PD ISO/TR 24666:2022

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# Sports and recreational facilities - Probes for entrapment/entanglement on playground equipment - Collection of data

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# National foreword

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The UK participation in its preparation was entrusted to Technical Committee SW/65, Children's playground equipment.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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TECHNICAL REPORT

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First edition
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# Sports and recreational facilities — Probes for entrapment/entanglement on playground equipment — Collection of data

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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.

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).

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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 *83*, *Sports and other recreational facilities and equipment*.

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.


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# Introduction

This document summarizes information about different regional and national standards on playground safety in order to provide a reference point for different types of entrapments and probes/gauges.

Some standards apply to entrapment tests universally, regardless of the intended user age group, on the basis that it is very difficult to control users when products are installed in a free access environment. Other standards apply to specific entrapment probe tests related to specific intended user age groups. In cases where user age references are provided in the standard, see in Annex A to Annex H.

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# Sports and recreational facilities — Probes for entrapment/entanglement on playground equipment — Collection of data

## 1 Scope

This document compiles a collection of different probes/gauges for assessing common playground equipment safety performance to eliminate known safety hazards such as: entrapment and entanglement hazards on playground, playspaces, and associated equipment used in different countries/regions around the world. It also explains some historical content of origins, the purpose and some rationales for the dimensions and shape of each of those probes.

NOTE These test probes and gauges, their dimensions and related historic rationale for their existence are of significant value to playground equipment, manufacturers, designers, installers, assemblers, owners, operators and inspectors alike and are necessary tools to the reduction of serious, life-threatening and debilitating injuries to the public playground intended users.

## 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/TR 20183, *Sports and other recreational facilities and equipment — Injury and safety definitions and thresholds — Guidelines for their inclusion in standards*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 20183 apply.

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

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

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

## 4 Rationale for anthropometrics and scoping of intended user groups in developing safety standards to reduce serious injury

### 4.1 ASTM F1487-21 (US) standard consumer safety performance specification for playground equipment for public use

**4.1.1** Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

**4.1.2** The range of age and size users encompassed by this consumer safety performance specification is the 5th percentile 2-year-old to the 95th percentile 12-year-old:

a) Maximum user — 12-year-old child; measurement characteristics are the 95th percentile values for combined sexes;

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b) Minimum user — 2-year-old child; measurement characteristics are the 5th percentile values for combined sexes;

c) Age groupings —Preschool (2 years to 5 years), School age (5 years to 12 years), and (2 years to 12 years).

## 4.2 ASTM F2373-11 (US) standard consumer safety performance specification for public use play equipment for children 6 months to 23 months

**4.2.1** Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

**4.2.2** The range of age and size users encompassed by this consumer safety performance specification is the 5th percentile 6-month-old to the 95th percentile 23-month-old:

a) Maximum user — 23-month-old child; measurement characteristics are the 95th percentile values for combined sexes;

b) Minimum user — 6-month-old child; measurement characteristics are the 5th percentile values for combined sexes;

c) Age groupings — toddler (6 months to 23 months).

## 4.3 U. S. consumer product safety commission handbook for public playground 2010 (US)

**4.3.1** Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

**4.3.2** The range of age and size users encompassed by this consumer safety guideline is the 5th percentile 2-year-old to the 95th percentile 12-year-old:

a) Maximum user — 12-year-old child; measurement characteristics are the 95th percentile values for combined sexes;

b) Minimum user — 2-year-old child; measurement characteristics are the 5th percentile values for combined sexes;

c) Age groupings — toddler (6 months to 23 months), Preschool (2 years to 5 years), School age (5 years to 12 years), and (2 years to 12 years).

## 4.4 EN 1176-1:2017 (European Union) Playground equipment and surfacing

### 4.4.1 Reference document for anthropometry

The base anthropometric data used in Europe is:

a) SAE SP-450:1977;

b) DIN 33402-2:2005.

Each of the sources are shown aligned with each other for any given body dimension. This data is presented as a condensed set of tables giving minimum and maximum values for common body dimensions.

### 4.4.2 Defined age groups

There is no defined age range in EN 1176-1:2017.


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## 4.5 AS 4685.1:2021 (Australia) Playground equipment and surfacing

NOTE AS 4685.1:2021 is significantly harmonized with the EN 1176-1:2017.

For reference document for anthropometry, see 4.4.1.

## 4.6 CSA Z614-20 (Canada) Children's playspaces and equipment

**4.6.1** Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

**4.6.2** The range of age and size users encompassed by this standard is the dimensions of the 95$^{th}$ percentile 18-month-old to the 95th percentile 12-year-old.

## 4.7 JPFA-SP-S: 2014 (JAPAN) standard on playground equipment safety and its annex 2: playground equipment for toddlers aged under 3

### 4.7.1 Reference document for anthropometry

Diagram of measurements (preschool-age) and data for 1-year olds to 6-year olds from the development of child anthropometric database and simulation technology for human injury[13].

Data for 10-year and 12-year old from AIST Japanese Body Dimension Data, 1997-98[15].

Diagram of measurements (school age) from Compact Compendium of Architectural Design References (1996)[14].

Part of data for 3-year olds from Infant/Toddler Body Measurements Report (1973)[16].

Part of data for 6-year olds from Anthropometric Charts and Table (1970)[17].

### 4.7.2 Range of age and size

The range of age and size users encompassed by the consumer safety performance standard, JPFA-SF -S:2014, are based on the median size (average by age) of pre-school children ages 3 to 6 years and elementary school students around the ages of 6 to 12 years). CSA Z614, ASTM F1487, ASTM F2373 and CPSC Handbook on Public Playground Safety recommend supervision for children from 3 to 6 years and that children under 3 years old be accompanied by a guardian at all times when using public parks.

## 4.8 SS 457:2017 (Singapore) Specification for playground equipment for public use

**4.8.1** Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

**4.8.2** Children age and size based on 5$^{th}$ percentile 2-year-old to 95$^{th}$ percentile 12-year-old.

## 4.9 MS 966:2017 (Malaysia) Playground equipment – Safety performance for public use – Specification

**4.9.1** Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

**4.9.2** Children age and size based on 5$^{th}$ percentile 2-year-old to 95$^{th}$ percentile 12-year-old.

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