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Basic human body measurements for technological design - Part 1: Body measurement definitions and landmarks (ISO/DIS 7250-1:2016)

Wesentliche Maße des menschlichen Körpers für die technische Gestaltung - Teil 1: Körpermaßdefinitionen und -messpunkte (ISO/DIS 7250-1:2016)

Définitions des mesures de base du corps humain pour la conception technologique - Partie 1: Définitions des mesures du corps et repères (ISO/DIS 7250-1:2016)

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Basic human body measurements for technological design —

Part 1: Body measurement definitions and landmarks

*Définitions des mesures de base du corps humain pour la conception technologique —
Partie 1: Définitions des mesures du corps et repères*

ICS: 13.180

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 159, *Ergonomics, SC 3, Anthropometry and biomechanics*.

This second edition cancels and replaces the first edition (ISO 7250-1:2008), which has been technically revised. <https://standards.iteh.ai/catalog/standards/sist/9820487d-fe67-4b6c-86ad-3205d2e20b1b/sist-en-iso-7250-1-2018>

Basic human body measurements for technological design —

Part 1: Body measurement definitions and landmarks

1 Scope

This part of ISO 7250 provides a description of anthropometric measurements which can be used as a basis for comparison of population groups and for the creation of anthropometric databases (ISO 15535). The basic list of measurements specified in this part of ISO 7250 is intended to serve as a guide for ergonomists who are required to define population groups and apply their knowledge to the geometric design of the places where people work and live. In addition the list serves as a basis for extracting one and two dimensional measurements from three-dimensional scans (ISO 20685). This list may serve as a guide for how to take anthropometric measurements, but it also gives information to the ergonomist and designer on the anatomical and anthropometrical bases and principles of measurement which are applied in the solution of design tasks. This part of ISO 7250 is intended to be used in conjunction with national or international regulations or agreements to assure harmony in defining population groups and to allow comparison of anthropometric data among member bodies. In its various applications, it is anticipated that the basic list will be supplemented by specific additional measurements. [Annex A](#) shows the correspondence of dimensions described here with their use in ISO 14738 and ISO 15534.

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 20685, *3-D scanning methodologies for internationally compatible anthropometric databases*

ISO 15535, *General requirements for establishing anthropometric databases*

3 Terms and Definitions

3.1

population group

group of people having some common environment or activity

Note 1 to entry: These groups may be as diverse as geographically defined populations or specified age groups.

3.2

anterior

ventral

towards the front of the body

3.3

bi

prefix denoting connection with, or relation to, each of two symmetrical paired parts

Note 1 to entry: For example, biacromial, bitragion.

ISO/DIS 7250-1:2016(E)**3.4****biceps femoris**

one of the large posterior muscles in the thigh of the leg

3.5**deltoid muscle**

large muscle on the lateral border of the upper arm in the shoulder region

3.6**distal**

away from the main mass of the body

3.7**Frankfurt plane**

standard horizontal plane at the level of the left tragion and the left infraorbitale (orbitale) when the midsagittal plane of the head is held vertically

3.8**gluteal fold**

skin furrow between the buttock and the thigh

3.9**grip axis**

axis of the fist corresponding with the longitudinal axis of a rod held in the hand

3.10**inferior****caudal**

away from the head

3.11**lateral**

towards the side of the body

3.12**longitudinal axis of the foot**

the imagined center line of the foot, connecting a point between the ankle bones, and the tip of the second toe; subject to interpretation because of the great variability in the shape of the foot

3.13**medial**

towards the midline of the body

3.14**metacarpal**

pertaining to the long bones of the hand between the carpals (wristbones) and the phalanges

3.15**phalanx, phalanges (plural)**

bone of the fingers or toes

3.16**posterior****dorsal**

towards the back of the body

3.17**process**

marked prominence of a bone

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3.18**proximal**

towards the main mass of the body

3.19**radial**

referring to the long bone in the forearm on the thumb side

3.20**sagittal**

pertaining to the anteroposterior (front to back) median plane of the body (midsagittal), or to a plane parallel to the median (parasagittal) plane

3.21**superior****cranial**

towards the head, towards the top

3.22**thyroid cartilage**

prominent cartilage on the anterior surface of the neck

3.23**ulnar**

referring to the long bone in the forearm on the little finger side

4 Measuring conditions and instruments

4.1 Conditions

It is important that the following conditions be documented together with the numerical results of any survey.

