

MEASURER'S HANDBOOK

Definition of Measurements

1. **Abdominal Depth, Sitting:** The horizontal distance between the anterior point of the abdomen (abdominal point anterior, sitting) and the back at the same level. The participant sits erect looking straight ahead. The measurement is taken with a beam caliper at the maximum point of quiet respiration.
2. **Acromial Height:** The vertical distance between the standing surface and the acromion landmark on the tip of the right shoulder. The participant stands erect looking straight ahead. The heels are together with weight distributed equally on both feet. The shoulders and upper extremities are relaxed. This measurement is taken with an anthropometer at the maximum point of quiet respiration.
3. **Acromial Height, Sitting:** The vertical distance between a sitting surface and the acromion landmark on the tip of the right shoulder. The participant sits erect looking straight ahead. The shoulders and upper extremities are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other. This measurement is taken with an anthropometer at the maximum point of quiet respiration.
4. **Arm Length:** The distance between the acromion landmark on the tip of the right shoulder and the dactylion III landmark at the tip of the middle finger. The participant stands erect with both arms straight at sides, hands extended, and palms facing the thighs. This measurement is taken with a beam caliper.
5. **Biacromial Breadth:** The distance between the right and left acromion landmarks at the tips of the shoulders. The participant sits erect looking straight ahead. The shoulders and upper extremities are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other. This measurement is taken with a beam caliper at the maximum point of quiet respiration.
6. **Bideltoid Breadth:** The maximum horizontal distance between the lateral margins of the upper arms on the deltoid muscles. The participant sits erect looking straight ahead. The shoulders and upper extremities are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other. This measurement is taken with a beam caliper at the maximum point of quiet respiration.
7. **Bustpoint/Thelion Breadth:** The distance between the left and right bustpoint landmarks on women and the center of the nipple (thelion) on men. The participant stands erect looking straight ahead. The shoulders and upper extremities are relaxed. This measurement is taken with a beam caliper at the maximum point of quiet respiration.
8. **Buttock-Knee Length:** The horizontal distance between the buttock plate and the anterior point of the right knee (knee point, anterior). The participant sits erect. The thighs are parallel and the knees flexed 90 degrees with the feet in line with the thighs. The measurement is taken with an anthropometer.
9. **Buttock-Popliteal Length:** The horizontal distance between the buttock plate and the back of the right knee (the popliteal fossa at the dorsal juncture of the calf and thigh). The participant

sits erect looking straight ahead. The thighs are parallel and the knees flexed 90 degrees with the feet in line with the thighs. The measurement is taken with an anthropometer.

10. **Crotch Height:** The vertical distance between the standing surface and the crotch. The participant stands erect looking straight ahead. The heels are together with weight distributed equally on both feet. The measurement is taken with an anthropometer.
11. **Elbow-Fingertip Length:** The horizontal distance between the back of the tip of the right elbow (olecranon, rear) and the tip of the right middle finger (dactylion III) when the right elbow is flexed 90 degrees. The participant stands erect looking straight ahead. The shoulders and upper extremities are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other. This measurement is taken with a beam caliper.
12. **Elbow Rest Height:** The vertical distance between a sitting surface and the bottom of the right elbow (olecranon, bottom). The participant sits erect looking straight ahead. The shoulders and upper extremities are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other. This measurement is taken with an anthropometer at the maximum point of quiet respiration.
13. **Eye Height, Sitting:** The vertical distance between a sitting surface and the outer corner of the right eye (ectocanthus). The participant sits erect with the head in the Frankfort plane. The shoulders and upper extremities are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other. The thighs are parallel and the knees flexed 90 degrees with the feet in line with the thighs. This measurement is taken with an anthropometer at the maximum point of quiet respiration.
14. **Foot Breadth:** The distance between the first metatarsophalangeal-protrusion landmark and the fifth metatarsophalangeal-protrusion landmark on the right foot. The participant stands erect looking straight ahead. The heels are together and the weight is distributed equally on both feet. This measurement is taken with a beam caliper.
15. **Foot Length:** The distance between the most posterior protrusion of the heel and the most anterior tip of the toes on the right foot. The participant stands erect looking straight ahead. The heels are together and the weight is distributed equally on both feet. This measurement is taken with a beam caliper.
16. **Hand Breadth:** The breadth of the hand between the landmarks at metacarpal II and metacarpal V. This measurement is taken with a sliding caliper when the participant places the right hand palm-down on a table with two distal phalanges on the fingers on a flat surface 8 mm higher than the table surface.
17. **Hand Circumference:** The circumference of the right hand over the landmarks at metacarpale II and metacarpale V. This measurement is taken with a tape when the participant places the right hand palm-down on a table with two distal phalanges on the fingers on a flat surface 8 mm higher than the table surface.
18. **Hand Length:** The length of the right hand between the stylium landmark on the wrist and the tip of the middle finger (dactylion III). This measurement is taken with a sliding caliper when the participant places the right hand palm-down on a table with two distal phalanges on the fingers on a flat surface 8 mm higher than the table surface.
19. **Head Breadth:** The maximum horizontal breadth of the head above the attachment of the ears. This measurement is taken with a spreading caliper.

