
**Basic human body measurements for
technological design —**

Part 2:
**Statistical summaries of body
measurements from individual ISO
populations**

*Définitions des mesures de base du corps humain pour la conception
technologique —*

*Partie 2: Résumés statistiques des mesurages du corps de populations
ISO individuelles*



Reference number
ISO/TR 7250-2:2010(E)

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Published in Switzerland

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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.

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.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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.

ISO/TR 7250-2 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 3, *Anthropometry and biomechanics*.

ISO/TR 7250 consists of the following parts, under the general title *Basic human body measurements for technological design*:

- *Part 1: Body measurement definitions and landmarks*
- *Part 2: Statistical summaries of body measurements from individual ISO populations*

Worldwide and regional design values for use in ISO equipment standards is to form the subject of a part 3.

Introduction

Anthropometric data used for technological design have been included in many ISO product standards. However, different review cycles make it impossible for simultaneous revision of these product standards as new anthropometric data become available. This Technical Report is intended to serve as a continually updated repository of the most current national anthropometric data. It is intended to make current and updated anthropometric data available for inclusion by reference in the various ISO product standards requiring anthropometric data.

Body dimensions of people have been increasing in many countries over the last several decades. The rate of increase differs from country to country. In the area where significant secular change is going on, statistical summaries described in this Technical Report will be outdated sooner. Therefore, it is intended that statistical summaries of human body measurements described in this Technical Report be updated as new data become available.

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Basic human body measurements for technological design —

Part 2:

Statistical summaries of body measurements from individual ISO populations

1 Scope

This Technical Report provides statistical summaries of body measurements together with database background information for working age people in the national populations of individual ISO member bodies. The data in this Technical Report are intended for use in conjunction with ISO standards for equipment design and safety, which require ISO 7250-1 body measurement input, wherever national specificity of design parameters is required.

NOTE 1 Users of this Technical Report who know of newly available data are encouraged to contact their ISO member bodies and the ISO TC 159/SC3 secretariat, as described in 6.2.

Body measurement data for technological design need to be reliable in terms of representing the intended population and measurement quality. To ensure the comparability of measurements, body dimensions in this Technical Report are measured according to ISO 7250-1. To ensure the reliability of statistical data, databases from which statistics are calculated adhere to ISO 15535.

This Technical Report provides body measurement data for people of working age. In order to provide practical data, the age range is not defined and the decision is left to each country, because working age differs among countries. However, the data for children under 16 years are not included.

NOTE 2 Secular change means changes in mean body dimensions of a specific group over time. The direction of change can be positive or negative.

2 Normative references

The following referenced documents are indispensable for the application 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 7250-1:2008, *Basic human body measurements for technological design — Part 1: Body measurements definitions and landmarks*

ISO 15535:2006, *General requirements for establishing anthropometric databases*

ISO 20685:—¹⁾, *3-D scanning methodologies for internationally compatible anthropometric databases*

1) To be published. (Revision of ISO 20685:2005.)

3 Anthropometric measurements

Measuring conditions and definitions of measurements in this Technical Report are the same as those described in ISO 7250-1. Body measurements are described in millimetres (mm) or kilograms (kg).

Body measurements obtained from 3-D systems or obtained using instruments different from those described in ISO 7250-1 are confirmed by member bodies to be sufficiently close to those produced by the traditional methods of ISO 7250-1 according to ISO 20685:—, Clause 5.

Sometimes a measurement is not performed exactly as described in ISO 7250-1, but is very similar. In such cases, the measurement may be substituted for the ISO 7250-1 measurement if its value is adequately close. To judge closeness, the method described in ISO 20685 needs to be used. The criteria for the judgment are given in Annex A.

The measured side (right or left) is described.

When measurements not described in ISO 7250-1 are also available, the number of these measurements and the reference are provided.

Age statistics are tabulated similarly and presented together with the anthropometric measurements.

4 Statistical procedures

4.1 Data editing

Before calculating statistical values, irregular values are detected and reviewed according to ISO 15535:2006, Annex F.

4.2 Statistics

In this Technical Report, the following statistics are described for each measurement: sample size, mean, standard deviation (SD), and 1st, 5th, 50th, 95th and 99th percentile values.

4.3 Population stratification

Population can be stratified by gender, age, location, occupation or education. To keep this Technical Report at a reasonable size, statistics are presented for females, males, and females and males combined, but not for other strata.

4.4 Age stratification

In order to provide practical data and to keep the Technical Report at a reasonable size, only one age group, including all working age people, is considered.

4.5 Body measurements for representative body forms

Measurements for body forms representing large, medium and small types are useful for technological design. While medium type can be represented by P50 values for all measurements, fixed percentile options are problematic for extreme body forms, such as those derived from all P5 or P95 values. When sitting height and leg length are P5, height is smaller than P5. Though such a problem is well recognized, there is no consensus on the method for obtaining measurements for body forms statistically representing the variation in a population. Considering this lack of consensus, it was decided not to present such data in this Technical Report.

5 Background information

5.1 General

Statistics of body dimensions are described together with the following information for users to judge their reliability and context.

5.2 Background of database

5.2.1 Time period of examination

Year(s) of measurement.

5.2.2 Location of examination

Name of the country and city.

5.2.3 Demographic data

For demographic data (gender, age, etc.), information on the following items is provided:

- a) definition of the working age;
- b) description of subjects;
- c) number of subjects by gender;
- d) ten-year age groups.

When more than one subgroup based on criteria other than the age and gender is involved, the percentage of each subgroup is provided, if necessary.

5.2.4 Publication on the anthropometric research

The author, publication year, title of the publication and the name of publisher are provided when the data have been published.

5.3 Representativeness of the sample

5.3.1 Sampling method

A description is given of the grounds on which the sample was judged to be representative of the intended population. These include an examination of the sampling method and may also include the comparison of height and weight in the measured sample data with those from a large sample representing the intended population. If the data need to be weighted in order to be representative, then the weighting method is described.

5.3.2 Information on secular change

When significant secular changes are going on, information on the rate of change over the last several decades is presented, when available, and appropriate references are given.

5.4 Accuracy and reliability of measurements

5.4.1 Skill of measurers

The number of measurers and information on the skill of each measurer, such as intra-observer mean absolute difference or technical error of measurement or repeated measurements, are shown when such data are available. When more than one measurer is involved, the methods used to control the quality of the measurement technique are documented. When the research is continued for more than one month, the method of quality control during the research period is documented.

5.4.2 Measurements from 3-D scanners

When measurements are extracted from 3-D scans, the results are compared to measurements obtained by traditional methods using the procedures in ISO 20685:—, Clause 5. Similarly, measurements taken using instruments not described in ISO 7250-1 are compared to those obtained by traditional methods.

6 Procedure for presenting member body statistics

6.1 General

This clause describes how the working group gathers and presents the statistics given in this Technical Report.

6.2 Submission of data

Users of this Technical Report and ISO member bodies are encouraged to submit anthropometric data for this Technical Report. Users with knowledge of additional anthropometric data should contact their ISO member body, and copy the ISO/TC 159/SC 3 secretariat on the communication (e-mail addresses can be found on the ISO website: <http://www.iso.org/>). Member bodies should contact the ISO/TC 159/SC 3 secretariat. When information is received, it will be processed as described below.

6.3 One data set from each member body

In the case of countries with more than one possible database, the member body has the responsibility to determine which of the databases is to be used. If more than one set of statistics is submitted, it is the responsibility of the working group to ask the member body to choose only one data set.

6.4 Meeting the criteria outlined in 4.2, 4.3 and 4.4

The working group requests that member bodies provide summary statistics that meet the criteria outlined in 4.2, 4.3 and 4.4. If the criteria are not met on the first submission, it is the responsibility of the working group to ask the member body to re-submit the statistics according to the criteria.

6.5 Examination of possible errors

6.5.1 General

Recognizing that errors can accidentally occur in any data set, it is the responsibility of the working group to examine the submitted summary statistics for reasonableness. The steps used are the following.

6.5.2 Minima and maxima

The minima and maxima for each dimension should be examined, comparing them to minima and maxima from other member body submissions. If, in the professional judgment of the working group, minima or

maxima are likely to be the result of errors, it is the responsibility of the working group to contact the member body to verify the submission.

6.5.3 Percentile values

The distance of the P1 and P99, P5 and P95 from the P50 percentile value should be examined. If the distant percentiles are, in the professional judgment of the working group, unusually distant from the P50, it is the responsibility of the working group to contact the member body to verify the submission.

6.5.4 Standard deviation

The standard deviation (SD) compared to the standard deviation submitted by other member bodies should be examined. If the standard deviation is, in the professional judgment of the working group, unusually large or unusually small, it is the responsibility of the working group to contact the member body to verify the submission.

6.5.5 Comparison of mean or P50 values from member bodies

The mean or P50 values with respect to mean or P50 values from other member bodies should be examined to make sure that the dimension being reported is that described in ISO 7250-1. If it appears, in the professional judgment of the working group, that a different measuring technique, or different measurement definition, has been used, it is the responsibility of the working group to contact the member body to verify the measurement procedure.

6.6 Marks on values likely to be in error

If resubmitted summary statistics are still, in the professional judgment of the working group, likely to be in error, the published values are marked with a footnote.

7 Statistics for ISO member bodies

7.1 ISO member body: Austria

Organization: Austrian Standards Institute

URL: <http://www.on-norm.at/>

Name of study: —

Austria adopts anthropometric data from DIN 33402-2:2005.

7.2 ISO member body: Germany

Organization: Deutsches Institut für Normung - German Standardization Institute (DIN)

URL: <http://www.din.de/cmd?level=tpl-home&contextid=din>

Name of study: —

Table 1 — Germany — Database

1 Measurement		
1.1	Measured side (right/left)	Right
1.2	Measurement definitions different from those described in ISO 7250-1	None
1.3	Substituted measurements	
1.4	Number of measurements not described in ISO 7250-1	
2 Age range		
2.1	Working age	18 to 65
2.2	Age range of subjects	18 to 65
3 Background data		
3.1	Time period of examination	1999 to 2002
3.2	Location of examination	Different areas of Germany
3.3	Survey sample	Representative (regional, social, ethnic)
3.4	Publication	DIN 33402-2:2005
4 Representativeness of the sample		
4.1	Sampling method	
4.2	Information on secular change	The secular trend in Germany has stopped.
5 Accuracy and reliability of measurements		
5.1	Intra- and inter-observer error rates	Exist
5.2	Measurements from 3-D scanners	None
5.3	Other measurement not taken using instruments described in ISO 7250-1	None
5.4	Type of clothing	Without shoes, minimal clothing

Table 2 — Germany — Statistical summary

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
		Age	Male								
			Female								
			Total								
1	4.1.1	Body mass (weight), kg	Male				64	79	100		
			Female				52	66	87		
			Total								
2	4.1.2	Stature (body height)	Male				1 650	1 750	1 855		
			Female				1 535	1 625	1 720		
			Total								
3	4.1.3	Eye height	Male				1 530	1 630	1 735		
			Female				1 430	1 515	1 605		
			Total								
4	4.1.4	Shoulder height	Male				1 345	1 450	1 550		
			Female				1 260	1 345	1 425		
			Total								
5	4.1.5	Elbow height	Male				1 025	1 100	1 175		
			Female				960	1 020	1 080		
			Total								
6	4.1.6	Iliac spine height, standing	Male								
			Female								
			Total								
7	4.1.7	Crotch height	Male				760	830	905		
			Female				710	775	830		
			Total								
8	4.1.8	Tibial height	Male				430	460	480		
			Female				400	425	450		
			Total								
9	4.1.9	Chest depth, standing	Male				195	225	270		
			Female				165	190	235		
			Total								
10	4.1.10	Body depth, standing	Male				260	285	380		
			Female				245	290	345		
			Total								
11	4.1.11	Chest breadth, standing	Male								
			Female								
			Total								
12	4.1.12	Hip breadth, standing	Male				340	360	385		
			Female				340	365	400		
			Total								
13	4.2.1	Sitting height (erect)	Male				855	910	965		
			Female				810	860	910		
			Total								
14	4.2.2	Eye height, sitting	Male				740	795	855		
			Female				705	755	805		
			Total								
15	4.2.3	Cervicale height, sitting	Male								
			Female								
			Total								

Table 2 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
16	4.2.4	Shoulder height, sitting	Male					570	625	670	
			Female				540	590	630		
			Total								
17	4.2.5	Elbow height, sitting	Male					210	240	285	
			Female				185	230	275		
			Total								
18	4.2.6	Shoulder-elbow length	Male					330	365	400	
			Female				290	320	350		
			Total								
19	4.2.7	Elbow-wrist length	Male								
			Female								
			Total								
20	4.2.8	Shoulder (biacromial) breadth	Male					370	405	435	
			Female				345	370	400		
			Total								
21	4.2.9	Shoulder (bideltoïd) breadth	Male					440	480	525	
			Female				395	435	485		
			Total								
22	4.2.10	Elbow-to-elbow breadth	Male					415	480	555	
			Female				395	485	555		
			Total								
23	4.2.11	Hip breadth, sitting	Male					350	375	420	
			Female				360	390	460		
			Total								
24	4.2.12	Lower leg length (popliteal height)	Male					410	450	490	
			Female				375	415	450		
			Total								
25	4.2.13	Thigh clearance	Male					130	150	180	
			Female				125	145	175		
			Total								
26	4.2.14	Knee height	Male					495	535	585	
			Female				460	500	545		
			Total								
27	4.2.15	Abdominal depth, sitting	Male					200	280	330	
			Female				205	250	325		
			Total								
28	4.2.16	Thorax depth at the nipple	Male								
			Female								
			Total								
29	4.2.17	Buttock-abdomen depth sitting	Male								
			Female								
			Total								
30	4.3.1	Hand length	Male					175	189	207	
			Female				162	177	193		
			Total								
31	4.3.2	Palm length perpendicular	Male					104	111	121	
			Female				92	100	108		
			Total								

Table 2 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
32	4.3.3	Hand breadth at metacarpals	Male					80	87	94	
			Female								
			Total								
33	4.3.4	Index finger length	Male				68	75	83		
			Female				62	69	77		
			Total								
34	4.3.5	Index finger breadth, proximal	Male				19	21	23		
			Female				17	19	21		
			Total								
35	4.3.6	Index finger breadth, distal	Male				17	18	20		
			Female				14	16	18		
			Total								
36	4.3.7	Foot length	Male				245	265	285		
			Female				225	245	260		
			Total								
37	4.3.8	Foot breadth	Male				92	101	111		
			Female				83	92	102		
			Total								
38	4.3.9	Head length	Male				185	195	205		
			Female				170	185	195		
			Total								
39	4.3.10	Head breadth	Male				145	155	165		
			Female				140	150	160		
			Total								
40	4.3.11	Face length (nasion-menton)	Male				105	115	130		
			Female				95	110	125		
			Total								
41	4.3.12	Head circumference	Male				545	570	600		
			Female				520	545	570		
			Total								
42	4.3.13	Sagittal arc	Male				330	350	375		
			Female				310	330	360		
			Total								
43	4.3.14	Bitragion arc	Male				340	365	385		
			Female				320	335	360		
			Total								
44	4.4.1	Wall-acromion distance	Male								
			Female								
			Total								
45	4.4.2	Grip reach; forward reach	Male				685	740	815		
			Female				625	690	750		
			Total								
46	4.4.3	Elbow-grip length	Male				325	350	390		
			Female				295	315	350		
			Total								
47	4.4.4	Fist (grip axis) height	Male				730	765	825		
			Female				670	715	760		
			Total								

