

# **ANTHROPOMETRIC DATA ANALYSIS SETS MANUAL**

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## INTRODUCTION

In 1994 the Human Systems Information Analysis Center (HSIAC; formerly the Crew System Ergonomics Information Analysis Center [CSERIAC]) acquired a large repository of data from the Computerized Anthropometric Research and Design (CARD) Laboratory of the Air Force Research Laboratory Crew System Interface Division (formerly the Paul M. Fitts Human Engineering Division of the Armstrong Laboratory) at Wright-Patterson AFB OH. This repository of data originally consisted of over fifty U.S. and International anthropometric surveys on both military and civilian populations. These surveys represent more than forty-five years of research and account for hundreds of measurements on thousands of individuals.

Since these surveys were conducted by many individuals and organizations over a long period of time, the measuring techniques and the terminology were not always consistent from survey to survey. For example, “stomach depth” in one survey may have been termed “abdominal depth” in another survey and waist circumference may have been measured at the level of the navel in one survey and the level of the subject’s waist natural indentation in the next survey. To eliminate these inconsistencies and the confusion they create, HSIAC performed an exhaustive evaluation of all the surveys for which the documentation could be obtained, determined the similarities and differences between the surveys and the measurements, and developed a standardized coding scheme to be applied to the measurements across all of the surveys.

A total of 27 surveys have been evaluated and are now available for general use (see Page 50 for a complete listing). Each survey contains the original ASCII dataset file and a text file that describes the survey, provides the documentation reference, and lists the specific variables that are included in the survey. The ASCII data can be directly imported into any statistical software package on a personal computer (PC) or Macintosh™ computer for analysis.

This manual contains the standardized measurement definitions, a glossary of landmark definitions, and a complete list of the standardized measurements and their codes.

## **DEFINITIONS OF TRADITIONAL MEASUREMENTS**

-A-

- 6 - Abdominal-Depth (sitting) - The depth of the abdomen.
- 7 - Abdominal Extension Breadth (sitting) - The horizontal breadth of the trunk at the level of the maximum protrusion of the abdomen.
- 8 - Abdominal-Extension (circumference) - The circumference of the lower torso at the level of the maximum anterior protrusion of the abdomen.
- 10 - Abdominal-Extension Depth - Subject stands erect. The horizontal distance between the anterior point of the abdomen and the back at the same level is measured with a beam caliper. Measure is taken at the point of maximum quiet inspiration. The subject must not pull in his or her stomach.
- 11 - Abdominal-Extension -Depth-Sitting - The horizontal distance between the anterior point of the abdomen and the back at the same level is measured with a beam caliper. The subject sits erect looking straight ahead. The measurement is made at the maximum point of quiet respiration.
- 18 - Abdominal-Extension (height) - The height of the maximum anterior protrusion of the abdomen.
- 23 - Acromion Height - The vertical distance between a standing surface and the acromion landmark on the tip of the right shoulder is measured with an anthropometer. The subject stands erect looking straight ahead.
- 25 - Acromion Height (sitting) - The vertical distance between a sitting surface and the acromion landmark on the tip of the right shoulder is measured with an anthropometer. The subject sits erect looking straight ahead. The shoulders and upper arms are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other.
- 39 - Acromion-Radiale Length - . The subject stands erect. The distance between the acromion landmark on the tip of the right shoulder and the radiale landmark on the right elbow is measured with a beam caliper held parallel to the long axis of the arm.
- 42 - Acromion to Biceps Circumference Level - The surface distance along the outer edge of the arm from acromion to the biceps circumference level.
- 48 - Age - The age, as of the previous birthday, as reported by the subject, to which 0.5 years were added.
- 58 - Ankle Circumference - The minimum horizontal circumference of the right ankle is measured with a tape.
- 64 - Ankle Height - The height of the level of minimum circumference of the leg.
- 70 - Arm-Circumference Axillary - The circumference of the right upper arm perpendicular to its long axis at the level of the anterior-scye-on-the-upper arm landmark is measured with a tape. The subject stands erect looking straight ahead with shoulders and upper extremities relaxed and the palms facing the sides.
- 72 - Arm Circumference -Biceps (Relaxed) - The maximum circumference of the right arm at the level of the biceps measured with the arm hanging relaxed.
- 73 - Arm Circumference Biceps (Relaxed- left) - The maximum circumference of the left arm at the level of the biceps measured with the arm hanging relaxed