20. **Head Circumference:** The maximum circumference of the head above the attachment of the ears to the head above the ridges of the eyebrows and around the back of the head. This measurement is taken with a tape.
21. **Head Length:** The distance from the glabella landmark between the brow-ridges to the posterior point on the back of the head. This measurement is taken with a spreading caliper.
22. **Hip Breadth, Sitting:** The maximum distance between the lateral points of the hips or thighs (whichever is greater). The participant sits erect with feet and knees together.
23. **Knee Height, Sitting:** The vertical distance between the footrest surface and the suprapatella landmark at the top of the right knee. The participant sits with the thighs parallel, the knees flexed 90 degrees, and the feet in line with the thighs. This measurement is taken with an anthropometer.
24. **Lateral Malleolus Height:** The vertical distance between a standing surface and the lateral malleolus landmark on the outside of the right ankle. The heels are together with weight distributed equally on both feet. The measurement is taken with a modified sliding caliper.
25. **Neck Breadth:** The distance between the left and right lateral points at the base of the neck. The participant sits erect looking straight ahead. This measurement is taken with a beam caliper.
26. **Popliteal Height:** The vertical distance from a footrest surface to the back of the right knee (the popliteal fossa at the dorsal juncture of the right calf and thigh). The participant sits erect looking straight ahead. The thighs are parallel and the knees flexed 90 degrees with the feet in line with the thighs. The measurement is taken with an anthropometer.
27. **Shoulder-Elbow Length:** The distance between the acromion landmark on the tip of the right shoulder and the bottom of the right elbow (olecranon, bottom). The participant stands with the right arm hanging at the side and the elbow flexed 90 degrees. The hand is straight and the palm faces inward. This measurement is taken with a beam caliper parallel to the long axis of the right upper arm.
28. **Sitting Height:** The vertical distance between the sitting surface and the top of the head. The participant sits erect with the head in the Frankfort plane. The shoulders and upper extremities are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other. The thighs are parallel and the knees flexed 90 degrees with the feet in line with the thighs. This measurement is taken with an anthropometer at the maximum point of quiet respiration.
29. **Stature (Standing Height):** The vertical distance between the standing surface and the top of the head. The participant stands erect with the head in the Frankfort plane. The heels are together with weight distributed equally on both feet. The shoulders and upper extremities are relaxed. This measurement is taken with an anthropometer at the maximum point of quiet respiration.
30. **Thigh Circumference:** The circumference of the right thigh at its juncture with the buttock. The participant stands erect with the weight distributed equally on both feet. The legs are spread apart just enough so that the thighs do not touch. The measurement is made with a tape perpendicular to the long axis of the thigh.

31. **Thigh Clearance:** The vertical distance between the sitting surface and the highest point on the top of the right thigh (thigh point, top). The participant sits erect with thighs parallel and the knees flexed 90 degrees, and the feet in line with the thighs. The measurement is taken with an anthropometer.
32. **Thigh Strap Length, Back:** The distance from the anterior superior iliac spine (right) landmark, down the gluteal furrow point, across the crotch, to the central release buckle (CRB) point. The participant stands erect with the weight distributed equally on both feet. The legs are spread apart just enough so that the thighs do not touch. The measurement is made with a tape at the maximum of quiet respiration.
33. **Thigh Strap Length, Front:** The distance from anterior superior iliac spine (right) landmark to the central release buckle (CRB) point. The participant stands erect looking straight ahead. The legs are spread apart just enough so that the thighs do not touch. The shoulders and upper extremities are relaxed. This measurement is taken with a tape at the maximum point of quiet respiration.
34. **Thumb-Tip Reach:** The distance between the surface of the back and the tip of the right thumb. The participant stands in a corner with feet together and heels 20 cm from the back wall. The buttock and shoulder are against the wall while the right arm is raised horizontally forward with the elbows straight, the thumbs on top, and the fingers curled out of the way. The measurement is read from a wall scale.
35. **Torso Strap Length Back:** The distance between cervicale to posterior superior iliac crest on the right. The participant stands erect looking straight ahead. The heels are together with weight distributed equally on both feet. The shoulders and upper extremities are relaxed. This measurement is taken with a tape at the maximum point of quiet respiration.
36. **Torso Strap Length Front:** The distance from the center release buckle (CRB) across the back of the neck, and back to the CRB. The participant stands erect looking straight ahead. The heels are together with weight distributed equally on both feet. The shoulders and upper extremities are relaxed. This measurement is taken with a tape at the maximum point of quiet respiration.
37. **Waist Circumference (Natural Indentation):** The horizontal circumference of the waist at the level of its natural indentation. The participant stands erect looking straight ahead. The heels are together with weight distributed equally on both feet. The shoulders and upper extremities are relaxed. This measurement is taken with a tape at the maximum point of quiet respiration.
38. **Waist Circumference (Omphalion):** The horizontal circumference at the level of navel. The participant stands erect looking straight ahead. The heels are together with weight distributed equally on both feet. The shoulders and upper extremities are relaxed. This measurement is taken with a tape at the maximum point of quiet respiration.
39. **Waist Height Standing, Omphalion:** The vertical distance between a standing surface and the center of the navel (omphalion). The participant stands erect looking straight ahead. The heels are together with weight distributed equally on both feet. The shoulders and upper extremities are relaxed. This measurement is taken with an anthropometer at the maximum point of quiet respiration.
40. **Weight:** Body weight of a participant, which is taken while the participant stands on the platform of a scale.