Table 2 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
48	4.4.5	Forearm-fingertip length	Male					440	475	510	
			Female				400	430	465		
			Total								
49	4.4.6	Buttock-popliteal length (seat depth)	Male					450	495	540	
			Female				435	485	530		
			Total								
50	4.4.7	Buttock-knee length	Male					565	610	655	
			Female				545	590	640		
			Total								
51	4.4.8	Neck circumference	Male					335	380	410	
			Female				305	345	385		
			Total								
52	4.4.9	Chest circumference	Male					870	975	1 110	
			Female				850	990	1 180		
			Total								
53	4.4.10	Waist circumference	Male					700	875	1 010	
			Female				665	790	990		
			Total								
54	4.4.11	Wrist circumference	Male					160	175	190	
			Female				150	165	180		
			Total								
55	4.4.12	Thigh circumference	Male					490	570	640	
			Female				485	565	670		
			Total								
56	4.4.13	Calf circumference	Male					325	375	415	
			Female				325	360	415		
			Total								

7.3 ISO member body: Italy

Organization: Ente Nazionale Italiano di Unificazione (UNI)

URL: <http://www.uni.com/it/>

Name of study: "Italia si misura" project

Table 3 — Italy — Database

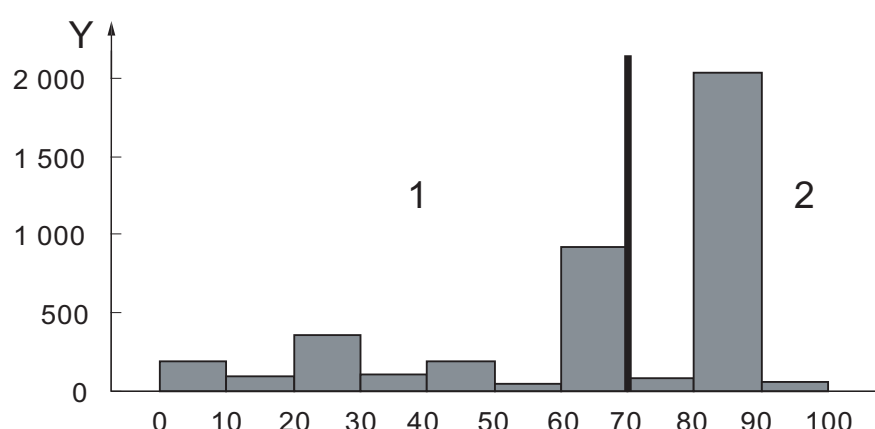
1 Measurement		
1.1	Measured side (right/left)	Right
1.2	Measurement definitions different from those described in ISO 7250-1	None
1.3	Substituted measurements	4.1.7 Crotch height: obtained from the difference of Stature less Sitting height (4.1.2 – 4.2.1). 4.2.3 Cervicale height, sitting and 4.2.4 Shoulder height, sitting as the difference of Stature less Cervicale height, standing and Stature less Shoulder height, standing from Sitting height: 4.2.3 = [4.2.1– (4.1.2 – Cervicale height, standing)] and 4.2.4 = [4.2.1– (4.1.2 – Shoulder height standing)]
1.4	Number of measurements not described in ISO 7250-1	Five measurements: Cervicale height, standing (See Reference [2], no. 11) , Crestale height (Reference [3] Altezza Crista iliaca), Bi-cristal breadth, Shoulder height, standing (see References [2] and [3]), Styloid height, standing, (see References [2] and [3])
2 Age range		
2.1	Working age	Age 17 to 84: the full sample ($n = 4\,135$)
2.2	Age range of subjects	Age 18 to 65: the sample used for this statistical presentation ($n = 4\,020$)
3 Background data		
3.1	Time period of examination	1990 to 1991, July to September
3.2	Location of examination	<p>Province of Ancona (postcode 60100) littoral from Senigallia to Numana (1990): mainly centre-north Italian population; Province of Naples (postcode 80100) littoral from Pozzuoli to Sorrento (1991): mainly south Italian population (independently by examination location, subject's origin is identified by their birth location first two digits of Italian post office postcode: centre-north <70 south ≥70). Postcode is a geographical (west < east, north < south, 00 Rome) and numerical variable that allows the arrangement of cases according to the user's needs.</p>  <p>Y frequency 1 centre-north 2 south</p>

Table 3 (continued)

3.3	Survey sample	Approximately 2 300 males and 1 850 females (the correct number is reported for each variable) distributed in almost equivalent centre-north Italy (Ancona) and south Italy (Naples) locations. The subdivision of centre-north and south population is based on ISTAT (Italian Statistical Body) military recruitment standards. The subjects are common volunteer adult people present on the survey site (beach). The choice of seashore in holiday time was to approach a reasonably non-specific population sample to incidentally measure people that had time to spend and no difficulty concerning clothing, making no selection of the volunteers. The choice of the site avoided socially selected locations.
3.4	Publication	Reference [4] Reference [5] Reference [6] Reference [7]

4 Representativeness of the sample

4.1	Sampling method	The age and gender frequencies reflect the proportions of the people at the beach and their willingness to collaborate. This can at first look to be a serious restriction of the sample. Nevertheless, such a distribution looks like a section of the natural distribution of the population by age, the so-called Lexis curve, and consequently, the bias is not expected to be critical, considering the primary object of the research. To balance the sample by gender, the samples are weighted equal (weight coefficients: 0,898 males and 1,129 females), keeping the total number equal to the original sample $4\ 020 \pm 1$.
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4.2	Information on secular change	<p>Sample shows an inner tendency of change that combines “secular trend” and “ageing”.</p> <p>Female stature by age classes</p> <table border="1"> <thead> <tr> <th>Age Class</th> <th>North F (cm)</th> <th>Centre F (cm)</th> <th>South F (cm)</th> </tr> </thead> <tbody> <tr> <td>29 inf</td> <td>~1625</td> <td>~1615</td> <td>~1590</td> </tr> <tr> <td>30-39</td> <td>~1615</td> <td>~1605</td> <td>~1580</td> </tr> <tr> <td>40-49</td> <td>~1605</td> <td>~1595</td> <td>~1565</td> </tr> <tr> <td>50-59</td> <td>~1595</td> <td>~1585</td> <td>~1545</td> </tr> <tr> <td>60 sup</td> <td>~1585</td> <td>~1575</td> <td>~1540</td> </tr> </tbody> </table> <p>Male stature by age classes</p> <table border="1"> <thead> <tr> <th>Age Class</th> <th>Centre M (cm)</th> <th>North M (cm)</th> <th>South M (cm)</th> </tr> </thead> <tbody> <tr> <td>29 inf</td> <td>~1765</td> <td>~1765</td> <td>~1730</td> </tr> <tr> <td>30-39</td> <td>~1765</td> <td>~1735</td> <td>~1710</td> </tr> <tr> <td>40-49</td> <td>~1735</td> <td>~1730</td> <td>~1700</td> </tr> <tr> <td>50-59</td> <td>~1715</td> <td>~1710</td> <td>~1685</td> </tr> <tr> <td>60 sup</td> <td>~1695</td> <td>~1690</td> <td>~1665</td> </tr> </tbody> </table>	Age Class	North F (cm)	Centre F (cm)	South F (cm)	29 inf	~1625	~1615	~1590	30-39	~1615	~1605	~1580	40-49	~1605	~1595	~1565	50-59	~1595	~1585	~1545	60 sup	~1585	~1575	~1540	Age Class	Centre M (cm)	North M (cm)	South M (cm)	29 inf	~1765	~1765	~1730	30-39	~1765	~1735	~1710	40-49	~1735	~1730	~1700	50-59	~1715	~1710	~1685	60 sup	~1695	~1690	~1665
Age Class	North F (cm)	Centre F (cm)	South F (cm)																																															
29 inf	~1625	~1615	~1590																																															
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40-49	~1605	~1595	~1565																																															
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50-59	~1715	~1710	~1685																																															
60 sup	~1695	~1690	~1665																																															

Table 3 (continued)

5 Accuracy and reliability of measurements		
5.1	Intra- and inter-observer error rates	The survey was carried out by a team of four (two male and two female) operators: Physical Education graduates (Ancona) and Doctor of Medicine graduate students (Naples), supervised by an expert anthropometrist and certified ergonomist (Dr. Ivana Coniglio). No specific intra- and inter- observer measurement of error rates had been performed. Original forms consent to identify operators. All measurements and statistics are taken and rounded in units of millimetres and kilograms.
5.2	Measurements from 3-D scanners	None
5.3	Other measurement not taken using instruments described in ISO 7250-1	None
5.4	Type of clothing	Their own bathing suits

Table 4 — Italy — Statistical summary

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
		Age	Male	2 011	38	13	19	20	37	60	64
			Female	2 011	36	13	19	19	35	59	64
			Total	4 021	37	13	19	19	36	60	64
1	4.1.1	Body mass (weight), kg	Male	1 974	76	10	54	60	75	93	103
			Female	1 980	60	9	43	48	59	78	88
			Total	3 954	68	12	45	50	67	83	96
2	4.1.2	Stature (body height)	Male	2 011	1 716	69	1 563	1 601	1 714	1 834	1 883
			Female	2 011	1 592	64	1 443	1 490	1 590	1 695	1 757
			Total	4 021	1 654	91	1 463	1 512	1 652	1 806	1 862
3	4.1.3	Eye height	Male								
			Female								
			Total								
4	4.1.4	Shoulder height	Male	1 919	1 410	56	1 303	1 323	1 405	1 508	1 553
			Female	1 990	1 303	58	1 166	1 210	1 302	1 394	1 448
			Total	3 909	1 356	78	1 187	1 232	1 354	1 485	1 535
5	4.1.5	Elbow height	Male	2 002	1 084	51	967	1 004	1 082	1 170	1 205
			Female	1 995	1 001	48	888	925	1 000	1 078	1 114
			Total	3 997	1 043	65	903	941	1 042	1 152	1 195
6	4.1.6	Iliac spine height, standing	Male								
			Female								
			Total								
7 ^a	4.1.7	Crotch height	Male	1 967	836	47	732	760	834	914	945
			Female	2 001	757	42	655	689	756	827	864
			Total	3 967	796	60	671	704	793	899	935
8	4.1.8	Tibial height	Male	1 991	457	31	397	411	454	511	538
			Female	1 970	432	28	373	386	431	480	497
			Total	3 961	444	32	378	395	443	500	526
9	4.1.9	Chest depth, standing	Male	2 006	215	23	166	180	214	255	277
			Female	2 004	188	27	138	152	185	235	271
			Total	4 010	201	29	144	158	200	250	275
10	4.1.10	Body depth, standing	Male								
			Female								
			Total								
11	4.1.11	Chest breadth, standing	Male								
			Female								
			Total								
12	4.1.12	Hip breadth, standing	Male								
			Female								
			Total								
13	4.2.1	Sitting height (erect)	Male	1 986	883	38	804	820	882	946	976
			Female	2 005	835	37	747	775	835	894	918
			Total	3 991	859	44	758	787	860	934	966
14	4.2.2	Eye height, sitting	Male								
			Female								
			Total								
15 ^a	4.2.3	Cervicale height, sitting	Male	1 976	643	35	563	586	642	702	730
			Female	1 970	604	33	529	550	604	659	685
			Total	3 947	624	39	536	561	622	690	718

Table 4 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
16 ^a	4.2.4	Shoulder height, sitting	Male	1 893	573	34	501	520	571	631	660
			Female	1 924	550	34	484	501	549	602	629
			Total	3 817	561	34	490	507	560	620	651
17	4.2.5	Elbow height, sitting	Male	2 000	238	32	164	186	237	291	314
			Female	1 988	238	28	170	190	238	283	303
			Total	3 988	238	30	167	188	237	288	312
18	4.2.6	Shoulder-elbow length	Male	1 950	322	22	277	288	322	357	381
			Female	1 922	303	22	259	270	302	339	360
			Total	3 871	313	24	262	275	312	351	375
19	4.2.7	Elbow-wrist length	Male	1 899	247	22	204	213	246	282	310
			Female	1 575	224	17	200	202	222	253	279
			Total	3 472	236	23	200	204	234	276	299
20	4.2.8	Shoulder (biacromial) breadth	Male	2 005	392	27	325	344	395	435	450
			Female	1 981	345	21	291	308	345	379	390
			Total	3 987	368	34	299	317	365	425	443
21	4.2.9	Shoulder (bideltoïd) breadth	Male	2 001	460	26	404	421	459	500	519
			Female	1 988	409	27	353	368	406	459	479
			Total	3 989	434	36	359	375	436	491	510
22	4.2.10	Elbow-to-elbow breadth	Male	2 006	498	45	379	420	499	571	594
			Female	1 998	443	46	338	372	442	525	570
			Total	4 004	471	53	348	383	472	558	578
23	4.2.11	Hip breadth, sitting	Male	1 989	350	28	285	305	343	397	431
			Female	1 995	359	33	292	312	355	417	465
			Total	3 984	355	32	288	308	352	410	450
24	4.2.12	Lower leg length (popliteal height)	Male	1 994	461	30	399	412	460	511	536
			Female	1 999	413	34	342	362	411	472	496
			Total	3 993	437	40	350	371	439	501	525
25	4.2.13	Thigh clearance	Male	2 003	138	14	104	116	138	160	172
			Female	1 998	134	16	101	110	134	159	171
			Total	4 001	136	15	102	112	136	160	172
26	4.2.14	Knee height	Male	2 007	531	30	464	486	530	582	602
			Female	2 005	484	30	412	439	483	537	563
			Total	4 012	508	38	425	448	507	572	596
27	4.2.15	Abdominal depth, sitting	Male	1 881	246	37	180	194	243	307	339
			Female	1 856	233	45	154	175	225	320	360
			Total	3 737	239	41	161	181	235	314	350
28	4.2.16	Thorax depth at the nipple	Male								
			Female								
			Total								
29	4.2.17	Buttock-abdomen depth sitting	Male								
			Female								
			Total								
30	4.3.1	Hand length	Male	1 906	193	10	168	175	193	210	211
			Female	1 882	176	9	155	163	176	190	200
			Total	3 788	184	13	158	165	184	205	210
31	4.3.2	Palm length perpendicular	Male								
			Female								
			Total								

