SLOVENSKI STANDARD
SIST-TP CEN/TR 17698:2021

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Ergonomija - Zahteve in razpoložljivost antropometričnih podatkov in podatkov o telesni zmogljivosti otrok v Evropi

Ergonomics - Demands and availability of anthropometric and strength data of children in Europe

Ergonomie - Bedarf und Verfügbarkeit von anthropometrischen und Kraftdaten von Kindern in Europa

Demandes et disponibilité des données anthropométriques et de force des enfants en Europe

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English Version

Ergonomics - Demands and availability of anthropometric and strength data of children in Europe

Ergonomie - Demandes et disponibilité des données anthropométriques et de force des enfants en Europe

Ergonomie - Bedarf und Verfügbarkeit von anthropometrischen und Kraftdaten von Kindern in Europa

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (CEN/TR 17698:2021) has been prepared by Technical Committee CEN/TC 122 “Ergonomics”, the secretariat of which is held by DIN.

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Introduction

The European Committee for Standardization (CEN) has carried out, within CEN/TC 122 “Ergonomics” a project to acquire anthropometric and strength data of children in Europe, initiated by the lack of published data. These data have to be current and reliable being the basis for the safety, comfort and usability of products used for or with children. From the economic point of view, they are the prerequisite for a successful position of European stakeholders on the international market.

At present, there is no sufficient knowledge neither on the existing anthropometric data and its availability nor on the specific demand of data from the relevant stakeholders. Therefore, the project has been divided in two phases. This technical report is a consequence of the results of the first phase of the project entitled “Analysis of the Demand and Availability of anthropometric data of children in Europe”. This first phase of the project included an extensive research on the demands, necessity and existence of Anthropometric and Strength data of European population under 18 years old. Background information and summary of this research project is provided in Clauses 4 to 8 of this Technical Report.

1 Scope

This document contains guidance on identifying reliable sources of anthropometric and strength data published since 2000 for the European population under the age of 18 years. It does not contain the anthropometric data itself.

This document is intended to give guidance to the stakeholders such as the standard writers, designers and manufacturers of products for children on how to identify currently available sources of anthropometric data that are relevant to their needs in terms of age/gender groupings, types of anthropometric data. This document also identifies the lack of data for specific applications hence implicitly indicating caution for the stakeholders

This document also provides information about the sources of anthropometric data listed within it. This information includes:

— Date of survey;

— Organization who carried out the survey;

— Geographic limitations of the survey;

— Size and gender of the population measured or scanned;

— Types of anthropometric measurements included in them.

This document has two annexes

— Annex A: Definition of body measurements;

— Annex B: Existing data sources.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Background of the project

Experts involved in several CEN Technical Committees (CEN/TC) and working for the standardization projects related to childcare products, toys and articles used by and for children have identified and emphasized the need of having precise and relevant up-to-date anthropometric data, related to the use of this kind of products.

Availability of correct anthropometric data and the use of updated data are important due to the changes in body measures and physical strengths of children along the past 30 years and no European-wide collection of data has been recently conducted to fill the gap in this population.

5 Description of the project

In order to describe the current scenario of anthropometric data of children in Europe, the first phase of the project comprised the following aims:

1. Research on the existence, quality and availability of anthropometric data of children in Europe.

2. Research on the demands from relevant stakeholders on anthropometric data of children with regard to the application of anthropometric data.

3. Comparison of the existence/availability of, and the demands for anthropometric data in order to identify the gap between available data and demands concerning their application.