Landmarks

1. **Abdominal Point, Anterior:** The most protruding point of the relaxed abdomen of a seated participant.
2. **Acromion, Left and Right:** The point of the intersection of the lateral border of the acromial process a line running down the middle of the shoulder from the neck to the tip of the shoulder.
3. **Anterior Superior Iliac Spine, Right and Left:** The anterior points of the right and left iliac crests.
4. **Bust Point/Thelion, Left and Right:** Anterior points of the bra cups for female (bustpoint) and center of the nipples on males (thelion).
5. **Central Release Buckle (CRB) Point:** A point directly under the omphalion (center of the navel) by a magnitude of one fourth of the difference between waist height omphalion and crotch height).
6. **Cervicale:** Superior palpable point of the spine of the 7th cervical vertebra.
7. **Dactylion III:** The tip of the middle finger.
8. **Deltoid Point, Left and Right:** The lateral point of the right deltoid muscle, and lateral point of the left deltoid muscle at the level of the right deltoid point.
9. **Dorsal Juncture of the Calf and Thigh:** The juncture between the right calf and thigh behind the knee of a subject sitting with the knee flexed 90 degrees.
10. **Ectocanthus:** Outside corner of the right eye formed by the meeting of the upper and lower eyelids.
11. **First Metatarsophalangeal Protrusion:** The medial protrusion of the right foot in the region of the first metatarsophalangeal joint.
12. **Fifth Metatarsophalangeal Protrusion:** The lateral protrusion of the right foot in the region of the fifth metatarsophalangeal joint.
13. **Glabella:** The anterior point on the frontal bone midway between the bony browridges.
14. **Gluteal Furrow Point, Right:** The lowest point of the lowest furrow or crease at the juncture of the right buttock and the thigh.
15. **Iliocristale:** The highest point of the right ilia crest of the pelvis, one half the distance between the anterior superior iliac and posterior superior iliac spines.
16. **Knee Point, Anterior, Left and Right:** The most protruding point of the kneecap of a seated participant.
17. **Lateral Malleous:** The lateral point of the right lateral malleolus (outside ankle bone).
18. **Metacarpale II:** The lateral point of the right metacarpophalangeal joint II (at the base of the index finger on the outer edge of the hand).

19. **Metacarpale V:** The medial point of the right metacarpophalangeal joint V (at the base of the little finger on the outer edge of the hand).
20. **Neck, Right Lateral and Left Lateral:** Lateral points at the base of the neck.
21. **Olecranon, Bottom and Rear:** The lowest and rearmost points of the right elbow with the elbow flexed 90 degrees.
22. **Posterior Superior Iliac Spine:** Posterior point of the crest of the right ilium.
23. **Stylian:** The lowest point of the bottom of the right radius.
24. **Suprapatella:** The superior point of the right patella (kneecap).
25. **Thigh Point, Top:** The highest point of the top of the right thigh of a seated participant.
26. **Thumtip, left and right:** The tip of the left and right thumb.
27. **Waist (natural indentation):** right and left, anterior and posterior: Level of the greatest indentation on the right side of the torso, or half distance 10th rib and illiocristale if no single indentation is clear.
28. **Waist (omphalion) right and left, anterior and posterior:** Level of the center of the navel.