Table 4 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
32	4.3.3	Hand breadth at metacarpals	Male	1 944	93	9	76	79	92	110	112
			Female	1 678	80	7	67	70	80	90	90
			Total	3 622	87	11	68	71	86	108	110
33	4.3.4	Index finger length	Male	1 962	92	8	74	79	92	105	110
			Female	1 620	78	5	65	70	79	86	89
			Total	3 582	86	10	68	71	84	102	110
34	4.3.5	Index finger breadth, proximal	Male	990	19	2	16	17	19	21	23
			Female	1 003	17	2	14	15	16	20	21
			Total	1 993	18	2	14	15	18	21	22
35	4.3.6	Index finger breadth, distal	Male								
			Female								
			Total								
36	4.3.7	Foot length	Male	1 991	262	12	234	242	261	282	291
			Female	2 001	237	11	211	220	236	256	267
			Total	3 991	249	17	214	223	249	278	288
37	4.3.8	Foot breadth	Male	1 989	99	7	84	88	99	110	115
			Female	1 923	90	6	80	82	90	100	106
			Total	3 912	95	8	80	83	94	108	114
38	4.3.9	Head length	Male	1 935	191	7	176	179	191	203	206
			Female	1 739	181	6	167	172	181	192	197
			Total	3 674	186	8	170	173	185	200	205
39	4.3.10	Head breadth	Male	2 004	153	7	136	141	153	164	168
			Female	1 961	145	7	130	134	145	156	161
			Total	3 965	149	8	132	136	149	162	167
40	4.3.11	Face length (nasion-menton)	Male								
			Female								
			Total								
41	4.3.12	Head circumference	Male								
			Female								
			Total								
42	4.3.13	Sagittal arc	Male								
			Female								
			Total								
43	4.3.14	Bitragion arc	Male								
			Female								
			Total								
44	4.4.1	Wall-acromion distance	Male								
			Female								
			Total								
45	4.4.2	Grip reach; forward reach	Male								
			Female								
			Total								
46	4.4.3	Elbow-grip length	Male								
			Female								
			Total								
47	4.4.4	Fist (grip axis) height	Male								
			Female								
			Total								

Table 4 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
48	4.4.5	Forearm-fingertip length	Male								
			Female								
			Total								
49	4.4.6	Buttock-popliteal length (seat depth)	Male	1 992	481	29	413	434	480	529	546
			Female	1 988	475	28	409	427	475	520	541
			Total	3 980	478	29	410	430	478	525	545
50	4.4.7	Buttock-knee length	Male								
			Female								
			Total								
51	4.4.8	Neck circumference	Male								
			Female								
			Total								
52	4.4.9	Chest circumference	Male	1 965	983	72	835	870	980	1 110	1 175
			Female	1 985	849	97	665	705	840	1 020	1 111
			Total	3 950	916	109	680	730	921	1 082	1 160
53	4.4.10	Waist circumference	Male	1 978	893	97	700	740	894	1 059	1 160
			Female	1 973	778	117	591	630	750	1 010	1 110
			Total	3 952	836	122	610	650	832	1 040	1 120
54	4.4.11	Wrist circumference	Male								
			Female								
			Total								
55	4.4.12	Thigh circumference	Male								
			Female								
			Total								
56	4.4.13	Calf circumference	Male								
			Female								
			Total								
^a Definition is different from ISO 7250-1 or substituted.											

7.4 ISO member body: Japan

Organization: Japanese Industrial Standards Committee (JISC)

URL: <http://www.jisc.go.jp/>

Name of study: Size JPN 2004-06 project

Table 5 — Japan — Database

1 Measurement																																														
1.1	Measured side (right/left)	Right																																												
1.2	Measurement definitions different from those described in ISO 7250-1	4.2.1 Sitting height (erect); 4.2.2 Eye height, sitting; 4.2.3 Cervicale height, sitting; 4.2.4 Shoulder height, sitting; 4.2.17 Buttock-abdomen depth, sitting: Subject sits erect with knees bent at right angles, supporting feet flat on the floor rather than lower legs hanging freely. 4.3.12 (Head circumference): tape measure passes Glabella. 4.4.1 (Wall-acromion distance): measured with arms hanging freely downward rather than with arms fully extended horizontally.																																												
1.3	Substituted measurements	None																																												
1.4	Number of measurements not described in ISO 7250-1	99 for females, 93 for males																																												
2 Age range																																														
2.1	Working age	20 to 65																																												
2.2	Age range of subjects	20 to 65																																												
3 Background data																																														
3.1	Time period of examination	October 18, 2004 to October 6, 2006																																												
3.2	Location of examination	Tokyo, Osaka, Moriguchi and Kobe																																												
3.3	Survey sample	<p>Subjects were paid volunteers aged 20 to 65 years.</p> <table border="1"> <thead> <tr> <th>Age group</th> <th>Male</th> <th>Female</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>20-24</td> <td>283</td> <td>350</td> <td>633</td> </tr> <tr> <td>25-29</td> <td>315</td> <td>303</td> <td>618</td> </tr> <tr> <td>30-34</td> <td>340</td> <td>298</td> <td>638</td> </tr> <tr> <td>35-39</td> <td>398</td> <td>283</td> <td>681</td> </tr> <tr> <td>40-44</td> <td>343</td> <td>261</td> <td>604</td> </tr> <tr> <td>45-49</td> <td>319</td> <td>229</td> <td>548</td> </tr> <tr> <td>50-54</td> <td>338</td> <td>242</td> <td>580</td> </tr> <tr> <td>55-59</td> <td>293</td> <td>248</td> <td>541</td> </tr> <tr> <td>60-64</td> <td>197</td> <td>218</td> <td>415</td> </tr> <tr> <td>65</td> <td>59</td> <td>44</td> <td>103</td> </tr> </tbody> </table>	Age group	Male	Female	Total	20-24	283	350	633	25-29	315	303	618	30-34	340	298	638	35-39	398	283	681	40-44	343	261	604	45-49	319	229	548	50-54	338	242	580	55-59	293	248	541	60-64	197	218	415	65	59	44	103
Age group	Male	Female	Total																																											
20-24	283	350	633																																											
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55-59	293	248	541																																											
60-64	197	218	415																																											
65	59	44	103																																											
3.4	Publication	Reference [8]																																												

Table 5 (continued)

4 Representativeness of the sample																															
4.1	Sampling method	Subjects were volunteers. Mean height and mean weight of the subjects were within ± 15 mm and $\pm 1,5$ kg of the national average in 2005 by the Ministry of Education, Sports and Science, except male 20 to 24 group (19 mm smaller and 3,5 kg lighter).																													
4.2	Information on secular change	<p>Significant secular change has been observed in the working age population in Japan. The rate of increase in mean height of 20-year-old males and females is shown in the following table based on the statistics by the Japanese government (cm/decade):</p> <table border="1"> <thead> <tr> <th rowspan="2">Birth year</th> <th colspan="2">Students</th> <th colspan="2">General population</th> </tr> <tr> <th>Male</th> <th>Female</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>1940–1949</td> <td>2,42</td> <td>1,81</td> <td>3,33</td> <td>3,75</td> </tr> <tr> <td>1950–1959</td> <td>1,48</td> <td>0,9</td> <td>2,71</td> <td>2,01</td> </tr> <tr> <td>1960–1969</td> <td>0,95</td> <td>0,96</td> <td>2,47</td> <td>1,14</td> </tr> <tr> <td>1970–1979</td> <td>–0,29</td> <td>0,77</td> <td>0,79</td> <td>0,43</td> </tr> </tbody> </table>	Birth year	Students		General population		Male	Female	Male	Female	1940–1949	2,42	1,81	3,33	3,75	1950–1959	1,48	0,9	2,71	2,01	1960–1969	0,95	0,96	2,47	1,14	1970–1979	–0,29	0,77	0,79	0,43
Birth year	Students			General population																											
	Male	Female	Male	Female																											
1940–1949	2,42	1,81	3,33	3,75																											
1950–1959	1,48	0,9	2,71	2,01																											
1960–1969	0,95	0,96	2,47	1,14																											
1970–1979	–0,29	0,77	0,79	0,43																											
5 Accuracy and reliability of measurements																															
5.1	Intra- and inter-observer error rates	Intra- and inter-observer errors were examined using technical error of measurement and the mean absolute difference. Results are reported in the “Report of R&D of intellectual infrastructure for small and medium enterprise in fiscal year 2006: Quality control of the traditional and 3-D anthropometry”.																													
5.2	Measurements from 3-D scanners	None																													
5.3	Other measurement not taken using instruments described in ISO 7250-1	None																													
5.4	Type of clothing	Men: fitted shorts (stretch fabric) Women: fitted, comfortable brassiere without supporting function (stretch fabric) and shorts (stretch fabric)																													

Table 6 — Japan — Statistical summary

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
		Age	Male	2 885	41,6	12,5	20	22	41	63	65
			Female	2 476	40,5	13,5	20	20	40	63	65
			Total	5 361	41,1	13,0	20	21	40	63	65
1	4.1.1	Body mass (weight), kg	Male	2 877	67,5	9,8	49	54	67	84	96
			Female	2 461	51,9	7,0	39	43	51	64	74
			Total	5 338	60,3	11,6	41	44	59	80	92
2	4.1.2	Stature (body height)	Male	2 880	1 695,6	59,9	1 555	1 597	1 696	1 795	1 838
			Female	2 462	1 570,3	55,1	1 446	1 481	1 570	1 664	1 703
			Total	5 342	1 637,9	85,1	1 463	1 501	1 638	1 776	1 823
3	4.1.3	Eye height	Male	2 874	1 579,3	58,3	1 443	1 484	1 579	1 675	1 719
			Female	2 463	1 459,8	54,3	1 338	1 372	1 459	1 552	1 590
			Total	5 337	1 524,2	82,1	1 352	1 392	1 524	1 658	1 702
4	4.1.4	Shoulder height	Male	2 879	1 369,8	54,3	1 246	1 282	1 369	1 460	1 499
			Female	2 463	1 263,1	50,4	1 151	1 182	1 263	1 350	1 384
			Total	5 342	1 320,6	74,7	1 166	1 201	1 321	1 442	1 486
5	4.1.5	Elbow height	Male	2 873	1 031,3	42,9	933	960	1 031	1 102	1 136
			Female	2 459	953,0	39,7	861	889	953	1 020	1 049
			Total	5 332	995,2	57,0	874	903	996	1 088	1 121
6	4.1.6	Iliac spine height, standing	Male	2 879	911,9	42,7	814	842	912	982	1 019
			Female	2 462	836,7	38,9	748	774	836	901	930
			Total	5 341	877,2	55,6	761	788	877	968	1 006
7	4.1.7	Crotch height	Male	2 878	771,7	39,6	683	707	771	837	868
			Female	2 462	705,7	37,2	621	645	705	768	795
			Total	5 340	741,3	50,6	632	660	741	824	858
8	4.1.8	Tibial height	Male	2 878	421,0	21,0	376	387	421	457	473
			Female	2 463	384,7	19,1	342	354	384	416	429
			Total	5 341	404,2	27,1	347	362	404	449	468
9	4.1.9	Chest depth, standing	Male	2 876	196,6	18,5	158	168	196	228	245
			Female	2 452	171,0	16,1	140	149	170	200	216
			Total	5 328	184,8	21,6	143	153	183	221	238
10	4.1.10	Body depth, standing	Male	2 871	247,5	28,6	190	205	245	296	321
			Female	2 449	220,2	25,3	175	185	217	268	295
			Total	5 320	234,9	30,3	178	191	232	289	312
11	4.1.11	Chest breadth, standing	Male	2 875	289,0	17,3	252	263	288	319	335
			Female	2 452	256,4	14,4	226	235	255	281	296
			Total	5 327	274,0	22,8	230	239	273	311	330
12	4.1.12	Hip breadth, standing	Male	2 874	332,4	15,9	297	308	332	359	374
			Female	2 459	330,9	16,8	296	304	330	360	375
			Total	5 333	331,7	16,3	296	306	331	359	375
13 ^a	4.2.1	Sitting height (erect)	Male	2 878	909,9	33,0	831	856	909	964	988
			Female	2 459	849,2	29,8	774	800	850	898	920
			Total	5 337	881,9	43,7	786	812	881	953	978
14 ^a	4.2.2	Eye height, sitting	Male	2 874	789,2	32,1	716	738	789	842	864
			Female	2 457	734,3	28,3	665	687	735	780	802
			Total	5 331	763,9	40,9	675	699	762	831	858
15 ^a	4.2.3	Cervicale height, sitting	Male	2 879	669,6	27,2	607	626	670	715	734
			Female	2 458	621,3	24,7	564	580	621	662	680
			Total	5 337	647,4	35,5	570	591	647	706	726

Table 6 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
16 ^a	4.2.4	Shoulder height, sitting	Male	2 875	586,3	27,9	523	542	585	633	653
			Female	2 457	545,8	25,4	487	504	546	586	608
			Total	5 332	567,7	33,5	493	513	567	624	645
17	4.2.5	Elbow height, sitting	Male	2 870	249,6	24,9	195	208	249	292	307
			Female	2 455	235,3	22,9	183	198	235	273	287
			Total	5 325	243,0	25,1	188	203	243	285	301
18	4.2.6	Shoulder-elbow length	Male	2 871	338,4	15,3	303	314	338	364	374
			Female	2 460	311,8	14,4	280	290	311	337	348
			Total	5 331	326,1	19,9	284	295	326	359	371
19	4.2.7	Elbow-wrist length	Male	2 868	261,3	14,7	229	237	261	285	298
			Female	2 455	235,6	13,2	206	215	235	258	268
			Total	5 323	249,4	19,0	210	220	249	281	293
20	4.2.8	Shoulder (biacromial) breadth	Male	2 877	401,6	17,3	362	374	401	431	444
			Female	2 463	358,3	14,7	326	335	358	383	397
			Total	5 340	381,7	27,0	329	341	382	424	440
21	4.2.9	Shoulder (bideltoid) breadth	Male	2 875	458,8	23,6	409	423	457	500	521
			Female	2 463	407,4	20,8	366	377	405	444	468
			Total	5 338	435,1	34,0	371	383	435	490	514
22	4.2.10	Elbow-to-elbow breadth	Male	2 870	426,4	36,2	352	371	425	486	530
			Female	2 459	370,6	35,0	307	322	365	437	472
			Total	5 329	400,6	45,2	314	332	400	475	512
23	4.2.11	Hip breadth, sitting	Male	2 868	358,8	20,4	313	327	358	393	413
			Female	2 454	360,5	22,2	314	327	359	398	420
			Total	5 322	359,6	21,3	314	327	359	395	417
24	4.2.12	Lower leg length (popliteal height)	Male	2 869	405,3	21,8	356	370	405	442	457
			Female	2 455	370,5	19,4	328	340	369	403	417
			Total	5 324	389,3	27,0	333	347	389	434	451
25	4.2.13	Thigh clearance	Male	2 864	149,4	12,9	120	129	149	171	182
			Female	2 453	131,7	11,9	107	114	131	152	162
			Total	5 317	141,2	15,2	110	117	141	167	178
26	4.2.14	Knee height	Male	2 868	497,7	25,2	440	456	498	540	558
			Female	2 453	453,6	22,5	405	418	453	492	508
			Total	5 321	477,3	32,5	410	427	477	530	553
27	4.2.15	Abdominal depth, sitting	Male	2 876	236,4	32,3	174	187	234	290	321
			Female	2 454	210,0	30,3	161	171	204	268	298
			Total	5 330	224,2	34,0	164	176	220	283	314
28	4.2.16	Thorax depth at the nipple	Male	2 876	222,9	22,5	174	187	223	261	280
			Female	2 450	208,2	23,0	169	177	205	252	274
			Total	5 326	216,1	23,9	170	181	214	258	279
29 ^a	4.2.17	Buttock-abdomen depth sitting	Male	2 874	231,0	30,5	172	186	229	283	311
			Female	2 452	212,7	29,5	160	173	208	269	299
			Total	5 326	222,6	31,4	164	177	219	278	307
30	4.3.1	Hand length	Male	2 870	192,5	8,1	175	179	192	206	212
			Female	2 453	178,1	7,9	161	166	178	192	197
			Total	5 323	185,8	10,7	164	169	186	204	210
31	4.3.2	Palm length perpendicular	Male	2 875	113,8	5,4	103	105	114	123	127
			Female	2 455	105,0	5,3	94	97	105	114	118
			Total	5 330	109,8	6,9	95	99	110	121	126