Photographs or detailed sketches of measurements and procedures are recommended.

a) Clothing of subject

During measurement, the subject shall be nude or shall wear only minimal clothing and shall be bareheaded and without shoes.

b) Support surfaces

Standing surfaces (floors), platforms or sitting surfaces shall be flat, horizontal and not compressible.

c) Body symmetry

For measurements which may be taken on either side of the body, it is recommended that both sides be measured. If this is not possible, it should be indicated on which side the measurement was taken.

d) Body posture

For standing measurements, the posture should generally include looking straight ahead, heels together, upper body relaxed and normal breathing. For sitting postures, the torso is erect, the shoulders relaxed, the subject looks straight ahead and the feet are supported so that the femora are horizontal and parallel to each other. Horizontal femora can be achieved with an adjustable foot platform, or with a series of platforms of varying thickness that can be combined to achieve the desired posture.

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4.2 Instruments

The standard measuring instruments recommended are the anthropometer, sliding calipers, spreading calipers, weighing scale and tape measure.

4.2.1 Anthropometer. This specialized tool is used for measuring linear distances between points on the body and standard reference surfaces, such as the floor or a seat platform.

4.2.2 Sliding and spreading calipers. These instruments are used for measuring the breadth and depth of body segments, as well as the distances between reference marks.

4.2.3 Tape measure. The tape measure is used for measuring body circumferences.

4.2.4 Measuring cube. A cube, 200 mm on each side, is used for determining the maximal posterior protrusion of a seated person.

4.2.5 Rod. A standard rod, 20 mm in diameter, and approximately 10 cm in length, is used for determining grip measurements.

NOTE For a detailed description of the measuring methods, see Reference [2].

4.3 Further conditions

Chest and other measurements affected by breathing should be taken during gentle breathing.

5 Landmarks

Measurements are often defined with respect to anthropometric landmarks. Often, these marks are drawn on the body prior to taking the measurements. In addition, these marks are often marked prior to 3D scanning.

5.1 Acromion

Most lateral point of the lateral edge of the spine (acromial process) of the scapula, projected vertically to the surface of the skin. See [Figure 1](#).

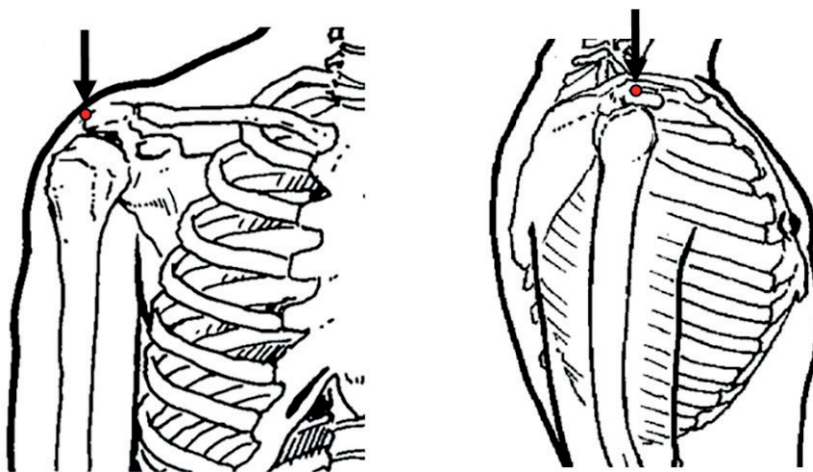


Figure 1 — Acromion

5.2 Cervicale

Tip of the prominent bone at the base of the back of the neck (spinous process of the seventh cervical vertebra) in the midsagittal plane, and projected posteriorly to the surface of the skin. See [Figure 2](#).

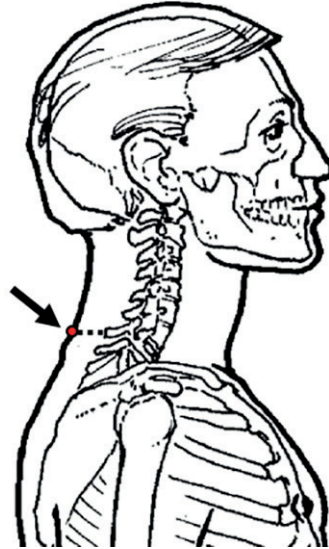


Figure 2 — Cervicale

5.3 Crotch level

Highest palpable point of the perineum. See [Figure 3](#).

NOTE If marked, it is typically marked using the top of a horizontal straightedge.