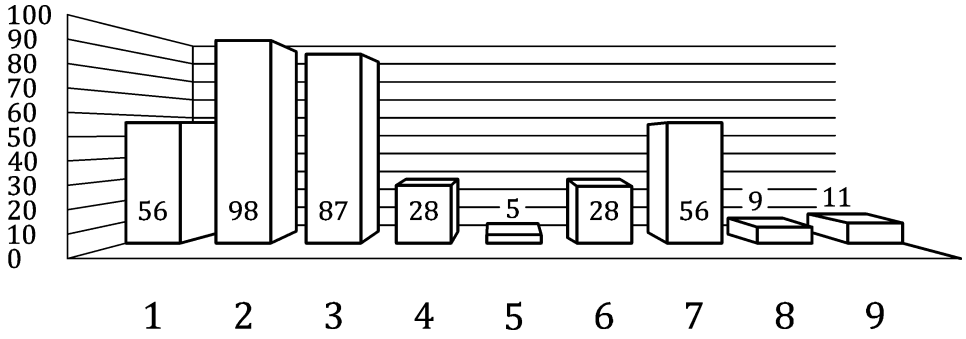
6 Anthropometric data needed by the stakeholders

6.1 General

The demands on anthropometric data has been explored using an *online questionnaire* that has been sent to a long list of stakeholders with needs of children anthropometric and strength data. The stakeholders that have answered the questionnaire were distributed along different groups whose professional activity is related with the design, evaluation and/or commercialization of products for children. A set of *workshops* and individual *interviews* were also performed in order to obtain more detailed information about the demands on children anthropometry and strengths.

Finally, **251 participants from 204 organizations, institutions and companies** answered the questionnaire and **20 participants from 18 organizations, institutions and companies** have participated in the workshops and interviews.

The charts below show the profile of the **participants in the questionnaires**. Figure 1 shows the number of participants in the survey shorted by professional profile. The stakeholders that have filled out the questionnaire mainly belong to the areas of **industry** (designer/product developer and quality expert), **standardization** and **research**. In addition, some participants belong to other areas of industry (marketing, sales, and management) and the areas of laboratories, representative bodies of sector (industrial associations) and consumer associations.

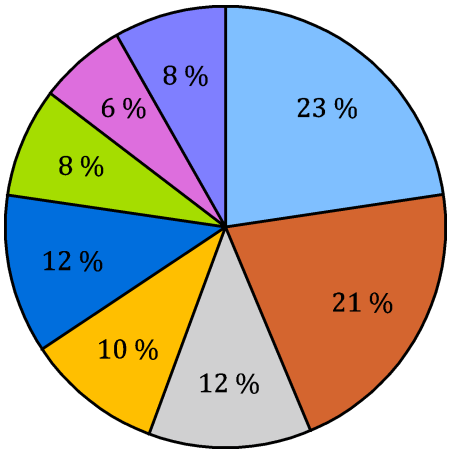


Key

1	Standardization	6	Laboratory – Other
2	Industry – Designer/Product Developer	7	Research
3	Industry – Quality Expert	8	Consumer Association
4	Industry – Other	9	Representative Body of Sector
5	Laboratory – Dummy/Mannequin Developer		

Figure 1 — Profile of the participants in the questionnaire

Figure 2 shows the percentage of participants by sector that have answered the questionnaire. In 'Other', sectors such as personal protective equipment and consumer goods are included. **73 % of participants were from Standardization Technical Committees**.



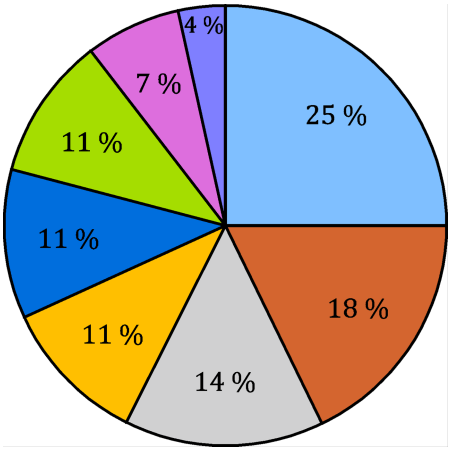
Key

- Clothing/footwear
- Toys
- Child use and care
- Playground
- Educational furniture
- Sport
- Transport (child restraining systems)
- Other

Figure 2 — Online questionnaire: Participation by sector

The **28 participants in the workshops and interviews** are mainly from areas of the Industry (Designer/Product developer) and Research laboratories/Universities (21 %), but also others from the Standardization and Consumer associations (6 %), R&D departments or associations of the Industry (3 %) and Certification laboratories (4 %) have participated.