Table 6 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
32	4.3.3	Hand breadth at metacarpals	Male	2 873	82,1	3,8	73	76	82	89	91
			Female	2 456	73,4	3,5	66	68	73	79	81
			Total	5 329	78,1	5,7	67	69	78	87	90
33	4.3.4	Index finger length	Male	2 873	70,3	3,8	62	64	70	77	79
			Female	2 455	65,9	3,7	58	60	66	72	75
			Total	5 328	68,3	4,3	59	61	68	76	78
34	4.3.5	Index finger breadth, proximal	Male	2 873	18,4	1,1	16	17	18	20	21
			Female	2 456	16,5	1,1	14	15	16	18	19
			Total	5 329	17,6	1,4	15	15	18	20	21
35	4.3.6	Index finger breadth, distal	Male	2 871	15,8	1,2	13	14	16	18	18
			Female	2 454	14,3	1,2	12	13	14	16	17
			Total	5 325	15,1	1,4	12	13	15	17	18
36	4.3.7	Foot length	Male	2 876	251,3	10,6	228	234	251	270	277
			Female	2 458	230,2	9,6	209	215	230	246	254
			Total	5 334	241,6	14,7	211	219	241	266	274
37	4.3.8	Foot breadth	Male	2 875	100,6	5,1	89	93	100	109	114
			Female	2 456	92,7	5,0	82	85	93	101	106
			Total	5 331	96,9	6,4	83	86	97	107	112
38	4.3.9	Head length	Male	2 878	191,4	6,7	176	181	191	203	208
			Female	2 456	180,5	6,3	167	170	180	191	196
			Total	5 334	186,4	8,5	168	173	186	200	206
39	4.3.10	Head breadth	Male	2 873	163,0	6,1	149	153	163	173	178
			Female	2 455	154,4	5,4	142	145	154	164	167
			Total	5 328	159,0	7,2	143	148	159	171	176
40	4.3.11	Face length (nasion-menton)	Male	2 879	122,9	6,3	109	113	123	133	138
			Female	2 458	115,2	6,0	102	106	115	125	130
			Total	5 337	119,3	7,2	103	108	119	131	136
41 ^a	4.3.12	Head circumference	Male	2 877	575,0	15,7	539	549	575	601	615
			Female	2 456	549,5	14,9	515	526	549	574	587
			Total	5 333	563,2	19,9	520	531	563	596	609
42	4.3.13	Sagittal arc	Male	2 875	390,9	17,2	349	362	391	419	429
			Female	2 450	378,7	14,6	344	354	379	403	413
			Total	5 325	385,3	17,2	347	358	384	414	426
43	4.3.14	Bitragion arc	Male	2 874	372,6	14,0	342	349	373	396	405
			Female	2 456	359,0	13,9	328	336	359	382	393
			Total	5 330	366,3	15,5	331	342	366	392	402
44 ^a	4.4.1	Wall-acromion distance	Male	2 877	95,1	14,5	60	72	95	119	130
			Female	2 459	86,4	13,5	55	64	86	109	118
			Total	5 336	91,1	14,7	57	67	90	115	127
45	4.4.2	Grip reach; forward reach	Male	2 867	693,0	34,5	611	635	693	750	773
			Female	2 449	636,2	31,3	565	588	635	690	713
			Total	5 316	666,8	43,5	575	599	666	739	766
46	4.4.3	Elbow-grip length	Male	2 870	336,0	15,6	300	311	335	362	373
			Female	2 454	306,0	14,8	273	282	305	331	344
			Total	5 324	322,2	21,3	278	288	322	357	369
47	4.4.4	Fist (grip axis) height	Male	2 873	754,1	35,8	671	697	753	812	840
			Female	2 458	698,5	32,9	624	642	699	752	777
			Total	5 331	728,5	44,2	632	658	728	802	831

Table 6 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
48	4.4.5	Forearm-fingertip length	Male	2 868	448,9	18,4	407	419	449	480	495
			Female	2 452	409,5	17,1	371	382	409	438	452
			Total	5 320	430,8	26,5	376	390	431	474	489
49	4.4.6	Buttock-popliteal length (seat depth)	Male	2 869	466,4	23,1	415	429	465	507	521
			Female	2 454	447,6	21,4	400	412	448	483	501
			Total	5 323	457,7	24,2	404	419	457	500	517
50	4.4.7	Buttock-knee length	Male	2 869	565,6	24,9	507	525	565	608	625
			Female	2 454	532,6	22,7	484	497	532	570	589
			Total	5 323	550,4	29,0	489	504	550	600	619
51	4.4.8	Neck circumference	Male	2 880	373,7	21,2	330	341	372	410	433
			Female	2 462	315,3	17,4	284	291	313	347	367
			Total	5 342	346,8	35,1	287	296	349	402	425
52	4.4.9	Chest circumference	Male	2 877	930,2	68,9	787	828	924	1 050	1 119
			Female	2 454	837,9	66,8	727	749	827	963	1 040
			Total	5 331	887,7	82,0	737	763	883	1 028	1 103
53	4.4.10	Waist circumference	Male	2 878	827,1	89,6	651	688	823	977	1 061
			Female	2 460	706,5	73,9	589	612	691	850	937
			Total	5 338	771,5	102,3	597	629	761	953	1 029
54	4.4.11	Wrist circumference	Male	2 877	171,6	8,9	152	158	171	187	195
			Female	2 458	152,4	8,1	137	141	152	166	175
			Total	5 335	162,8	12,8	138	143	163	184	192
55	4.4.12	Thigh circumference	Male	2 878	559,4	45,4	463	490	557	637	684
			Female	2 462	534,2	38,8	451	475	533	600	638
			Total	5 340	547,8	44,3	456	482	544	623	673
56	4.4.13	Calf circumference	Male	2 877	376,1	27,4	315	334	375	422	448
			Female	2 463	343,6	22,5	296	311	342	382	406
			Total	5 340	361,2	30,0	302	316	359	413	439

^a Definition is different from ISO 7250-1 or substituted.

7.5 ISO member body: Kenya

Organization: Kenya Bureau of Standards (KEBS)

URL: <http://www.kebs.org/>

Name of study: —

Table 7 — Kenya — Database

1 Measurement																													
1.1	Measured side (right/left)	Right																											
1.2	Measurement definitions different from those described in ISO 7250-1	4.1.2 Stature (body height); 4.1.3 Eye height; 4.1.4 Shoulder height: the subject stands on the platform of a height scale. The scale lever is adjusted to rest at the desired point. 4.1.5 Elbow height; 4.1.6 Iliac spine height, standing: the measurements were taken using meter rule and carpenter's tape measure, depending on the subject's height.																											
1.3	Substituted measurements	4.1.7 Crotch height: the data for this measurement were represented by the data taken by measuring the wrist height of the subject standing straight upright on a flat surface. 4.1.11 Chest breadth, standing; 4.1.12 Hip breadth, standing; 4.2.8 Shoulder (biacromial) breadth; 4.2.9 Shoulder (bideltoid) breadth; 4.2.10 Elbow-to-elbow breadth; 4.2.11 Hip breadth, sitting: the principle of constant distance at any point between any two lines parallel to each other was applied. Two meter rules were placed at the desired point and held parallel to one another. The constant distance between the two meter rules was then taken with a tape measure.																											
1.4	Number of measurements not described in ISO 7250-1	None																											
2 Age range																													
2.1	Working age	Official working age 18 to 55. There are a number of persons over 55 years serving in the public sector in various capacities.																											
2.2	Age range of subjects	18 to 73																											
3 Background data																													
3.1	Time period of examination	Measurements taken between December 2006 and February 2007																											
3.2	Location of examination	Measurements carried out in four out of the eight provinces in the country																											
3.3	Survey sample	The measured subjects were working volunteers. Number of subjects by age group: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Age group</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>18–20</td> <td>2</td> <td>8</td> </tr> <tr> <td>21–30</td> <td>37</td> <td>29</td> </tr> <tr> <td>31–40</td> <td>37</td> <td>22</td> </tr> <tr> <td>41–50</td> <td>48</td> <td>14</td> </tr> <tr> <td>51–60</td> <td>8</td> <td>1</td> </tr> <tr> <td>61–70</td> <td>0</td> <td>0</td> </tr> <tr> <td>71–80</td> <td>1</td> <td>0</td> </tr> <tr> <td>Total</td> <td>133</td> <td>74</td> </tr> </tbody> </table>	Age group	Male	Female	18–20	2	8	21–30	37	29	31–40	37	22	41–50	48	14	51–60	8	1	61–70	0	0	71–80	1	0	Total	133	74
Age group	Male	Female																											
18–20	2	8																											
21–30	37	29																											
31–40	37	22																											
41–50	48	14																											
51–60	8	1																											
61–70	0	0																											
71–80	1	0																											
Total	133	74																											
3.4	Publication	The data are yet to be published as the national reference document.																											

Table 7 (continued)

4 Representativeness of the sample		
4.1	Sampling method	Subjects were volunteers from various tribes and locations of the country.
4.2	Information on secular change	A study in secular change has not been done, but due to the social and economic changes being experienced, it is evident that such changes are occurring.
5 Accuracy and reliability of measurements		
5.1	Intra- and inter-observer error rates	The measurements were carried out by three persons. Some measurements on one subject were carried out by two observers. For the measurements carried out by one individual, reliability was not examined.
5.2	Measurements from 3-D scanners	None
5.3	Other measurement not taken using instruments described in ISO 7250-1	None
5.4	Type of clothing	Men: measurements taken with their shirts and trousers on. Women: measurements taken while they were wearing light tops. Women in Kenya do have additional head gear, which consists of artificial hair and braiding. The head measurements taken included the artificial hair and braids, for they constitute the normal everyday part of a Kenyan lady's head attire.

Table 8 — Kenya — Statistical summary

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
		Age	Male	133	37,6	9,5	20	24	39	51	55
			Female	74	31,9	8,8	20	20	31	45	51
			Total	207	35,6	9,6	20	21	36	50	54
1	4.1.1	Body mass (weight), kg	Male	133	70,6	13,7	47	52	69	95	106
			Female	74	67,9	13,5	45	49	67	91	99
			Total	207	69,7	13,6	46	50	68	95	108
2 ^a	4.1.2	Stature (body height)	Male	133	1 717,4	74,6	1 536	1 607	1 720	1 850	1 884
			Female	74	1 628,9	69,2	1 490	1 532	1 615	1 735	1 785
			Total	207	1 685,7	84,1	1 506	1 552	1 685	1 837	1 869
3 ^a	4.1.3	Eye height	Male	133	1 612,9	74,1	1 436	1 498	1 610	1 738	1 770
			Female	74	1 524,5	66,7	1 397	1 437	1 512	1 627	1 675
			Total	207	1 581,3	83,1	1 416	1 450	1 581	1 729	1 769
4 ^a	4.1.4	Shoulder height	Male	133	1 440,3	76,7	1 280	1 331	1 442	1 549	1 589
			Female	74	1 369,6	64,3	1 241	1 292	1 358	1 480	1 508
			Total	207	1 415,0	79,9	1 256	1 300	1 423	1 540	1 587
5 ^a	4.1.5	Elbow height	Male	132	1 052,2	61,3	926	963	1 050	1 148	1 197
			Female	74	995,7	64,5	811	900	995	1 082	1 112
			Total	206	1 031,9	67,9	886	940	1 036	1 130	1 189
6 ^a	4.1.6	Iliac spine height, standing	Male	132	921,8	62,5	780	833	920	1 027	1 101
			Female	73	885,4	50,4	796	818	874	970	1 017
			Total	205	908,8	60,9	785	821	910	1 009	1 087
7 ^a	4.1.7	Crotch height	Male	132	812,8	45,1	713	746	818	885	924
			Female	73	768,4	47,0	650	686	770	842	859
			Total	205	797,0	50,4	680	720	798	873	912
8	4.1.8	Tibial height	Male	132	454,5	30,1	377	406	457	500	518
			Female	74	436,6	29,5	377	394	436	490	503
			Total	206	448,1	31,0	371	400	450	500	512
9	4.1.9	Chest depth, standing	Male	130	220,1	28,5	167	181	217	266	316
			Female	74	218,6	32,0	171	178	215	265	306
			Total	204	219,9	29,8	166	178	217	266	316
10	4.1.10	Body depth, standing	Male	127	285,5	42,2	212	227	280	354	391
			Female	74	279,6	41,3	203	213	284	337	350
			Total	201	283,4	41,8	206	220	280	345	385
11 ^a	4.1.11	Chest breadth, standing	Male	128	304,5	30,0	249	259	302	361	372
			Female	74	296,9	37,6	215	245	292	370	380
			Total	202	301,7	33,1	233	257	300	365	376
12 ^a	4.1.12	Hip breadth, standing	Male	127	334,8	28,4	285	292	332	387	405
			Female	74	363,9	35,9	302	308	369	423	434
			Total	201	345,5	34,3	286	300	340	407	431
13	4.2.1	Sitting height (erect)	Male	132	842,2	43,0	767	780	840	910	955
			Female	74	797,3	42,9	709	735	798	874	889
			Total	206	826,0	48,0	721	750	827	902	944
14	4.2.2	Eye height, sitting	Male	132	729,3	38,8	647	670	730	800	821
			Female	74	688,4	39,8	595	633	687	757	772
			Total	206	714,6	43,7	611	646	720	786	813
15	4.2.3	Cervicale height, sitting	Male	127	609,4	34,1	543	566	608	670	697
			Female	74	575,6	32,2	514	523	575	627	643
			Total	201	597,0	37,1	515	531	598	657	688

