairs and prams — Requirements and test methods

Voitures d'enfant — Poussettes et landaus — Exigences et méthodes d'essai

Reference number
ISO 31110:2020(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ... **vi**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**

4 General requirements and test conditions ... **4**
4.1 General ... 4
4.2 Samples ... 4
4.3 Principle of the most onerous condition ... 4
4.4 Tolerances for test equipment ... 5
4.5 Test conditions ... 5
4.6 Determination of the protected volume ... 5
4.6.1 Protected volume of seat units ... 5
4.6.2 Protected volume of pram bodies having a length greater than 800 mm ... 7
4.6.3 Protected volume for pram bodies having a maximum internal length of 800 mm and car seats ... 8
4.7 Determination of the junction line ... 8
4.8 Determination of occupant space ... 9
4.8.1 Determination of occupant space for seat unit and car seat ... 9
4.8.2 Determination of occupant space for pram body having a length less than 800 mm ... 9
4.8.3 Determination of occupant space for pram body having a length greater than 800 mm ... 9

5 Test equipment ... **10**
5.1 Test masses ... 10
5.1.1 General ... 10
5.1.2 Test mass A ... 10
5.1.3 Test mass B ... 11
5.1.4 Test mass C ... 12
5.1.5 Test mass D ... 13
5.1.6 Test mass D_0 ... 14
5.1.7 Test mass F ... 15
5.1.8 Test mass G ... 15
5.1.9 Test bar ... 17
5.2 Test probes ... 17
5.2.1 Finger probes ... 17
5.2.2 Conical probes ... 18
5.3 Angle measuring device ... 19
5.4 Test ball ... 21
5.5 Hinged board ... 21
5.6 Small parts cylinder ... 21
5.7 Test surface ... 22
5.8 Rectangular stops ... 22
5.9 Irregular surface test equipment ... 22
5.9.1 Obstacles ... 22
5.9.2 Articulating arms ... 24
5.10 Test cylinder ... 24
5.11 Clamp device ... 25

6 Chemical hazards ... **26**
6.1 General ... 26
6.2 Requirements ... 26
6.2.1 General ... 26
6.2.2 Sampling ... 27

6.3 Migration of certain elements ... 27
6.4 Phthalates ... 27
6.5 Azo colorants ... 28
6.6 Formaldehyde ... 29
6.7 Flame retardants ... 29

7 Thermal hazards ... 30

8 Mechanical hazards ... 30
8.1 Protective functions ... 30
8.1.1 Suitability of vehicle ... 30
8.1.2 Minimum internal height of pram body ... 33
8.1.3 Restraint system and fasteners ... 34
8.2 Entrapment hazards ... 39
8.2.1 Holes and openings ... 39
8.3 Hazards from moving parts ... 40
8.3.1 Requirements ... 40
8.3.2 Shearing hazards ... 40
8.3.3 Crushing hazards (see F.3.4) ... 41
8.3.4 Wheels ... 41
8.3.5 Locking mechanism(s) ... 41
8.4 Entanglement hazards ... 45
8.4.1 Requirements ... 45
8.4.2 Test method ... 46
8.5 Choking and ingestion hazards ... 46
8.5.1 Requirements ... 46
8.5.2 Test methods ... 47
8.6 Suffocation hazards ... 48
8.6.1 Internal lining of the pram body and seat unit ... 48
8.6.2 Requirements — Packaging ... 48
8.7 Hazards from edges and protrusions ... 48
8.8 Parking and braking devices ... 48
8.8.1 Requirements ... 48
8.8.2 Test methods ... 49
8.9 Stability ... 52
8.9.1 Stability of vehicle ... 52
8.10 Structural integrity ... 56
8.10.1 Carrying handles and handle anchorage points of pram bodies and seat units with a carrying function ... 56
8.10.2 Longitudinal stability of a pram body with carrying handles ... 57
8.10.3 Strength and durability of attachment devices for pram bodies, seat units, car seats or carry cots ... 57
8.10.4 Irregular surface test ... 58
8.10.5 Dynamic strength ... 59
8.10.6 Wheel strength ... 61
8.10.7 Handle strength ... 64