Figure 3 shows the percentage of participants by sector that have participated in the workshops and interviews.



Key

- Transport
- Toys
- Child use and care
- Education furniture
- General
- Sport
- Construction
- Playground

Figure 3 — Workshops and Interviews: Participation by sector

The measurements, sorted by sector and kind of measurement or part of the body, that are relevant for the participants in the questionnaires, workshops and interviews are shown in the following sections.

The colour of the cell is related with the importance of the measurement for the sector. Therefore:

— Measurements in **green** colour are highlighted by 50 % of the respondents of the questionnaires and the participants in the workshops consider them **highly relevant**.

— Measurements in **yellow** colour are highlighted by 25 % of the respondents of the questionnaires and the participants in the workshops consider them **relevant**.

— Measurements in **white** colour were not mentioned as relevant or necessary for the sector.

The description and illustrations of the measurements are included in the **Annex A.**

6.2 Head measurements

Head	Toys	Playground	Child use and care	Sport	Educational furniture	Clothing	Restraint transport	Construction	Global
1 Head breadth	R	HR	R	HR	HR	R	HR	HR	HR
2 Ear-to-ear (bitragion) breadth		R							R
3 Face breadth (bizygomatic or cheekbones)									
4 Face breadth (brow ridges)									
5 Jaw breadth									
6 Eye separation (Interpupilar distance)									
7 Neck breadth	R	HR	R		R	R	R	HR	HR
8 Bitragion arc of the head									
9 Neck circumference/Neck girth	R	HR	HR		HR	HR	R	R	HR
10 Neck-base girth	R	R				R		R	R
11 Head circumference/Head girth	R	HR	HR		HR	HR		R	HR
12 Sagittal arc of the head		R		R		R			R
13 Head length		HR	R		R	R	HR		HR
14 Maximum head diameter (chin to back of head)		HR	HR		HR				HR
15 Head height (7th Cervicale)			R			R	R	R	R
16 Head height (Vertex to chin)	R	HR	HR	HR		R	R	R	HR
17 Face height									
18 Face length (menton-sellion)									
19 Mouth breadth			HR						HR
20 Mouth opening (between incisors)	R		HR						HR

6.3 Hand measurements

Hand	Toys	Playground	Child use and care	Sport	Educational furniture	Clothing	Restraint transport	Construction	Global
1 Hand length (stylion to wrist crease)	R	R	R	R	R	R	R	R	R
2 Palm length perpendicular				R		R		R	R
3 Hand length (to thumb crotch)		R	R		R			HR	HR
4 Hand breadth at metacarpals	R	HR	R	R	HR	R		HR	HR
5 Hand breadth at thumb	R	HR	HR	HR	R	R	R	HR	HR
6 Hand circumference at palm	R	R	HR	HR	HR	R		R	HR
7 Thumb breadth at distal joint		R	HR	HR	HR	R		R	HR
8 Index finger breadth, distal		R	HR	HR	HR			HR	HR
9 Index finger breadth, proximal		R	R	HR	R			R	HR
10 Middle finger breadth at distal joint			HR	HR	HR			HR	HR
11 Middle finger breadth at middle joint			R	HR	R			R	HR
12 Third finger breadth at distal joint			HR	HR	HR			HR	HR
13 Third finger breadth at middle joint			R	HR	R			R	HR
14 Little finger breadth at distal joint		R	HR	HR	HR			HR	HR
15 Little finger breadth at middle joint		R	R	HR	R			R	HR
16 Middle finger length (distal joint to tip)		R	HR	HR	HR			HR	HR
17 Middle finger length (middle joint to distal joint)			R		HR			R	HR
18 Thumb length					HR	R		R	HR
19 Index finger length	R				HR	R		R	HR
20 Middle finger length	R	HR			HR	R		R	HR
21 Third finger length					HR	R		R	HR
22 Little finger length					HR	R		R	HR