Table 8 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
16	4.2.4	Shoulder height, sitting	Male	130	562,2	32,2	500	510	560	610	639
			Female	74	536,4	32,3	480	483	535	590	614
			Total	204	552,9	34,5	480	500	554	609	625
17	4.2.5	Elbow height, sitting	Male	131	198,8	31,0	135	148	200	251	260
			Female	74	198,9	26,9	150	159	200	239	252
			Total	205	198,9	29,5	140	150	200	248	260
18	4.2.6	Shoulder-elbow length	Male	131	362,8	28,3	291	320	360	409	430
			Female	74	338,2	23,9	289	305	340	371	398
			Total	205	353,9	29,3	290	310	353	404	425
19	4.2.7	Elbow-wrist length	Male	130	303,1	27,8 ^b	259	272	300	338	407 ^b
			Female	74	282,9	19,7	233	257	285	314	333
			Total	204	295,8	26,9 ^b	245	264	294	330	375 ^b
20 ^a	4.2.8	Shoulder (biacromial) breadth	Male	127	362,9	43,4 ^b	232 ^b	279	370	413	452
			Female	72	345,2	34,5	254	292	344	397	425
			Total	199	356,5	41,2 ^b	234 ^b	284	361	410	445
21 ^a	4.2.9	Shoulder (bideloid) breadth	Male	129	448,9	39,5	360	387	450	510	545
			Female	73	437,1	40,1	363	380	432	498	532
			Total	202	444,6	40,0	360	385	445	508	544
22 ^a	4.2.10	Elbow-to-elbow breadth	Male	130	459,6	48,3	367	392	457	544	574
			Female	74	455,2	53,8	354	372	450	545	558
			Total	204	458,0	50,3	355	380	455	545	570
23 ^a	4.2.11	Hip breadth, sitting	Male	130	361,4	37,3	293	303	359	424	456
			Female	74	401,9	40,0	331	339	401	470	491
			Total	204	376,1	42,9	295	310	373	453	472
24	4.2.12	Lower leg length (popliteal height)	Male	131	438,5	24,0	395	400	440	480	489
			Female	73	412,0	24,1	366	378	410	455	472
			Total	204	429,0	27,2	369	390	428	479	490
25	4.2.13	Thigh clearance	Male	132	151,0	19,2	111	120	150	185	196
			Female	74	161,0	23,9	125	128	160	190	241
			Total	206	154,6	21,5	112	123	155	190	200
26	4.2.14	Knee height	Male	131	544,3	29,7	480	500	547	600	609
			Female	73	524,0	27,5	467	485	520	570	590
			Total	204	537,0	30,5	470	495	535	591	610
27	4.2.15	Abdominal depth, sitting	Male	130	261,8	45,0	181	197	263	333	366
			Female	74	267,1	45,0	183	200	265	338	367
			Total	204	263,7	44,9	180	199	264	337	370
28	4.2.16	Thorax depth at the nipple	Male	131	233,4	27,1	182	194	231	280	294
			Female	74	265,4	40,7	197	201	263	330	369
			Total	205	245,0	36,0	182	196	242	310	335
29	4.2.17	Buttock-abdomen depth sitting	Male	127	260,3	43,0	184	197	258	330	354
			Female	74	275,2	51,7	177	193	278	347	392
			Total	201	265,8	46,8	180	196	265	340	370
30	4.3.1	Hand length	Male	133	191,7	10,4	168	177	191	210	220
			Female	73	182,8	11,1	159	167	182	199	207
			Total	206	188,5	11,4	163	170	189	210	218
31	4.3.2	Palm length perpendicular	Male	131	106,4	6,5	94	96	105	118	123
			Female	74	102,2	6,2	91	94	102	114	116
			Total	205	104,9	6,7	91	95	105	116	122

Table 8 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
32	4.3.3	Hand breadth at metacarpals	Male	133	86,8	6,2	75	77	86	97	106
			Female	73	80,4	5,2	72	74	80	89	94
			Total	206	84,5	6,6	73	75	85	95	106
33	4.3.4	Index finger length	Male	133	73,4	5,9	63	65	73	82	88
			Female	74	69,9	6,7	57	61	69	80	87
			Total	207	72,2	6,4	59	63	72	82	89
34	4.3.5	Index finger breadth, proximal	Male	130	21,6	1,7	18	19	21	24	26
			Female	73	19,6	1,8	15	17	20	22	24
			Total	203	20,9	2,0	16	18	21	24	26
35	4.3.6	Index finger breadth, distal	Male	130	18,3	1,4	15	16	18	20	22
			Female	72	16,7	1,4	14	14	17	19	19
			Total	202	17,9	1,8	14	15	18	20	22
36	4.3.7	Foot length	Male	132	263,6	14,2	228	242	264	288	299
			Female	74	246,1	12,6	225	229	244	270	281
			Total	206	257,3	16,0	226	232	256	284	298
37	4.3.8	Foot breadth	Male	132	99,6	6,6	87	90	100	111	117
			Female	74	92,2	6,1	80	84	94	101	103
			Total	206	97,0	7,4	80	85	97	109	117
38	4.3.9	Head length	Male	132	200,2	8,4	178	187	201	213	218
			Female	74	196,4	8,6	176	181	197	210	213
			Total	206	198,9	8,7	176	184	199	211	218
39	4.3.10	Head breadth	Male	132	152,3	6,4	139	143	152	162	169
			Female	74	148,2	7,7	133	138	147	161	167
			Total	206	150,8	7,1	134	140	151	162	171
40	4.3.11	Face length (nasion-menton)	Male	133	115,7	7,7	99	104	114	130	132
			Female	73	109,8	7,9	96	99	108	121	133
			Total	206	113,7	8,3	96	102	113	130	133
41	4.3.12	Head circumference	Male	133	575,3	31,6 ^b	424 ^b	545	580	610	620
			Female	74	576,4	34,8 ^b	482 ^b	540	580	620	625
			Total	207	575,7	32,7 ^b	394 ^b	540	580	610	625
42	4.3.13	Sagittal arc	Male	133	340,1	16,1	312	318	345	370	382
			Female	71	352,5	23,6	299	310	350	390	402
			Total	204	347,7	19,3	300	316	345	380	390
43	4.3.14	Bitragion arc	Male	133	356,8	15,6	325	332	355	380	397
			Female	73	365,1	18,7	330	335	365	394	410
			Total	206	359,7	17,2	325	334	360	390	400
44	4.4.1	Wall-acromion distance	Male	128	143,7	17,4	110	116	145	177	188
			Female	72	136,8	17,7	100	105	140	160	174
			Total	200	141,2	17,8	105	110	140	168	186
45	4.4.2	Grip reach; forward reach	Male	132	764,3	45,5	672	691	760	840	884
			Female	73	723,8	49,5	649	659	720	809	864
			Total	205	749,9	50,7	650	668	748	831	885
46	4.4.3	Elbow-grip length	Male	129	381,7	26,8	323	347	378	428	449
			Female	73	359,3	26,2	318	325	355	410	421
			Total	202	373,6	28,6	318	330	371	423	445
47	4.4.4	Fist (grip axis) height	Male	130	729,3	42,7	644	660	730	794	815
			Female	74	698,2	46,4	620	633	696	762	829
			Total	204	718,0	46,4	630	646	715	793	815

Table 8 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
48	4.4.5	Forearm-fingertip length	Male	129	490,7	24,5	431	452	490	531	545
			Female	73	461,0	25,5	413	423	460	504	532
			Total	202	479,9	28,6	417	432	482	530	540
49	4.4.6	Buttock-popliteal length (seat depth)	Male	100	497,0	31,9	426	450	496	550	564
			Female	60	509,2	37,9	444	455	510	570	609
			Total	160	501,5	34,6	428	453	500	560	587
50	4.4.7	Buttock-knee length	Male	129	608,2	32,7	555	561	607	662	694
			Female	73	608,5	35,6	500	561	610	660	669
			Total	202	608,3	33,7	516	560	610	660	690
51	4.4.8	Neck circumference	Male	132	372,1	29,4	317	330	370	420	449
			Female	74	331,5	25,0	283	293	330	378	390
			Total	206	357,5	34,0	290	310	355	410	445
52	4.4.9	Chest circumference	Male	132	925,4	87,2	745	799	920	1 068	1 141
			Female	74	950,4	101,8	764	813	950	1 120	1 184
			Total	206	934,4	93,3	757	805	927	1 094	1 146
53	4.4.10	Waist circumference	Male	132	857,1	100,2	663	721	854	1 037	1 081
			Female	74	818,4	104,9	625	660	810	984	1 013
			Total	206	843,2	103,4	640	690	842	1 010	1 075
54	4.4.11	Wrist circumference	Male	133	168,8	13,1	143	149	170	190	198
			Female	74	161,9	12,5	138	144	160	185	191
			Total	207	166,4	13,3	140	147	165	190	195
55	4.4.12	Thigh circumference	Male	129	541,2	63,7	420	440	530	655	675
			Female	71	611,6	72,4	494	500	610	720	783
			Total	200	566,2	74,8	420	450	559	695	740
56	4.4.13	Calf circumference	Male	131	359,1	35,7	299	307	360	416	464
			Female	74	366,8	33,8	303	320	370	416	456
			Total	205	361,9	35,2	298	312	360	416	469
<p>^a Definition is different from ISO 7250-1 or substituted.</p> <p>^b Unusual values judged by ISO TC 159/SC 3/WG 1 experts.</p>											

7.6 ISO member body: Korea

Organization: Korean Agency for Technology and Standards (KATS)

URL: <http://www.kats.go.kr/english/index.asp>

Name of study: Size Korea 2003

Table 9 — Korea — Database

1 Measurement																							
1.1	Measured side (right/left)	Right																					
1.2	Measurement definitions different from those described in ISO 7250-1	None																					
1.3	Substituted measurements	None																					
1.4	Number of measurements not described in ISO 7250-1	59 dimensions (male), 62 dimensions (female)																					
2 Age range																							
2.1	Working age	18 to 60																					
2.2	Age range of subjects	18 to 60																					
3 Background data																							
3.1	Time period of examination	2003 to 2004																					
3.2	Location of examination	Korea																					
3.3	Survey sample	<table border="1"> <thead> <tr> <th>Age</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>18–19</td> <td>455</td> <td>446</td> </tr> <tr> <td>20–29</td> <td>655</td> <td>647</td> </tr> <tr> <td>30–39</td> <td>705</td> <td>726</td> </tr> <tr> <td>40–49</td> <td>405</td> <td>412</td> </tr> <tr> <td>50–60</td> <td>393</td> <td>383</td> </tr> <tr> <td>Total</td> <td>2 613</td> <td>2 614</td> </tr> </tbody> </table>	Age	Male	Female	18–19	455	446	20–29	655	647	30–39	705	726	40–49	405	412	50–60	393	383	Total	2 613	2 614
		Age	Male	Female																			
		18–19	455	446																			
		20–29	655	647																			
		30–39	705	726																			
		40–49	405	412																			
50–60	393	383																					
Total	2 613	2 614																					
3.4	Publication	Reference [9] Website: sizekorea.kats.go.kr (in Korean)																					
4 Representativeness of the sample																							
4.1	Sampling method	Subjects were volunteers and not randomly selected																					
4.2	Information on secular change																						
5 Accuracy and reliability of measurements																							
5.1	Intra- and inter-observer error rates	Reliability of measurements for each observer was not examined																					
5.2	Measurements from 3-D scanners	None																					
5.3	Other measurement not taken using instruments described in ISO 7250-1	None																					
5.4	Type of clothing	Men: fitted shorts suitable for measuring Women: fitted sports brassiere and shorts, suitable for measuring See Figure A.1 of ISO 20685:—.																					

Table 10 — Korea — Statistical summary

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
		Age	Male	2 613	34,0	12,2	18	19	33	57	60
			Female	2 614	34,1	12,1	18	19	33	56	59
			Total	5 227	34,0	12,2	18	19	33	57	59
1	4.1.1	Body mass (weight), kg	Male	2 611	70,1	9,7	50	55	70	87	96
			Female	2 612	56,1	7,8	41	45	55	71	78
			Total	5 223	63,1	11,2	43	47	62	83	93
2	4.1.2	Stature (body height)	Male	2 613	1 707,6	61,3	1 564	1 608	1 708	1 805	1 847
			Female	2 614	1 579,0	54,8	1 453	1 491	1 577	1 670	1 707
			Total	5 227	1 643,3	86,7	1 469	1 511	1 640	1 787	1 835
3	4.1.3	Eye height	Male	2 613	1 591,2	59,9	1 448	1 493	1 592	1 687	1 728
			Female	2 613	1 469,3	52,5	1 348	1 384	1 470	1 556	1 591
			Total	5 226	1 530,3	83,0	1 364	1 403	1 526	1 668	1 712
4	4.1.4	Shoulder height	Male	2 612	1 392,1	53,4	1 270	1 304	1 392	1 479	1 516
			Female	2 613	1 285,6	47,8	1 177	1 209	1 284	1 366	1 399
			Total	5 225	1 338,8	73,5	1 189	1 226	1 336	1 460	1 501
5	4.1.5	Elbow height	Male	2 613	1 044,3	42,4	947	974	1 045	1 115	1 140
			Female	2 613	967,3	38,2	878	907	967	1 032	1 057
			Total	5 226	1 005,8	55,8	889	918	1 003	1 099	1 130
6	4.1.6	Iliac spine height, standing	Male	2 606	913,7	47,1	799	832	914	990	1 022
			Female	2 613	844,8	40,9	751	779	844	913	942
			Total	5 219	879,2	56,0	760	792	877	974	1 010
7	4.1.7	Crotch height	Male	2 613	776,6	41,6	677	707	778	843	874
			Female	2 611	707,4	37,1	624	649	707	768	798
			Total	5 224	742,1	52,4	635	659	740	830	861
8	4.1.8	Tibial height	Male	2 609	438,2	25,3	381	397	438	480	505
			Female	2 612	402,4	22,5	350	367	402	440	454
			Total	5 221	420,2	29,9	354	374	420	470	494
9	4.1.9	Chest depth, standing	Male	2 613	211,3	19,0	170	181	210	244	261
			Female	2 614	189,2	19,7	151	160	187	224	244
			Total	5 227	200,2	22,3	155	165	200	237	256
10	4.1.10	Body depth, standing	Male	2 607	227,7	27,7	171	186	225	275	307
			Female	2 611	234,3	28,5	182	193	231	285	312
			Total	5 218	231,0	28,3	176	190	228	281	310
11	4.1.11	Chest breadth, standing	Male	2 612	314,5	21,6	267	281	314	351	370
			Female	2 612	279,5	18,7	242	252	278	312	333
			Total	5 224	297,0	26,8	245	257	295	343	361
12	4.1.12	Hip breadth, standing	Male	2 613	330,9	16,5	294	305	330	360	372
			Female	2 614	325,4	16,6	289	299	325	354	364
			Total	5 227	328,1	16,8	291	302	328	357	369
13	4.2.1	Sitting height (erect)	Male	2 612	921,5	32,2	846	869	922	974	996
			Female	2 614	857,8	29,2	787	811	858	905	927
			Total	5 226	889,7	44,3	796	820	888	962	989
14	4.2.2	Eye height, sitting	Male	2 613	805,7	31,3	730	755	805	857	876
			Female	2 613	747,6	27,8	679	701	747	792	812
			Total	5 226	776,7	41,5	688	713	775	846	869
15	4.2.3	Cervicale height, sitting	Male	2 613	672,9	27,2	607	628	673	718	736
			Female	2 614	624,9	24,1	567	586	625	664	681
			Total	5 227	648,9	35,2	575	594	648	709	730

