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Replacing GB/T 5703-1999

Basic human body measurements for technological design

用于技术设计的人体测量基础项目

(ISO 7250-1:2008, Basic human body measurements for technological design
– Part 1: Body measurement definitions and landmarks, MOD)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard, through redrafting method, modifies and adopts ISO 7250-1:2008 “Basic human body measurements for technological design – Part 1: Body measurement definitions and landmarks, MOD”.

As compared with ISO 7250-1:2008, the main technical differences of this standard are as follows:

- ADD the normative appendix A;

This standard replaces GB/T 5703-1999 “Basic human body measurements for technological design”. As compared with the GB/T 5703-1999, the main changes are as follows:

- In Appendix A, ADD 72 new measurement items and 14 corresponding measurement points;
- In Appendix A, DELETE 3 original measurement items (physiognomic facial length, physiognomic superior facial length, and bitragion-menton arc) and 8 measurement points (cranial, otobasion inferior, ear length, supra-auricular point, subaurale, labrale inferior, tomion, and symphision) irrelevant to the measurement items in this standard.
- DELETE the appendix B;

This standard was proposed by AND shall be under the jurisdiction of the National Ergonomics Standardization Technical Committee (SAC/TC 7).

The responsible drafting organizations of this standard: China Standardization Research Institute, Air Force Aviation Medicine Research Institute, Beijing Institute of Clothing Technology, General Armament Department Chemical Defense Institute.

The main drafters of this standard: Zhang Xin, Ran Linghua, Guo Xiaochao, Xiao Hui, Zheng Rong, Ding Songtao, Liu Taijie.

This Standard replaces the previously-issued standards as follows:

- GB/T 5703-1985;
- GB/T 5703-1999;

Basic human body measurements for technological design

1 Scope

This standard provides a description of anthropometric measurements which can be used as a basis for comparison of population groups.

The basic list specified in this standard 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.

This list is not intended to serve as a guide for how to take anthropometric measurements, but it 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 standard is intended to be used in conjunction with national or international regulations or agreements to assure harmony in defining population groups. In its various applications, it is anticipated that the basic list will be supplemented by specific additional measurements.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1 Population group

Group of people having some common environment or activity.

Note: These groups may be as diverse as geographically defined populations or specified aged groups.

2.2 Anthropometric terms

2.2.1

Acromion

Most lateral point of the lateral edge of the spine of the scapula.

Note: The height of the acromion is usually equated with shoulder height.

2.2.2

Anterior

Ventral

Appendix A

(Normative)

Recommended anthropometry terms

A.1 Basic terms

A.1.1

Standing posture

Standing erect, head is positioned along the Frankfurt plane, eyes viewing forwards, shoulders relaxed, upper limbs hanging freely downwards, hand outstretched, palm center facing inwards, fingers slightly attached to the thigh side, the left and right feet heels drawing close to each other AND the front ends being apart for about 45°, AND the body weight uniformly distributed onto two feet.

A.1.2

Sitting posture

The torso is erected, head is positioned along the Frankfurt plane, eyes viewing forwards, knees bent to about right angle, AND feet placed horizontally on the floor.

A.1.3

Sagittal

A point passing through the human body, which is perpendicular to the geometrical plane of the center sagittal plane. The sagittal divides the human body into upper part and the lower part.

A.2 Measurement point terms

A.2.1 Head measurement point terms

A.2.1.1 Vertex

The uppermost point on the center sagittal at the head top, whilst the head is positioned by the eye-ear plane.

A.2.1.2 Opisthocranium

The point on the occipitalia farthest away from the glabella on the center sagittal.

A.2.1.3 Zygion

The point on the zygomatic arch which is the highest process outwards.

A.2.1.4 Entocanthion

The point at the palpebral fissure inner angle at which the upper eye lid intersects with the lower eye lid.

A.2.1.5 Ectocanthion

The point at the palpebral fissure outer angle at which the upper eye lid intersects with the lower eye lid.

A.2.1.6 Papilla

The center point at the pupil.

A.2.1.7 Orbitale

The lowermost point at the lower edge of the orbit.

A.2.1.8 Pronasale

The point of the highest process, forwards from the apex nasi, when the head is positioned along the Frankfurt plane.

A.2.1.9 Alare

The outermost point on the ala nasi.

A.2.1.10 Subnasale

The deepest point at the angle as formed by the nasal septum and the upper lip skin on the center sagittal.