9 Durability and adhesion of marking ... 67
9.1 Requirement ... 67
9.2 Test method ... 67

10 Product information ... 67
10.1 General ... 67
10.2 Marking of product ... 67
10.3 Purchase information ... 68
10.4 Instructions for use ... 68

Annex A (informative) **Examples of a folding system ... 71**

Annex B (informative) **Articulating arms ... 72**

Annex C (informative) **Chemicals ... 76**

Annex D (informative) **Guidelines for the application of 8.3.5.1.1.3 "Unintentional release of locking mechanism(s)"** **81**

Annex E (informative) **Examples of moving parts of the canopies inside 100 mm from the pivot point** **84**

Annex F (informative) **Further information on hazards** **87**

Bibliography **92**

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 Project Committee ISO/PC 310, *Wheeled child conveyances*.

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.

Wheeled child conveyances — Pushchairs and prams — Requirements and test methods

1 Scope

This document specifies the safety requirements and test methods for pushchairs and prams, intended for the transportation of one or more children up to three years of age.

This document does not apply to toys, pushchairs intended for sport use, pushchairs and prams propelled by a motor, and pushchairs and prams designed for children with special needs.

Other relevant standard(s) can apply if any when a pushchair or pram or any part of the pushchair or pram has several functions or can be converted into another function.

NOTE The average weight of a three-year-old child corresponds to 15 kg.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8124-1:2018, *Safety of toys — Part 1: Safety aspects related to mechanical and physical properties*

ISO 8124-2:2014, *Safety of toys — Part 2: Flammability*

ISO 8124-3:2020, *Safety of toys — Part 3: Migration of certain elements*

ISO 8124-6:2018, *Safety of toys — Part 6: Certain phthalate esters in toys and children's products*

ISO 14184-1, *Textiles — Determination of formaldehyde — Part 1: Free and hydrolysed formaldehyde (water extraction method)*

ISO 14362-1, *Textiles — Methods for determination of certain aromatic amines derived from azo colorants — Part 1: Detection of the use of certain azo colorants accessible with and without extracting the fibres*

ISO 14362-3, *Textiles — Methods for determination of certain aromatic amines derived from azo colorants — Part 3: Detection of the use of certain azo colorants, which may release 4-aminoazobenzene*

ISO 17226-1, *Leather — Chemical determination of formaldehyde content — Part 1: Method using high performance liquid chromatography*

ISO 17234-1, *Leather — Chemical tests for the determination of certain azo colorants in dyed leathers — Part 1: Determination of certain aromatic amines derived from azo colorants*

ISO 17234-2, *Leather — Chemical tests for the determination of certain azo colorants in dyed leathers — Part 2: Determination of 4-aminoazobenzene*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
automatic locking device
device that engages with no additional voluntary action by the carer, when the vehicle is erected to its position of use

3.2
base material
material upon which coatings may be formed or deposited

3.3
braking device
device intended to reduce the speed of the *wheeled child conveyance* (3.25)

3.4
bumper bar protective covering
component designed and intended as a means to prevent exposure of any underlying accessible foam or other filling material

Note 1 to entry: Examples include, but are not limited to, woven, knit, coated, laminated, extruded, or calendared textile-based materials and leathers.

3.5
carry cot
portable bassinet
hand-held bassinet
product consisting of a base, sides, ends and carrying handle(s), within which a child can be laid down and transported by hand(s)

3.6
chassis
wheeled framework with one or more handles for pushing, pulling and steering, designed to accommodate and transport one or more of the *pram body* (3.17), *seat unit* (3.22) or car seat

3.7
crotch restraint
device positioned between the child's legs to prevent the child from sliding forwards

3.8
folding system
assembly of moving parts which enables the vehicle to be changed from an erected position to a folded position and vice versa under the control of the carer

EXAMPLE See Figure A.1.