Table 10 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
16	4.2.4	Shoulder height, sitting	Male	2 613	595,9	26,6	532	552	596	640	655
			Female	2 613	556,7	24,1	501	516	556	597	615
			Total	5 226	576,3	32,1	508	525	575	630	650
17	4.2.5	Elbow height, sitting	Male	2 612	258,3	23,9	202	220	258	297	313
			Female	2 612	246,7	22,1	196	210	247	283	298
			Total	5 224	252,5	23,7	200	214	252	292	307
18	4.2.6	Shoulder-elbow length	Male	2 612	337,8	15,6	302	313	337	364	374
			Female	2 613	307,3	15,2	273	283	307	333	344
			Total	5 225	322,6	21,6	278	288	322	359	370
19	4.2.7	Elbow-wrist length	Male	2 612	267,2	14,1	232	244	267	290	300
			Female	2 611	242,8	13,0	213	223	243	264	276
			Total	5 223	255,0	18,3	217	226	255	285	297
20	4.2.8	Shoulder (biacromial) breadth	Male	2 613	396,4	22,1	342	359	397	430	447
			Female	2 613	359,5	17,2	318	331	360	388	399
			Total	5 226	377,9	27,1	323	337	376	424	441
21	4.2.9	Shoulder (bideltoid) breadth	Male	2 612	465,6	24,6	408	425	465	506	528
			Female	2 611	418,1	23,7	365	381	417	458	476
			Total	5 223	441,9	33,9	372	389	442	497	519
22	4.2.10	Elbow-to-elbow breadth	Male	2 611	475,0	44,9	376	404	475	546	589
			Female	2 613	420,9	41,4	332	356	420	492	525
			Total	5 224	448,0	51,0	338	368	445	533	575
23	4.2.11	Hip breadth, sitting	Male	2 612	347,7	21,0	302	315	346	385	403
			Female	2 614	348,4	20,4	304	317	347	383	404
			Total	5 226	348,1	20,7	303	316	347	384	403
24	4.2.12	Lower leg length (popliteal height)	Male	2 612	399,6	22,2	347	365	399	437	455
			Female	2 614	368,8	21,4	318	333	369	403	418
			Total	5 226	384,2	26,7	324	340	384	429	447
25	4.2.13	Thigh clearance	Male	2 613	153,0	15,9	117	128	153	179	195
			Female	2 611	137,3	12,9	110	117	137	159	170
			Total	5 224	145,1	16,5	112	120	144	173	188
26	4.2.14	Knee height	Male	2 766	510,2	24,6	455	470	510	552	568
			Female	2 752	474,9	21,8	424	439	474	511	527
			Total	5 518	492,6	29,2	430	447	491	542	561
27	4.2.15	Abdominal depth, sitting	Male	2 603	232,8	32,2	170	184	230	287	313
			Female	2 612	215,0	34,3	156	169	210	280	313
			Total	5 215	223,9	34,4	160	174	220	285	313
28	4.2.16	Thorax depth at the nipple	Male	2 613	221,2	21,4	173	186	220	258	273
			Female	2 611	220,9	26,4	171	182	218	270	294
			Total	5 224	221,0	24,0	172	184	220	263	286
29	4.2.17	Buttock-abdomen depth sitting	Male	2 610	240,2	31,9	174	192	239	295	319
			Female	2 613	226,4	32,3	170	182	222	288	320
			Total	5 223	233,3	32,8	171	185	230	292	320
30	4.3.1	Hand length	Male	2 611	185,8	8,3	167	172	186	199	205
			Female	2 613	174,7	8,0	156	161	175	188	193
			Total	5 224	180,3	9,9	158	164	180	197	203
31	4.3.2	Palm length perpendicular	Male	2 612	107,2	5,6	94	98	107	116	121
			Female	2 614	101,6	5,8	88	92	102	111	114
			Total	5 226	104,4	6,4	89	93	104	115	119

Table 10 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
32	4.3.3	Hand breadth at metacarpals	Male	2 612	83,6	4,2	74	77	84	90	94
			Female	2 613	76,7	4,1	67	70	77	83	86
			Total	5 225	80,2	5,4	68	71	80	89	92
33	4.3.4	Index finger length	Male	2 610	69,9	4,3	60	63	70	77	80
			Female	2 614	65,1	4,0	56	59	65	72	75
			Total	5 224	67,5	4,8	57	60	67	75	79
34	4.3.5	Index finger breadth, proximal	Male	2 611	19,0	1,2	16	17	19	21	22
			Female	2 614	17,3	1,2	15	15	17	19	20
			Total	5 225	18,1	1,4	15	16	18	20	22
35	4.3.6	Index finger breadth, distal	Male	2 611	16,2	1,2	14	14	16	18	19
			Female	2 614	15,1	1,2	13	13	15	17	18
			Total	5 225	15,6	1,3	13	14	16	18	19
36	4.3.7	Foot length	Male	2 612	250,6	11,4	225	232	250	270	278
			Female	2 613	230,0	9,7	206	214	230	246	252
			Total	5 225	240,3	14,8	210	217	239	265	276
37	4.3.8	Foot breadth	Male	2 611	99,5	5,8	86	90	99	109	114
			Female	2 611	91,8	5,5	80	83	92	101	105
			Total	5 222	95,7	6,8	81	85	95	107	111
38	4.3.9	Head length	Male	2 613	184,5	6,9	169	173	185	196	202
			Female	2 610	175,7	6,5	162	165	176	186	191
			Total	5 223	180,1	8,0	163	167	180	194	199
39	4.3.10	Head breadth	Male	2 613	159,8	6,1	145	150	160	170	174
			Female	2 612	151,9	6,1	136	141	152	161	165
			Total	5 225	155,8	7,3	138	144	156	167	172
40	4.3.11	Face length (nasion-menton)	Male	2 610	120,3	7,7	103	108	120	133	141
			Female	2 613	114,4	6,9	98	103	114	126	131
			Total	5 223	117,3	7,9	100	105	117	130	138
41	4.3.12	Head circumference	Male	2 611	571,7	15,5	535	548	571	597	609
			Female	2 612	547,9	14,3	516	525	548	571	582
			Total	5 223	559,8	19,1	518	530	560	592	605
42	4.3.13	Sagittal arc	Male	2 611	364,8	20,8	315	331	365	399	413
			Female	2 613	346,2	23,3	295	308	346	383	400
			Total	5 224	355,5	23,9	299	313	357	393	410
43	4.3.14	Bitragion arc	Male	2 612	378,8	17,3	340	351	379	407	418
			Female	2 612	362,0	14,9	330	338	362	387	400
			Total	5 224	370,4	18,2	332	342	370	402	413
44	4.4.1	Wall-acromion distance	Male	2 611	93,6	19,3	59	65	92	127	143
			Female	2 609	93,4	16,1	60	69	93	121	133
			Total	5 220	93,5	17,8	59	67	93	124	139
45	4.4.2	Grip reach; forward reach	Male	2 608	698,8	42,7	594	621	700	766	798
			Female	2 613	659,2	30,1	590	612	658	709	735
			Total	5 221	679,0	41,9	592	615	676	752	785
46	4.4.3	Elbow-grip length	Male	2 610	327,3	17,1	288	300	327	356	369
			Female	2 611	301,7	16,3	264	275	302	329	340
			Total	5 221	314,5	21,0	270	281	314	350	365
47	4.4.4	Fist (grip axis) height	Male	2 609	757,6	35,5	670	699	758	815	840
			Female	2 611	708,7	33,5	629	655	708	764	789
			Total	5 220	733,1	42,3	639	666	732	802	830

Table 10 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
48	4.4.5	Forearm-fingertip length	Male	2 613	449,4	20,0	402	416	450	483	497
			Female	2 612	411,6	17,4	369	383	412	441	453
			Total	5 225	430,5	26,6	374	390	429	475	490
49	4.4.6	Buttock-popliteal length (seat depth)	Male	2 613	467,1	26,6	406	424	466	511	528
			Female	2 614	445,4	22,4	394	410	445	483	498
			Total	5 227	456,3	26,9	398	414	455	503	523
50	4.4.7	Buttock-knee length	Male	2 613	570,6	26,3	512	530	570	616	634
			Female	2 614	541,4	24,6	486	504	541	581	598
			Total	5 227	556,0	29,3	493	510	555	606	630
51	4.4.8	Neck circumference	Male	2 613	376,8	22,0	330	342	376	415	432
			Female								
			Total								
52	4.4.9	Chest circumference	Male	2 612	961,6	61,7	820	860	962	1 066	1 110
			Female	2 614	851,7	60,2	732	761	849	956	1 011
			Total	5 226	906,6	82,1	745	778	905	1 042	1 095
53	4.4.10	Waist circumference	Male	2 613	821,0	84,4	656	694	817	966	1 028
			Female	2 614	730,7	88,0	587	612	717	900	984
			Total	5 227	775,8	97,3	597	631	767	948	1 010
54	4.4.11	Wrist circumference	Male	2 613	167,0	8,9	148	153	167	182	190
			Female	2 613	149,7	9,1	132	136	149	166	174
			Total	5 226	158,4	12,5	133	139	159	179	186
55	4.4.12	Thigh circumference	Male	2 613	557,7	44,9	455	484	557	635	673
			Female	2 613	543,4	41,5	454	477	542	614	650
			Total	5 226	550,6	43,8	455	480	550	624	660
56	4.4.13	Calf circumference	Male	2 613	372,9	27,0	313	331	372	420	441
			Female	2 613	341,9	24,5	290	305	340	385	410
			Total	5 226	357,4	30,1	294	312	355	410	434

7.7 ISO member body: The Netherlands

Organization: Nederlands Normalisatie-instituut (NEN)

URL: <http://www2.nen.nl/>

Name of study: Delft study, CAESAR Netherlands

Table 11 — The Netherlands — Database

1 Measurement		
1.1	Measured side (right/left)	Right
1.2	Measurement definitions different from those described in ISO 7250-1	4.1.2 Stature (body height); 4.1.4 Shoulder height; 4.1.7 Crotch height and 4.4.9 Chest circumference: feet approx. 10 cm apart with toes rotated approx. 33°. 4.2.1 Sitting height (erect); 4.2.2 Eye height, sitting; 4.2.4 Shoulder height, sitting; 4.2.5 Elbow height, sitting; 4.2.8 Shoulder (biacromial) breadth; 4.2.11 Hip breadth, sitting: legs supported, knees bent at right angle. 4.2.14 Knee height: taken from medial side with left leg moved out of way. Scan extracted – 4.3.8 Foot breadth: Scanning posture – foot outlines approx. 10 cm apart with toes rotated approx. 30°; arms and wrists straight with hands 20 cm from body, palms facing inward, fingers spread; 4.4.7 Buttock-knee length: legs supported, knees bent at right angle, thighs parallel.
1.3	Substituted measurements	4.1.3 Eye height: computed from: 4.1.2 – (4.2.1 – 4.2.2); 4.1.5 Elbow height: computed from: 4.1.2 – 4.2.1 + 4.2.5; 4.2.6 Shoulder-elbow length: computed from 4.2.4 – 4.2.5.
1.4	Number of measurements not described in ISO 7250-1	78 dimensions See Reference [15]. Copies: National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.
2 Age range		
2.1	Working age	18 to 65
2.2	Age range of subjects	18 to 65
3 Background data		
3.1	Time period of examination	August 1999 to September 2000
3.2	Location of examination	Soesterberg (The Netherlands); subjects from all 12 provinces of the Netherlands.
3.3	Survey sample	Subjects were volunteers aged 18 to 65 years and randomly selected. Data were weighted in the published report according to age, education and ethnicity.
3.4	Publication	Reference [10]. Copies: TNO, P.O. Box 23, 3769 ZG Soesterberg (The Netherlands). Reference [11] Reference [12]
4 Representativeness of the sample		
4.1	Sampling method	Subjects were volunteers from all provinces.
4.2	Information on secular change	None

Table 11 (continued)

5 Accuracy and reliability of measurements		
5.1	Intra- and inter-observer error rates	Reliability of measurements for each observer was not reported.
5.2	Measurements from 3-D scanners	4.1.4 Shoulder height; 4.2.8 Shoulder (biacromial) breadth; 4.3.8 Foot breadth: scanning posture – foot outlines approx. 10 cm apart with toes rotated approx. 30°; arms and wrists straight with hands 20 cm from body, palms facing inward, fingers spread.
5.3	Other measurement not taken using instruments described in ISO 7250-1	None
5.4	Type of clothing	Men: fitted shorts (stretch fabric) suitable for scanning Women: fitted sports brassiere (stretch fabric) and shorts (stretch fabric) suitable for scanning

Table 12 — The Netherlands — Statistical summary

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
		Age ^b	Male	564	38,5	13,4	18	19	38	60	64
			Female	698	38,6	12,8	18	20	38	60	64
			Total								
1	4.1.1	Body mass (weight), kg	Male	595	85,6	17,3	57	62	83	117	143
			Female	679	73,9	15,8	46	53	72	103	119
			Total								
2 ^a	4.1.2	Stature (body height)	Male	563	1 808,1	92,8	1 600	1 672	1 806	1 959	2 054
			Female	679	1 672,3	79,0	1 488	1 528	1 673	1 799	1 864
			Total								
3 ^{ab}	4.1.3	Eye height	Male	558	1 695,9	84,4	1 488	1 565	1 695	1 842	1 916
			Female	691	1 569,1	73,2	1 397	1 447	1 568	1 689	1 749
			Total								
4 ^c	4.1.4	Shoulder height	Male	542	1 476,4	81,3	1 304	1 352	1 474	1 625	1 682
			Female	587	1 361,5	70,5	1 203	1 230	1 361	1 477	1 529
			Total								
5 ^{ab}	4.1.5	Elbow height	Male	562	1 122,6	66,1	965	1 018	1 121	1 239	1 296
			Female	685	1 040,7	54,4	917	949	1 038	1 126	1 181
			Total								
6	4.1.6	Iliac spine height, standing	Male								
			Female								
			Total								
7 ^a	4.1.7	Crotch height	Male	588	838,2	63,5	696	743	839	933	1 014
			Female	674	785,3	53,0	624	706	789	876	910
			Total								
8	4.1.8	Tibial height	Male								
			Female								
			Total								
9	4.1.9	Chest depth, standing	Male								
			Female								
			Total								
10	4.1.10	Body depth, standing	Male								
			Female								
			Total								
11	4.1.11	Chest breadth, standing	Male								
			Female								
			Total								
12	4.1.12	Hip breadth, standing	Male								
			Female								
			Total								
13	4.2.1	Sitting height (erect)	Male	589	941,8	42,5	846	876	943	1 012	1 043
			Female	677	884,6	38,1	797	819	887	943	973
			Total								
14 ^a	4.2.2	Eye height, sitting	Male	594	825,4	39,7	746	760	828	892	923
			Female	676	774,5	35,8	701	713	776	830	856
			Total								
15	4.2.3	Cervicale height, sitting	Male								
			Female								
			Total								