A.2.11 Cheilion

The lowermost point of the chin region on the center sagittal when the head is positioned along the eye-ear plane.

A.2.1.13 Gonion

The point of highest process outwards and rearwards from the angular mandibula.

A.2.2 Measurement point terms for torso and limb

A.2.2.1 Fossa jugularis

The intersection point between the connection line of the upper edges of the left and right clavicle extermistas sternalis AND the center sagittal.

The point of highest process rear-downwards of the ulna olecranon when the elbow is bent for 90°.

A.2.2.14 Iliocristale

The point of highest process outwards from the iliocristale.

A.2.2.15 Iliocristale anterior

The highest process point front downwards from the iliocristale anterior.

A.2.2.16 Trochanterion

The uppermost point of the greater trochanter of the thighbone.

A2.2.17 Peak of buttock

The highest process point, backwards from the buttock.

A.2.2.18 Perineum point

The intersection point between the connection line of the lowermost points of the left and right ischium nodules AND the center sagittal.

A.2.2.19 Patella center point

The center point of the connection line between the upper end and the lower end of the patella.

A.2.2.20 Anterior distal end of tibia point

The foremost point of the lower end of the tibia.

A.2.2.21 Sphyrion

The lower end point of the malleolus medialis of tibia.

A.2.2.22 Malleolus fibulae point

The lower end point of the lateral malleolus of fibula.

A.2.2.23 Phalangion

The highest process point, upwards from the proximal end of the phalanges prima of the hand back, AND the phalangion of each finger refers to the 1th ~ Vth phalangion, respectively.

A.2.2.24 Fingertip

The furthest downwards point at the middle finger refers to the middle fingertip when the upper limb hangs downwards freely. AND it refers to the fingertip on each other fingers.

The vertical distance from the radial to the floor.

A.3.1.10 Waist height

The vertical distance from the middle point of the lowermost rib and the middle of crista iliaca to the floor.

A.3.1.11 Peak of buttock height

The vertical distance from the buttock peak to the floor.

A.3.1.12 Trochanter height

The vertical distance from the trochanter to the floor.

A.3.1.13 Knee height

The vertical distance from the middle point of patella to the floor.

A.3.1.14 Calf height

The vertical distance from the most rearwards prominent point from the crus to the floor.

A.3.1.15 Lateral malleolus height

The vertical distance from the lateral malleolus to the floor.

A.3.1.16 Medial malleolus height

The vertical distance from the medial malleolus to the floor.

A.3.1.17 Anterior neck length

The length of the curve from the gnathion to chest upper point along the front middle line of the torso.

A.3.1.18 Posterior neck length

The length of the curve from the inion to the neck point along the rear middle line of the head.

A.3.1.19 Posterior neck hemicircumference

The length of the arc of the external points at both sides of neck root passing between the neck points.

A.3.1.20 Side neck-to-anterior axillary arc

The length of the arc from the external side point of the neck root to the armpit front point.

A.3.1.31 Acromion-to-neck root length

The length of the curve from the lateral neck root to the acromion.

A.3.1.32 Length of upper extremity

The vertical distance from the acromion to the middle finger tip, when the upper limb hangs freely downwards.

A.3.1.33 Arm length

The vertical distance from the acromion to the styliion ulna, when the upper limb hangs freely downwards.

A.3.1.34 Upperarm length

The vertical distance from the acromion to the radius, when the upper limb hangs freely downwards.

A.3.1.35 Forearm length

The vertical distance from the radius to the styliion radius, when the upper limb hangs freely downwards.

A.3.1.36 Length of upper extremity

The vertical distance from the acromion to the middle finger tip, when the upper limb hangs freely downwards.

A.3.1.37 Lower extremity length

The straight-line length from the perineum point to the tibiale.

A.3.1.38 Thigh length

The vertical distance from the spine to the tibiale.

A.3.1.39 Leg length

The vertical distance from the tibiale to the medial ankle point.

A.3.1.40 Crotch length

Along the front middle line of the torso, the length of the curve from the waist circumference through the perineum point to the intersection point between the rear middle line of the torso and the waist circumference.

A.3.1.41 Armpit breadth

The straight-line distance from the anterior armpit to the posterior armpit.

A.3.1.42 Waist depth

A.3.1.54 Crista iliaca breadth

The straight-line distance between the left and the right crista iliaca.

A.3.1.55 Spinal breadth

The straight-line distance between the left and right spines.