3.9
footrest
support for the feet, used by the child when sitting

3.10
integrated platform
integrated part of the *wheeled child conveyance* (3.25) designed to support an additional child in a standing position

3.11
leg rest
support for the legs, used by the child when sitting

3.12
locking device
mechanical component, part of the *locking mechanism* (3.13), that maintains part(s) of the vehicle erected in the position of use (e.g. latch(es), hooks, over centre lock) which could be deactivated or activated by action(s) on the *operating device* (3.14)

EXAMPLE See Figure A.1.

3.13
locking mechanism
assembly of components consisting of one or more *locking device(s)* (3.12) and one or more *operating device(s)* (3.14)

EXAMPLE See Figure A.1.

3.14
operating device
part of the *locking mechanism(s)* (3.13) designed to be activated by the carer through one or several positive action(s)

EXAMPLE See Figure A.1.

3.15
parking device
device to maintain the *wheeled child conveyance* (3.25) in a stationary position

3.16
pram
vehicle comprising a *chassis* (3.6) and one or more *pram bodies* (3.17)

3.17
pram body
carriage
structure with essentially vertical and continuous sides that ends with an internal base designed to transport one or more children in a primarily horizontal position

3.18
protected volume
volume accessible by the child when sitting or lying in the *wheeled child conveyance* (3.25), where specific safety requirements are necessary

Note 1 to entry: See 4.6.

3.19
pushchair
vehicle comprising a *chassis* (3.6) and one or more *seat units* (3.22) or car seats

3.20
restraint system
system to restrain the child within the *wheeled child conveyance* (3.25)

3.21
reversible handle
handle that can be rotated on the *chassis* (3.6) to change the direction of pushing

3.22
seat unit
structure that may or may not be adjustable to achieve a reclining, upright or lying flat position, designed to support one or more children

3.23
type A car seat
child restraint system (CRS) used for children up to 9 kg

EXAMPLE In Europe, see Regulation ECE R44 (group 0) or Regulation ECE R129.

3.24
type B car seat
child restraint system (CRS) used for children up to 13 kg

EXAMPLE In Europe, see Regulation ECE R44 (group 0+) or Regulation ECE R129.

3.25
wheeled child conveyance
vehicle designed for the transportation of one or more children that can be manually steered while being primarily pushed

4 General requirements and test conditions

4.1 General

Words in italics are defined in Clause 3. Additional information on the background and rationale for various requirements are given in Annexes C and F.

4.2 Samples

Tests should be carried out in the order of the clauses given in this document, unless otherwise stated. Each test shall be carried out only using one vehicle, unless otherwise stated.

Vehicles with multiple places for pram bodies and/or seat units shall conform to all applicable requirements in all possible arrangements in accordance with the manufacturer's instructions. If a vehicle can be equipped with an additional seat unit, pram body or car seat supplied or recommended by the manufacturer, the combination shall conform to this document.

4.3 Principle of the most onerous condition

Unless otherwise stated, each test in this document shall be conducted with the vehicle in the most onerous condition for that test in terms of:

— the choice and number of seat units, pram bodies and/or car seats attached to the chassis stated in the manufacturer's instructions;

— the addition of any additional seat unit(s) approved by the manufacturer;

— the use of test masses: for vehicles transporting more than one child, at least one place that a child can occupy shall be loaded with a test mass;

— the loading (or not) of any receptacle designed for carrying additional load(s) allowed for in the instructions or otherwise approved by the manufacturer and the placing (or not) of load(s) in any such facility, up to the maximum mass allowed in the manufacturer's instructions, or 2 kg if nothing is indicated;

NOTE Small pockets fitted onto textile parts are not concerned by this condition.

— the addition (or not) of any other accessories supplied or recommended by the manufacturer for use with the vehicle and with accessories loaded in accordance with the manufacturer's instructions;

— the adjustment of seat units, pram bodies, handles, car seats and any other adjustable features or accessories, or any other optional arrangement of the vehicle allowed in the manufacturer's instructions or otherwise approved by the manufacturer.