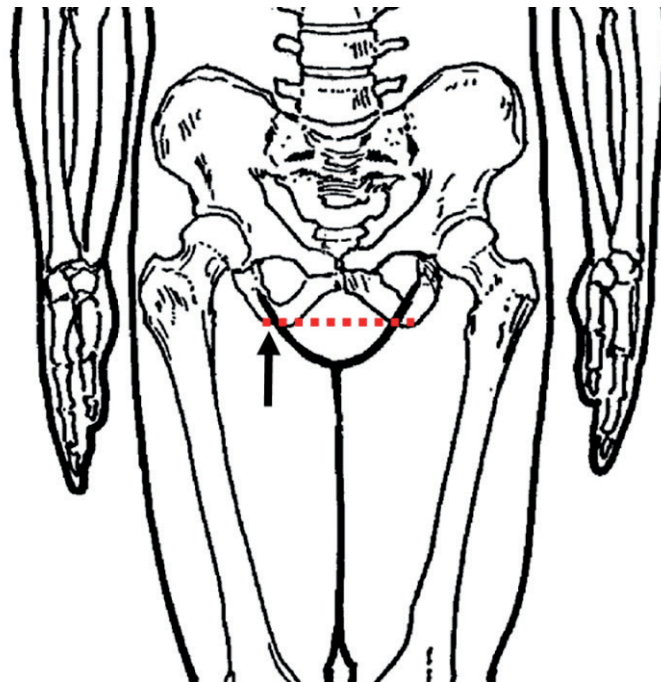


Figure 3 — Crotch level

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5.4 Ectocanthus

The lateral corner of the eye formed by the meeting of the upper and lower eyelids. See [Figure 4](#).



Figure 4 — Ectocanthus

5.5 Glabella

Most anterior point of the forehead between the browridges in the midsagittal plane. See [Figure 5](#).

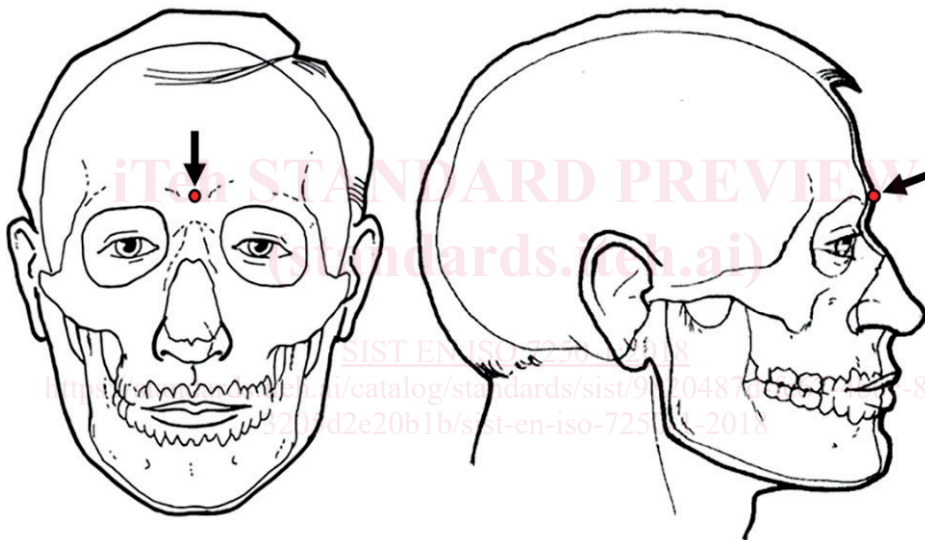


Figure 5 — Glabella

5.6 Iliospinale anterius**Anterior superior iliac spine**

Most downward-directed point of the iliac crest – projected anteriorly and horizontally to the surface of the skin. See [Figure 6](#).

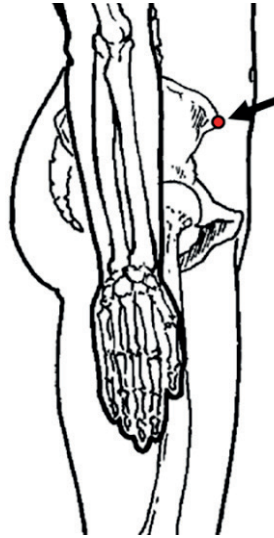


Figure 6 — Anterior superior iliac spine

5.7 Lowest point of rib cage

Inferior point of the bottom of the rib cage (tenth rib), projected horizontally, 45° from the midsagittal plane, to the surface of the skin. See [Figure 7](#).

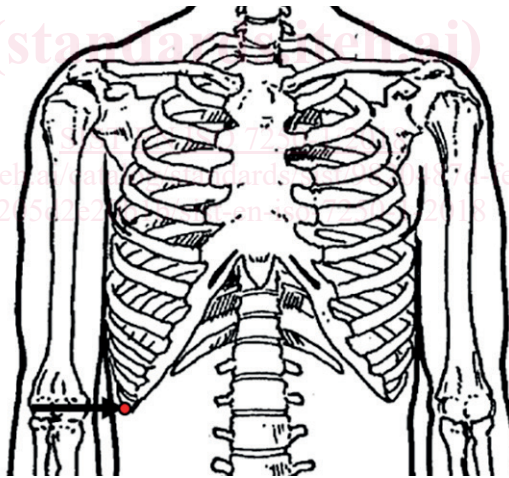


Figure 7 — Lowest point of rib cage

5.8 Menton

Lowest point of the tip of the chin in the midsagittal plane, projected anteriorly. See [Figure 8](#).