

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

This Technical Report was approved by CEN on 3 October 2021. It has been drawn up by the Technical Committee CEN/TC 122.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

| Contents | Page |
|---|-------------|
| European foreword | 3 |
| Introduction | 4 |
| 1 Scope..... | 5 |
| 2 Normative references..... | 5 |
| 3 Terms and definitions..... | 5 |
| 4 Background of the project | 5 |
| 5 Description of the project | 6 |
| 6 Anthropometric data needed by the stakeholders..... | 6 |
| 6.1 General..... | 6 |
| 6.2 Head measurements..... | 9 |
| 6.3 Hand measurements..... | 10 |
| 6.4 Foot measurements | 12 |
| 6.5 Supine measurements..... | 13 |
| 6.6 Standing measurements..... | 14 |
| 6.7 Sitting measurements | 18 |
| 6.8 Reach measurements | 19 |
| 6.9 Strength measurements | 20 |
| 7 Existing data sources | 22 |
| 7.1 General..... | 22 |
| 7.2 Methodology | 22 |
| 7.3 Characterization of databases..... | 23 |
| 7.3.1 General..... | 23 |
| 7.3.2 Identification of the database..... | 23 |
| 7.3.3 Context of the database | 24 |
| 7.3.4 Description of the sample | 25 |
| 7.3.5 Characterization of the measurement protocol | 25 |
| 7.3.6 Kind of measurements..... | 27 |
| 8 Information on data gaps..... | 31 |
| Annex A (informative) Definition of body measurements..... | 34 |
| Annex B (informative) Existing data sources..... | 84 |
| Bibliography | 144 |

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.

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

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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.

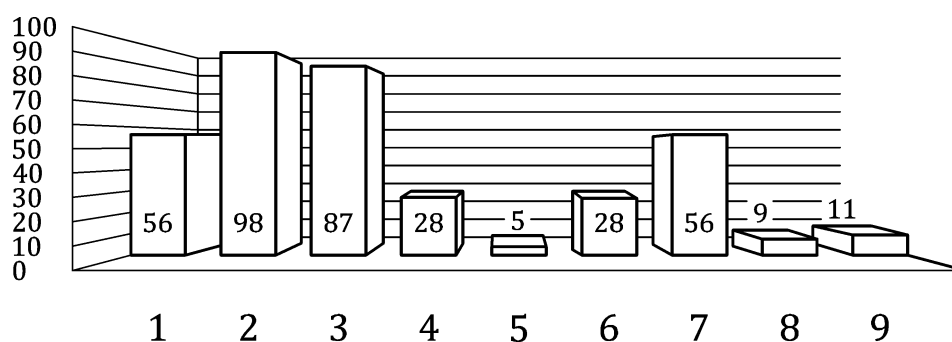
6 Anthropometric data needed by the stakeholders

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.**

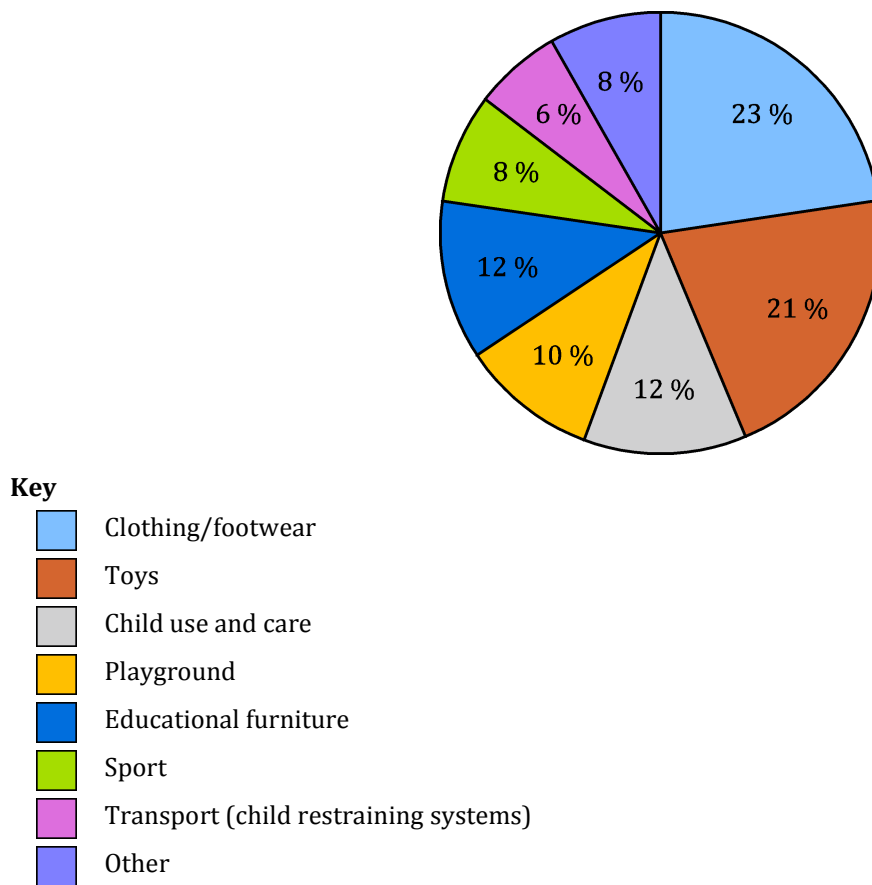


Figure 2 — Online questionnaire: Participation by sector

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.