Hand	Toys	Playground	Child use and care	Sport	Educational furniture	Clothing	Restraint transport	Construction	Global
23 Hand depth	R	R	HR	HR	R		R	R	HR
24 Hand clearance (maximum aperture)	R	R		HR	R			R	HR
25 Middle finger depth at distal joint				HR	R				HR
26 Middle finger depth at middle joint				HR	R			R	HR
27 Fist depth	R	R	R	HR	R			R	HR
28 Fist circumference			R		R				R
29 Middle finger length (knuckle to middle joint, hand clenched)	R								R
30 Fist breadth	R	R	HR	HR	R			HR	HR
31 Maximum grip diameter (between thumb and index finger)		HR	HR	HR	HR		R	R	HR
32 Maximum grip diameter (between thumb and middle finger)	R	HR	R	HR	HR			R	HR
33 Grip length (middle finger to thumb)	R	HR	R					R	HR
34 Thumb diameter (minimum aperture)		R	R	HR	HR			R	HR
35 Index finger diameter (minimum aperture)	R	R	HR	HR	HR			HR	HR
36 Middle finger diameter (minimum aperture)	R	R	HR	HR	HR			R	HR
37 Little finger diameter (minimum aperture)		HR	HR	HR	HR			R	HR

6.4 Foot measurements

Foot	Toys	Playground	Child use and care	Sport	Educational furniture	Clothing	Restraint transport	Construction	Global
1 Foot length	R	HR	R	HR	HR	HR	R	HR	HR
2 Forefoot length		R	R						R
3 Distance heel — 1st metatarsal						R			R
4 Distance heel — 5th metatarsal								R	R
5 Toes width								HR	HR
6 Foot breadth	R	HR	R	HR	HR	R	R	HR	HR
7 Heel breadth		R				R			R
8 Ankle breadth	R	HR				R			HR
9 Toes girth									
10 Ball girth			R			R			R
11 Instep girth						R			R
12 Minimum leg girth						R			R
13 Ankle circumference		R				R			R
14 Heel to instep girth						R			R
15 Foot height		HR		HR	HR	R		HR	HR
16 Height of 1st toe		R	R	HR				HR	HR
17 Height of 1st metatarsal		R	R		HR			HR	HR
18 Height of 5th toe								HR	HR
19 Height of 5th metatarsal								HR	HR
20 Instep height			R			R		HR	HR
21 Heel height									
22 Ankle height	R	R				R		HR	HR

6.5 Supine measurements

Measurements in supine posture are a specific set of the standing measurements that are taken in children under 24 months and only before they can stand up.

Supine	Toys	Playground	Child use and care	Sport	Educational furniture	Clothing	Restraint transport	Construction	Global
1 Body mass[1]	HR	HR	HR	HR	HR		HR	HR	HR
2 Body length, crown to sole (Supine) /recumbent length	R	HR	HR		HR	R	HR	HR	HR
3 Shoulder height (supine)		HR	R		R	R	HR		HR
4 Elbow height (supine)		R	R		R	R	R		R
5 Sitting height/Crown to rump (supine)		HR	HR		HR	R	HR	HR	HR
6 Leg length, buttock to sole (supine)	R	HR	R		HR	R	HR	R	HR
7 Hip depth (supine)		R	R		HR	R	R	R	HR
8 Buttock to popliteal length (supine)	R	R	R		R		R		R
9 Lower leg length, popliteal to sole (supine)		R	R		R	R	R		R
10 Lower leg length, knee to sole (supine)		R			R	R	R	R	R
11 Mid-thigh depth (supine)		R			HR		R		HR
12 Waist breadth (in infants)		HR	HR		HR	R	HR	R	HR
13 Hip breadth, standing (maximum in infants)	R	HR	HR		HR	R	HR	R	HR
14 Waist circumference (maximum in infants)		R	R		HR	R	R		HR
15 Mid-thigh girth (supine)		R				R	R		R

[1] The body mass had not been addressed in the questionnaire described in 6.1 and its relevance for the sectors was, therefore, based on literature [7].