Table 12 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
16 ^a	4.2.4	Shoulder height, sitting	Male	590	629,9	36,0	549	566	628	688	725
			Female	675	589,5	33,2	522	536	591	642	670
			Total								
17 ^a	4.2.5	Elbow height, sitting	Male	590	254,6	28,3	190	210	255	300	328
			Female	664	248,0	27,0	189	204	247	293	321
			Total								
18 ^{ab}	4.2.6	Shoulder-elbow length	Male	555	376,6	23,0	323	339	377	415	434
			Female	683	342,5	20,0	295	311	343	378	389
			Total								
19	4.2.7	Elbow-wrist length	Male								
			Female								
			Total								
20 ^c	4.2.8	Shoulder (biacromial) breadth	Male	542	413,8	25,4	357	377	412	456	472
			Female	586	375,2	22,2	319	339	374	412	427
			Total								
21	4.2.9	Shoulder (bideltoid) breadth	Male	590	472,5	30,4	415	428	471	522	564
			Female	678	433,2	31,6	369	390	430	490	522
			Total								
22 ^d	4.2.10	Elbow-to-elbow breadth	Male	181	496,6	37,1	402	431	496	560	568
			Female	207	463,3	43,9	367	395	461	542	568
			Total								
23	4.2.11	Hip breadth, sitting	Male	589	383,1	29,8	327	340	382	438	465
			Female	677	418,9	38,3	336	363	414	487	523
			Total								
24 ^d	4.2.12	Lower leg length (popliteal height)	Male	181	485,8	30,2	408	440	484	538	556
			Female	207	436,1	26,7	373	391	436	483	493
			Total								
25 ^d	4.2.13	Thigh clearance	Male	181	146,2	14,5	112	121	146	173	189
			Female	207	146,9	14,6	117	124	146	174	184
			Total								
26 ^a	4.2.14	Knee height	Male	584	557,1	36,0	481	501	558	617	661
			Female	664	510,7	28,8	438	464	512	560	578
			Total								
27 ^d	4.2.15	Abdominal depth, sitting	Male	181	283,5	40,3	202	220	282	349	398
			Female	207	276,5	45,9	186	209	271	358	395
			Total								
28	4.2.16	Thorax depth at the nipple	Male								
			Female								
			Total								
29	4.2.17	Buttock-abdomen depth sitting	Male								
			Female								
			Total								
30	4.3.1	Hand length	Male	595	202,8	11,2	178	184	203	221	232
			Female	679	184,5	9,9	161	168	184	201	206
			Total								
31	4.3.2	Palm length perpendicular	Male								
			Female								
			Total								

Table 12 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
32 ^d	4.3.3	Hand breadth at metacarpals	Male	181	90,8	4,7	80	84	91	99	102
			Female	207	80,2	4,2	70	74	80	88	91
			Total								
33	4.3.4	Index finger length	Male								
			Female								
			Total								
34	4.3.5	Index finger breadth, proximal	Male								
			Female								
			Total								
35 ^d	4.3.6	Index finger breadth, distal	Male	181	18,5	1,5	15	16	18	21	21
			Female	207	16,1	1,5	12	14	16	19	20
			Total								
36	4.3.7	Foot length	Male	594	268,9	15,9	237	246	268	296	325
			Female	679	243,2	13,0	208	222	244	264	273
			Total								
37 ^c	4.3.8	Foot breadth	Male	542	103,9	7,4	89	91	104	116	123
			Female	584	94,9	6,7	80	86	95	107	113
			Total								
38	4.3.9	Head length	Male	590	197,7	8,0	178	184	198	210	216
			Female	679	187,7	6,8	172	176	188	199	203
			Total								
39	4.3.10	Head breadth	Male	593	153,2	5,9	139	145	153	163	169
			Female	679	146,0	5,5	135	138	146	155	160
			Total								
40	4.3.11	Face length (nasion-menton)	Male	590	122,9	7,4	105	111	123	135	138
			Female	679	112,8	6,5	98	103	112	123	129
			Total								
41	4.3.12	Head circumference	Male	589	574,3	18,2	532	544	575	606	616
			Female	676	550,3	15,4	517	523	550	574	583
			Total								
42	4.3.13	Sagittal arc	Male								
			Female								
			Total								
43	4.3.14	Bitragion arc	Male								
			Female								
			Total								
44	4.4.1	Wall-acromion distance	Male								
			Female								
			Total								
45 ^d	4.4.2	Grip reach; forward reach	Male	181	751,5	44,4	647	670	745	823	871
			Female	207	684,9	35,3	592	627	685	745	770
			Total								
46 ^d	4.4.3	Elbow-grip length	Male	181	355,5	20,7	310	324	354	393	414
			Female	207	322,1	17,0	284	294	321	349	364
			Total								
47 ^d	4.4.4	Fist (grip axis) height	Male	181	804,0	46,5	698	730	803	879	930
			Female	207	747,9	40,0	647	679	748	816	839
			Total								

Table 12 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
48 ^d	4.4.5	Forearm-fingertip length	Male	181	483,2	25,0	427	447	481	530	556
			Female	207	438,7	19,5	393	407	437	470	484
			Total								
49 ^d	4.4.6	Buttock-popliteal length (seat depth)	Male	181	508,4	29,3	440	462	505	565	584
			Female	207	497,6	27,5	442	452	500	545	567
			Total								
50 ^a	4.4.7	Buttock-knee length	Male	589	636,2	37,4	559	583	634	703	736
			Female	678	608,1	31,2	541	557	608	664	693
			Total								
51	4.4.8	Neck circumference	Male								
			Female								
			Total								
52 ^a	4.4.9	Chest circumference	Male	594	1 028,5	104,4	842	883	1 016	1 225	1 301
			Female	679	1 010,0	121,9	805	859	980	1 249	1 339
			Total								
53	4.4.10	Waist circumference	Male								
			Female								
			Total								
54	4.4.11	Wrist circumference	Male								
			Female								
			Total								
55	4.4.12	Thigh circumference	Male								
			Female								
			Total								
56	4.4.13	Calf circumference	Male								
			Female								
			Total								

^a Definition is different from ISO 7250-1 or substituted.

^b Unweighted data, see Table 11, 3.3.

^c Scan-extracted, see Table 11, 1.2 and 5.2.

^d Data from Delft study.

7.8 ISO member body: Thailand

Organization: Thai Industrial Standards Institute (TISI)

URL: <http://www.tisi.go.th/>

Name of study: —

Table 13 — Thailand — Database

1 Measurement		
1.1	Measured side (right/left)	Right
1.2	Measurement definitions different from those described in ISO 7250-1	Not shown in the report
1.3	Substituted measurements	None
1.4	Number of measurements not described in ISO 7250-1	Not shown in the report
2 Age range		
2.1	Working age	20 to 60
2.2	Age range of subjects	30 to 39
3 Background data		
3.1	Time period of examination	November 2000 to April 2001
3.2	Location of examination	Female in 19 provinces and male in 12 provinces from four regions of Thailand
3.3	Survey sample	Not shown in the report
3.4	Publication	Reference [13]
4 Representativeness of the sample		
4.1	Sampling method	Not shown in the report
4.2	Information on secular change	None
5 Accuracy and reliability of measurements		
5.1	Intra- and inter-observer error rates	No report
5.2	Measurements from 3-D scanners	None
5.3	Other measurement not taken using instruments described in ISO 7250-1	None
5.4	Type of clothing	Lightest clothing without shoes or socks

Table 14 — Thailand — Statistical summary

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
		Age	Male	1 246	30-39						
			Female	1 170	30-39						
			Total								
1	4.1.1	Body mass (weight), kg	Male	1 246	64,3	9,5		51,0	63,8	81,9	
			Female	1 170	53,5	8,2		42,0	52,5	69,0	
			Total								
2	4.1.2	Stature (body height)	Male	1 246	1 666	59		1 576	1 663	1 770	
			Female	1 170	1 547	50		1 467	1 546	1 633	
			Total								
3	4.1.3	Eye height	Male	1 246	1 550	58		1 462	1 549	1 650	
			Female	1 170	1 433	49		1 353	1 433	1 515	
			Total								
4	4.1.4	Shoulder height	Male	1 246	1 370	56		1 282	1 369	1 467	
			Female	1 170	1 265	46		1 190	1 265	1 340	
			Total								
5	4.1.5	Elbow height	Male	1 246	1 025	54		953	1 024	1 100	
			Female	1 170	951	39		895	952	1 014	
			Total								
6	4.1.6	Iliac spine height, standing	Male	1 246	918	45		849	915	995	
			Female	1 170	872	41		810	872	937	
			Total								
7	4.1.7	Crotch height	Male								
			Female								
			Total								
8	4.1.8	Tibial height	Male	1 246	453	26		410	452	498	
			Female	1 170	385	18		357	385	415	
			Total								
9	4.1.9	Chest depth, standing	Male	1 246	184	18		157	183	217	
			Female	1 170	176	20		149	173	213	
			Total								
10	4.1.10	Body depth, standing	Male								
			Female								
			Total								
11	4.1.11	Chest breadth, standing	Male	1 246	298	21		270	298	334	
			Female	1 170	261	20		232	258	298	
			Total								
12	4.1.12	Hip breadth, standing	Male	1 246	325	22		295	325	360	
			Female	1 170	325	22		294	325	362	
			Total								
13	4.2.1	Sitting height (erect)	Male	1 246	870	35		813	870	925	
			Female	1 170	824	28		778	823	873	
			Total								
14	4.2.2	Eye height, sitting	Male	1 246	758	33		705	758	810	
			Female	1 170	714	29		814 ^a	666 ^a	714 ^a	
			Total								
15	4.2.3	Cervicale height, sitting	Male	1 246	635	31		590	634	682	
			Female	1 170	599	26		560	599	640	
			Total								

Table 14 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
16	4.2.4	Shoulder height, sitting	Male								
			Female	1 170	546	25		509	546	588	
			Total								
17	4.2.5	Elbow height, sitting	Male	1 246	232	31		185	230	279	
			Female	1 170	231	22		197	230	267	
			Total								
18	4.2.6	Shoulder-elbow length	Male	1 246	348	17		322	347	375	
			Female								
			Total								
19	4.2.7	Elbow-wrist length	Male	1 246	278	17 ^a		260 ^a	277	305	
			Female	1 170	240	12		220	240	260	
			Total								
20	4.2.8	Shoulder (biacromial) breadth	Male	1 246	372	29		330	370	420	
			Female	1 170	344	26		305	342	390	
			Total								
21	4.2.9	Shoulder (bideltoid) breadth	Male	1 246	446	26		407	446	489	
			Female	1 170	400	26		362	397	448	
			Total								
22	4.2.10	Elbow-to-elbow breadth	Male	1 246	447	39		399	447	504	
			Female	1 170	405	30		361	402	462	
			Total								
23	4.2.11	Hip breadth, sitting	Male	1 246	345	24		310	343	382	
			Female	1 170	352	27		310	350	400	
			Total								
24	4.2.12	Lower leg length (popliteal height)	Male	1 246	414	21		380	413	450	
			Female	1 170	389	22		355	389	423	
			Total								
25	4.2.13	Thigh clearance	Male	1 246	140	16		124 ^a	139	163	
			Female	1 170	137	12		117	137	159	
			Total								
26	4.2.14	Knee height	Male	1 246	509	28		470	508	556	
			Female	1 170	497	22		463	496	532	
			Total								
27	4.2.15	Abdominal depth, sitting	Male								
			Female								
			Total								
28	4.2.16	Thorax depth at the nipple	Male	1 246	206	20		179	204	237	
			Female	1 170	216	24		182	213	261	
			Total								
29	4.2.17	Buttock-abdomen depth sitting	Male	1 246	219	28		181	215	270	
			Female	1 170	218	30		177	215	276	
			Total								
30	4.3.1	Hand length	Male	1 246	195	11		180	195	212	
			Female	1 170	180	8		167	180	194	
			Total								
31	4.3.2	Palm length perpendicular	Male	1 246	112	8		102	110	123	
			Female	1 170	103	5		95	102	110	
			Total								

Table 14 (continued)

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
32	4.3.3	Hand breadth at metacarpals	Male	1 246	84	6		76	83	92	
			Female	1 170	73	4		66	73	80	
			Total								
33	4.3.4	Index finger length	Male	1 246	76	5		70 ^a	75	85	
			Female	1 170	72	4		65	71	79	
			Total								
34	4.3.5	Index finger breadth, proximal	Male	1 246	16 ^a	1 ^a		15 ^a	16 ^a	18 ^a	
			Female	1 170	16 ^a	1 ^a		14 ^a	16 ^a	19 ^a	
			Total								
35	4.3.6	Index finger breadth, distal	Male	1 246	19 ^a	1 ^a		17 ^a	19 ^a	21 ^a	
			Female	1 170	17 ^a	1 ^a		15 ^a	17 ^a	18 ^a	
			Total								
36	4.3.7	Foot length	Male	1 246	247	12		229	246	267	
			Female	1 170	227	10		210	227	243	
			Total								
37	4.3.8	Foot breadth	Male	1 246	100	10 ^a		90	103	110	
			Female	1 170	94	7		83	95	105	
			Total								
38	4.3.9	Head length	Male								
			Female	1 170	170	60 ^a		160	170	181	
			Total								
39	4.3.10	Head breadth	Male	1 246	161	6		151	161	171	
			Female	1 170	146	6		136	146	155	
			Total								
40	4.3.11	Face length (nasion-menton)	Male								
			Female								
			Total								
41	4.3.12	Head circumference	Male	1 246	553	16		529	553	580	
			Female	1 170	538	15		515	538	563	
			Total								
42	4.3.13	Sagittal arc	Male	1 246	392	18		360	390	420	
			Female	1 170	336	12		320 ^a	335	355	
			Total								
43	4.3.14	Bitrignon arc	Male	1 246	384	14		360	382	410	
			Female	1 170	351	14		330	350	375	
			Total								
44	4.4.1	Wall-acromion distance	Male	1 246	103	15		80	100	125	
			Female								
			Total								
45	4.4.2	Grip reach; forward reach	Male	1 246	719	34		665	720	780	
			Female	1 170	678	32		627	677	730	
			Total								
46	4.4.3	Elbow-grip length	Male								
			Female	1 170	292	16		268	292	318	
			Total								
47	4.4.4	Fist (grip axis) height	Male	1 246	739	37		683	740	800	
			Female	1 170	696	31		647	696	746	
			Total								

Table 14 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
48	4.4.5	Forearm-fingertip length	Male	1 246	465	21		430	464	500	
			Female	1 170	423	19		392	422	453	
			Total								
49	4.4.6	Buttock-popliteal length (seat depth)	Male	1 246	471	32		416	472	522	
			Female	1 170	474	24		437	473	515	
			Total								
50	4.4.7	Buttock-knee length	Male	1 246	566	29		520	565	611	
			Female	1 170	546	25		507	545	587	
			Total								
51	4.4.8	Neck circumference	Male	1 246	401 ^a	21 ^a		370 ^a	400 ^a	440 ^a	
			Female	1 170	377 ^a	20 ^a		347 ^a	375 ^a	410 ^a	
			Total								
52	4.4.9	Chest circumference	Male	1 246	879	58		790	874	980	
			Female	1 170	862	79		750	850	1 010	
			Total								
53	4.4.10	Waist circumference	Male	1 246	801	74		690	800	930	
			Female	1 170	689	71		600	675	830	
			Total								
54	4.4.11	Wrist circumference	Male	1 246	164	15 ^a		150	162	180	
			Female	1 170	147	9		135 ^a	145	162	
			Total								
55	4.4.12	Thigh circumference	Male	1 246	563	56		470	560	660	
			Female	1 170	534	47		465	530	625	
			Total								
56	4.4.13	Calf circumference	Male	1 246	358	29		315	355	405	
			Female	1 170	338	26		300	335	385	
			Total								

^a Unusual values judged by ISO TC 159/SC 3/WG 1 experts.