A.3.1.56 Trochanteric breadth

The straight-line distance between the left and the right trochanteric.

A.3.1.57 Thigh breadth

The transverse horizontal straight-line distance between the highest processes of the tibiale side and the fibula of the thigh at the lower edge of the hip fold.

A.3.1.58 Neck root circumference

The circumference length from the neck point through the lateral left and right neck root and neck pit to the starting point.

A.3.1.59 Maximum body circumference

The horizontal circumference length of the torso passing through the lateral shoulder at both sides.

A.3.1.60 Upper chest circumference

The length of the horizontal circumference passing through the left and right posterior armpits.

A.3.1.61 Lower chest circumference

The length of the horizontal circumference at the lower edge of the breast.

A.3.1.62 Scye circumference

The length of the horizontal circumference from the acromion through the anterior armpit and posterior armpit to the starting point.

A.3.1.63 Biceps circumference

The length of the horizontal circumference at the thickest part of biceps, when the upper limbs hang freely downwards.

A.3.1.64 Least forearm circumference

The length of the horizontal circumference at the thickest part of forearm, when the upper limbs hang freely downwards.

A.3.1.65 Elbow circumference

The vertical distance from the grip axis to the floor when the upper limbs reach vertically upwards.

A.3.2.6 Armreach from back

The horizontal straight-line distance from the rear edge of the back to the middle finger tip when the upper limbs reach freely and horizontally forwards.

A.3.2.7 Arms span

The straight-line distance between the two middle finger tips when the both arms reach laterally and horizontally to the maximum extent.

A.3.2.8 Functional arms span

The straight-line distance between the left and right grip axis when the both arms reach laterally and horizontally to the maximum extent.

A.3.2.9 Akimodo

The straight-line distance between the two elbow tips when the subject's arms bend along the horizontal plane, waist stretches erect, palm faces downwards, fingers outstretch and adduct and touch chest, AND both arms reach laterally and horizontally to the maximum extent.

A.3.3 Measurement items of sitting posture

A.3.3.1 Iliocristale height, sitting

The vertical distance from the iliac crest to the horizontal sitting plane in the sitting posture.

A.3.3.2 Bithigh breadth

The transverse horizontal straight-line distance between the highest processes outwards of the both thighs when the subject adducted of knees and feet at sitting posture.

A.3.3.3 Abdominal circumference, sitting

The length of the horizontal circumference of abdomen passing through the iliac crest at sitting posture.

A.3.4 Functional items at sitting posture

A.3.4.1 Lower extremity length, sitting

The horizontal straight-line length from the hip rear edge to the heel facies volaris when the lower limbs extend horizontally forwards to the largest extent AND the ankle is in right angle state.

A.3.4.2 Biepicondylar breadth, sitting

The straight-line distance from the thumb tip to the index finger tip when the subject extends five fingers to the maximum extents, places five fingers on the desk, and maintains five fingers unmoved.

A.3.6.7 Fingertip I-V distance

The straight-line distance from the thumb tip to the little finger when the thumb and little finger extend outwards to the maximum extent.

A.3.6.8 Maximum lateral moving distance of fingertip I

The maximum straight-line distance of the movement of the thumb tip when the subject's right-hand holds the upright part of the "thumb tip maximum movement distance gauge", the thumb extends leftwards to the maximum extent and then the rightwards, AND the first metacarpal part is not away from the upright.

A.3.6.9 Maximum grip diameter

The maximum thickness between the thumb and the digital joints when the right-hand grips freely AND the thumb is placed at the radius side of the index finger.

A.3.6.10 Maximum grip breadth

The maximum hand width at the hand joints when the right-hand grips freely AND the thumb is placed at the radius side of the index finger.

A.3.6.11 Maximum grasping diameter

The straight-line distance from the middle finger phalangion (ph III) to the thumb joint's highest process outwards when the thumb tip is contacting with the middle finger tip to form an almost circle inside.

A.3.6.12 Grip circumference

The internal circumference length of the ring as formed by the index finger and the thumb when the subject holds a measurement taper AND the hand ulna side faces to the taper tip. At this time, the thumb is placed freely and laterally, AND the tips of the rest fingers are easily touching to the skin of the palm they are facing.

A.3.6.13 Fist girth

The length of the circumference starting from the middle finger phalangion through the front middle part of the thumb's first knuckle and the little fingertip to the starting point when the hand grips gently AND the thumb is placed at the radius side of the index finger.

A.3.7 Foot measurement items

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