7.9 ISO member body: United States

Organization: American National Standards Institute (ANSI)

URL: <http://www.ansi.org/>

Name of study: CAESAR

Table 15 — United States — Database

1 Measurement																																																																																			
1.1	Measured side (right/left)	Right																																																																																	
1.2	Measurement definitions different from those described in ISO 7250-1	<p>4.1.2 Stature (body height); 4.1.7 Crotch height; 4.4.9 Chest circumference: feet approx. 10 cm apart with toes rotated approx. 33°.</p> <p>4.2.1 Sitting height (erect); 4.2.2 Eye height, sitting; 4.2.4 Shoulder height, sitting; 4.2.5 Elbow height, sitting; 4.4.7 Buttock-knee length: legs supported, knees bent at right angle, thighs parallel.</p> <p>4.2.11 Hip breadth, sitting: legs supported, knees bent at right angle.</p> <p>4.2.14 Knee height: taken from medial side with left leg moved out of way.</p> <p>Scan extracted – 4.1.4 Shoulder height, 4.2.8 Shoulder (biacromial) breadth, 4.3.8 Foot breadth: Scanning posture – foot outlines approx. 10 cm apart with toes rotated approx. 30°; arms and wrists straight with hands 20 cm from body, palms facing inward, fingers spread.</p>																																																																																	
1.3	Substituted measurements	None																																																																																	
1.4	Number of measurements not described in ISO 7250-1	78 dimensions See Reference [15]. Copies: National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161																																																																																	
2 Age range																																																																																			
2.1	Working age	18 to 65																																																																																	
2.2	Age range of subjects	18 to 65																																																																																	
3 Background data																																																																																			
3.1	Time period of examination	April 1998 to July 2000																																																																																	
3.2	Location of examination	10 US States: CA, MI, IA, OH, NC, NJ, MN, TX, OR and GA, as well as Ottawa, Ontario, Canada																																																																																	
3.3	Survey sample	<p>Subjects were volunteers aged 18 to 65 years and not randomly selected. Raw counts shown below. Demographic data are weighted in the published report.</p> <table border="1"> <thead> <tr> <th rowspan="2">Gender</th> <th rowspan="2">Race group</th> <th colspan="6">Age group</th> <th rowspan="2">Total</th> </tr> <tr> <th><20</th> <th>20-29</th> <th>30-39</th> <th>40-49</th> <th>50-59</th> <th>≥60</th> </tr> </thead> <tbody> <tr> <td rowspan="7">Female</td> <td>White</td> <td>16</td> <td>177</td> <td>232</td> <td>292</td> <td>173</td> <td>72</td> <td>962</td> </tr> <tr> <td>African American</td> <td>8</td> <td>54</td> <td>30</td> <td>41</td> <td>14</td> <td>1</td> <td>148</td> </tr> <tr> <td>Native American/Alaskan</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>4</td> </tr> <tr> <td>Hispanic</td> <td>3</td> <td>6</td> <td>5</td> <td>2</td> <td>1</td> <td>1</td> <td>18</td> </tr> <tr> <td>Asian/Pacific Islander</td> <td>8</td> <td>31</td> <td>21</td> <td>17</td> <td>11</td> <td>5</td> <td>93</td> </tr> <tr> <td>Other not listed/Mixed race</td> <td>0</td> <td>9</td> <td>9</td> <td>7</td> <td>5</td> <td>2</td> <td>32</td> </tr> <tr> <td>Missing</td> <td>0</td> <td>1</td> <td>2</td> <td>0</td> <td>2</td> <td>0</td> <td>5</td> </tr> <tr> <td>Total</td> <td></td> <td>35</td> <td>279</td> <td>300</td> <td>360</td> <td>207</td> <td>81</td> <td>1 262</td> </tr> </tbody> </table>	Gender	Race group	Age group						Total	<20	20-29	30-39	40-49	50-59	≥60	Female	White	16	177	232	292	173	72	962	African American	8	54	30	41	14	1	148	Native American/Alaskan	0	1	1	1	1	0	4	Hispanic	3	6	5	2	1	1	18	Asian/Pacific Islander	8	31	21	17	11	5	93	Other not listed/Mixed race	0	9	9	7	5	2	32	Missing	0	1	2	0	2	0	5	Total		35	279	300	360	207	81	1 262
Gender	Race group	Age group						Total																																																																											
		<20	20-29	30-39	40-49	50-59	≥60																																																																												
Female	White	16	177	232	292	173	72	962																																																																											
	African American	8	54	30	41	14	1	148																																																																											
	Native American/Alaskan	0	1	1	1	1	0	4																																																																											
	Hispanic	3	6	5	2	1	1	18																																																																											
	Asian/Pacific Islander	8	31	21	17	11	5	93																																																																											
	Other not listed/Mixed race	0	9	9	7	5	2	32																																																																											
	Missing	0	1	2	0	2	0	5																																																																											
Total		35	279	300	360	207	81	1 262																																																																											

Table 15 (continued)

		Age group							Total	
		Gender	Race group	<20	20-29	30-39	40-49	50-59		≥60
		Male	White	12	181	241	224	161	49	868
			African American	4	35	37	24	16	0	116
			Native American/Alaskan	0	0	0	1	0	2	3
			Hispanic	3	13	7	8	1	1	33
			Asian/Pacific Islander	4	23	22	18	10	6	83
			Other not listed/Mixed race	0	7	4	4	1	0	16
			Missing	0	1	1	0	0	0	2
			Total	23	260	312	279	189	58	1 121
3.4	Publication	Reference [14]. Copies: National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161								
4 Representativeness of the sample										
4.1	Sampling method	Volunteers from 10 geographical locations.								
4.2	Information on secular change	The sampling of this data set did not allow conclusions about secular change.								
5 Accuracy and reliability of measurements										
5.1	Intra- and inter-observer error rates	Reliability of measurements for each observer was not reported.								
5.2	Measurements from 3-D scanners	4.1.4 Shoulder height; 4.2.8 Shoulder (biacromial) breadth; 4.3.8 Foot breadth: scanning posture – foot outlines approx. 10 cm apart with toes rotated approx. 30°; arms and wrists straight with hands 20 cm from body, palms facing inward, fingers spread.								
5.3	Other measurement not taken using instruments described in ISO 7250-1	None								
5.4	Type of clothing	Men: fitted shorts (stretch fabric) suitable for scanning Women: fitted sports brassiere (stretch fabric) and shorts (stretch fabric), suitable for scanning								

Table 16 — United States — Statistical summary

No.	ISO 7250-1 measurement			Sample size	Mean	SD	P1	P5	P50	P95	P99
				<i>n</i>							
		Age ^b	Male	1 121	39,3	11,9	19	21	39	60	64
			Female	1 262	39,8	12,1	19	21	40	61	64
			Total								
1	4.1.1	Body mass (weight), kg	Male	1 119	83,2	17,4	56	63	80	115	141
			Female	1 261	69,6	19,9	45	49	66	103	141
			Total								
2 ^a	4.1.2	Stature (body height)	Male	1 119	1 766,6	80,6	1 606	1 650	1 759	1 901	1 965
			Female	1 261	1 637,9	78,4	1 491	1 526	1 630	1 767	1 825
			Total								
3	4.1.3	Eye height	Male								
			Female								
			Total								
4 ^c	4.1.4	Shoulder height	Male	1 113	1 445,2	76,4	1 288	1 341	1 442	1 570	1 633
			Female	1 257	1 342,5	69,9	1 210	1 243	1 336	1 456	1 514
			Total								
5	4.1.5	Elbow height	Male								
			Female								
			Total								
6	4.1.6	Iliac spine height, standing	Male								
			Female								
			Total								
7 ^a	4.1.7	Crotch height	Male	1 119	797,0	54,9	692	719	796	880	923
			Female	1 260	747,7	52,9	646	672	744	831	864
			Total								
8	4.1.8	Tibial height	Male								
			Female								
			Total								
9	4.1.9	Chest depth, standing	Male								
			Female								
			Total								
10	4.1.10	Body depth, standing	Male								
			Female								
			Total								
11	4.1.11	Chest breadth, standing	Male								
			Female								
			Total								
12	4.1.12	Hip breadth, standing	Male								
			Female								
			Total								
13 ^a	4.2.1	Sitting height (erect)	Male	1 119	920,6	42,8	827	856	919	985	1 018
			Female	1 260	864,1	38,7	783	809	861	925	952
			Total								
14 ^a	4.2.2	Eye height, sitting	Male	1 119	803,2	41,5	713	739	801	867	896
			Female	1 260	754,5	36,6	675	701	753	811	836
			Total								
15	4.2.3	Cervicale height, sitting	Male								
			Female								
			Total								

Table 16 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
16 ^a	4.2.4	Shoulder height, sitting	Male	1 119	601,9	37,8	522	549	601	656	687
			Female	1 261	567,5	31,6	501	523	566	615	641
			Total								
17 ^a	4.2.5	Elbow height, sitting	Male	1 119	239,1	35,1	170	190	239	287	305
			Female	1 260	236,9	29,8	173	193	236	280	304
			Total								
18	4.2.6	Shoulder-elbow length	Male								
			Female								
			Total								
19	4.2.7	Elbow-wrist length	Male								
			Female								
			Total								
20 ^c	4.2.8	Shoulder (biacromial) breadth	Male	1 113	418,6	23,0	371	383	418	455	469
			Female	1 257	375,9	22,3	331	343	375	412	429
			Total								
21	4.2.9	Shoulder (bideltoid) breadth	Male	1 119	490,4	37,8	422	440	486	550	592
			Female	1 261	431,4	39,1	372	385	426	493	555
			Total								
22	4.2.10	Elbow-to-elbow breadth	Male								
			Female								
			Total								
23 ^a	4.2.11	Hip breadth, sitting	Male	1 117	376,3	38,1	311	329	372	435	483
			Female	1 259	410,4	52,9	331	348	403	501	557
			Total								
24	4.2.12	Lower leg length (popliteal height)	Male								
			Female								
			Total								
25	4.2.13	Thigh clearance	Male								
			Female								
			Total								
26 ^a	4.2.14	Knee height	Male	1 119	558,0	32,1	489	513	556	607	638
			Female	1 261	508,5	31,3	450	466	506	556	585
			Total								
27	4.2.15	Abdominal depth, sitting	Male								
			Female								
			Total								
28	4.2.16	Thorax depth at the nipple	Male								
			Female								
			Total								
29	4.2.17	Buttock-abdomen depth sitting	Male								
			Female								
			Total								
30	4.3.1	Hand length	Male	1 119	202,0	12,0	178	186	201	219	230
			Female	1 260	181,7	12,1	159	166	180	199	209
			Total								
31	4.3.2	Palm length perpendicular	Male								
			Female								
			Total								

Table 16 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
32	4.3.3	Hand breadth at metacarpals	Male								
			Female								
			Total								
33	4.3.4	Index finger length	Male								
			Female								
			Total								
34	4.3.5	Index finger breadth, proximal	Male								
			Female								
			Total								
35	4.3.6	Index finger breadth, distal	Male								
			Female								
			Total								
36	4.3.7	Foot length	Male	1 119	266,7	15,4	232	244	265	290	304
			Female	1 261	239,1	14,2	211	220	238	260	271
			Total								
37 ^c	4.3.8	Foot breadth	Male	1 114	104,1	8,0	88	92	104	116	121
			Female	1 258	92,8	8,5	73	81	93	105	112
			Total								
38	4.3.9	Head length	Male	1 119	199,9	10,4	183	187	200	212	216
			Female	1 260	188,5	7,1	172	177	188	199	203
			Total								
39	4.3.10	Head breadth	Male	1 119	154,5	6,7	142	145	154	164	170
			Female	1 260	146,2	5,3	134	137	145	154	159
			Total								
40	4.3.11	Face length (nasion-menton)	Male	1 118	121,3	8,0	104	110	121	133	140
			Female	1 260	111,7	7,1	97	101	111	122	126
			Total								
41	4.3.12	Head circumference	Male	1 119	577,1	18,1	543	551	576	604	616
			Female	1 260	552,0	18,1	518	525	551	581	596
			Total								
42	4.3.13	Sagittal arc	Male								
			Female								
			Total								
43	4.3.14	Bitragion arc	Male								
			Female								
			Total								
44	4.4.1	Wall-acromion distance	Male								
			Female								
			Total								
45	4.4.2	Grip reach; forward reach	Male								
			Female								
			Total								
46	4.4.3	Elbow-grip length	Male								
			Female								
			Total								
47	4.4.4	Fist (grip axis) height	Male								
			Female								
			Total								

Table 16 (continued)

No.	ISO 7250-1 measurement			Sample size <i>n</i>	Mean	SD	P1	P5	P50	P95	P99
48	4.4.5	Forearm-fingertip length	Male								
			Female								
			Total								
49	4.4.6	Buttock-popliteal length (seat depth)	Male								
			Female								
			Total								
50 ^a	4.4.7	Buttock-knee length	Male	1 119	614,0	36,5	544	562	610	673	708
			Female	1 260	587,7	40,5	507	533	584	648	695
			Total								
51	4.4.8	Neck circumference	Male								
			Female								
			Total								
52 ^a	4.4.9	Chest circumference	Male	1 119	1 023,6	112,7	837	884	1 008	1 210	1 354
			Female	1 261	964,3	140,6	783	814	932	1 207	1 374
			Total								
53	4.4.10	Waist circumference	Male								
			Female								
			Total								
54	4.4.11	Wrist circumference	Male								
			Female								
			Total								
55	4.4.12	Thigh circumference	Male								
			Female								
			Total								
56	4.4.13	Calf circumference	Male								
			Female								
			Total								
<p>^a Definition is different from ISO 7250-1 or substituted.</p> <p>^b Unweighted data, see Table 15, 3.3.</p> <p>^c Scan-extracted, see Table 15, 1.2 and 5.2.</p>											

Annex A (informative)

Maximum allowable difference between values obtained by the method described in ISO 7250-1 and by other methods

Table A.1 shows the maximum allowable difference between values obtained by the method described in ISO 7250-1 and by other methods. It is according to ISO 20685:—, Annex A.

Table A.1 — Maximum allowable difference between values

Measurement type	Maximum mean difference mm
Segment lengths	5
Body heights	4
Large circumferences	9
Small circumferences	4
Body breadths	4
Body depths	5
Head dimensions without hair	1
Hand dimensions	1
Foot dimensions	2

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ICS 13.180

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