- 77 - Arm Circumference - Biceps (Flexed) - The circumference of the right upper arm around the flexed biceps muscle is measured with a tape held perpendicular to the long axis of the upper arm. The subject stands with the upper arm extended horizontally and the elbow flexed 90°. The fist is clenched and held facing the head, and the subject exerts maximum effort in “making a muscle”.
- 78 - Arm Circumference - Biceps (Flexed - left) - The circumference of the left upper arm around the flexed biceps muscle is measured with a tape held perpendicular to the long axis of the upper arm. The subject stands with the upper arm extended horizontally and the elbow flexed 90°. The fist is clenched and held facing the head, and the subject exerts maximum effort in “making a muscle”.
- 80 - Arm Reach From Wall - The distance from the wall to the tip of the middle finger measured with the subject’s shoulders against the wall, the hand and arm extended forward.
- 81 - Arm Reach From Wall - Sitting - Subject’s right arm and fingers are extended forward parallel to the floor. Measure the distance from the back of the right shoulder to the tip of the middle finger.
- 90 - Axilla Height - The vertical distance between a standing surface and the right axillary fold, as designated by the anterior-scye-on-the-torso landmark, is measured with an anthropometer. The subject stands erect looking straight ahead.
- 91 - Axilla to Waist Length - The surface distance from the armpit to waist level.

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- 92 - Back Curvature - The tape distance across the back as measured from the point on the right side in the midaxillary plane at chest level to the similar left point.
- 93 - Back Arc at Bust - The surface distance across the back between the midaxillary lines at the level of the bra points (or chest level for men).
- 95 - Back Arc at Waist - The surface distance across the back between the midaxillary lines at waist level.
- 103 - Biacromial Breadth - The distance between the right and left acromion landmarks at the tips of the shoulders is measured with a beam caliper. The subject sits erect. The shoulders and upper arms are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other.
- 110 - Biceps Skinfold - A vertical fold of skin is measured at the anterior mid point of the contracted bicep muscle. This midpoint is found by measuring the distance between the lateral epicondyle of the left humerus and the acromial landmark.
- 122 - Bideltoid Breadth - The maximum horizontal distance between the lateral margins of the upper arms on the deltoid muscles is measured with a beam caliper. The subject sits erect looking straight ahead. The shoulders and upper arms are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other.
- 126 - Bigonial Breadth - The breadth of the jaw across the gonial angles.
- 130 - Biiliocristale Breadth - The breadth of the torso measured between the superior points of the ilia in the midaxillary plane.
- 134 - Bimalleolar Breadth - The horizontal distance between the maximum protrusions of the ankle bones (lateral and medial malleoli) of the right foot is measured with a Holtain caliper. The subject stands with the weight equally distributed on both feet.
- 138 - Biocular Breadth - The distance between the outer corners of the eyes.

- 140 - Bispinous Breadth - The straight-line distance between the right and left anterior superior iliac spine landmarks is measured with a beam caliper. The subject stands looking straight ahead with the heels together and the weight distributed equally on both feet.
- 142 - Bitragion Breadth - The breadth of the head as measured from the right to left trigion.
- 144 - Bitragion - Coronal Arc - The surface distance between the right and left trigion landmarks across the top of the head is measured with a tape. The head is in the Frankfort plane.
- 146 - Bitragion - Crinion Arc - The surface distance between the right and left trigion landmarks across the top of the forehead at the lowest point of the hairline (crinion). Measured with a tape.
- 150 - Bitragion - Menton (chin) Arc - The surface distance between the right and left trigion landmarks across the chin landmark at the tip of the chin is measured with a tape. The teeth are lightly occluded.
- 152 - Bitragion - Minimum Frontal Arc - The surface distance between the right and left trigion landmarks across the forehead just above the ridges of the eyebrow is measured with a tape.
- 153 - Bitragion Posterior Arc - The distance from right to left trigion measured with the tape passing over the base of the skull.
- 156 - Bitragion Submandibular Arc - The surface distance between the right and left trigion landmarks across the submandibular landmark at the juncture of the jaw and the neck is measured with a tape. The head is in the Frankfort plane and the teeth are lightly occluded.
- 158 - Bitragion-Subnasale Arc - The surface distance between the right and left trigion landmarks across the subnasale landmark just under the nose is measured with a tape.
- 161 - Bitrochanterion Breadth - The horizontal distance between the trochanters measured with the flesh compressed.
- 165 - Bizygomatic Breadth - The maximum horizontal breadth of the face (between the zygomatic arches) is measured with a spreading caliper.
- 167 - Body Length-Supine-Knees Flexed - The distance from the top of the head to the tip of the toes when the subject lies supine, knees raised so the angle between the upper and lower legs approximates 60 degrees and the toes are touching a wall.
- 169 - Bowed Torso Height - The distance from the floor to the top of the head measured as the subject stands with the feet 12 inches apart, palms of the hands on the kneecaps and the head as close to the Frankfort Plane as possible.
- 172 - Bustpoint to Bustpoint Breadth - The distance between the right and left bustpoint landmarks on women and the center of the nipples (thelion) on men is measured with a beam caliper. The subject stands erect looking straight ahead. The shoulders and upper extremities are relaxed.
- 178 - Buttock Circumference - The circumference of the body measured at the level of the maximum posterior protuberance of the buttocks.
- 179 - Buttock Circumference - Sitting - The circumference of the buttocks measured with the tape passing under the buttocks and brought up diagonally across the lap.
- 185 - Buttock Curvature - The surface distance across the back between the midaxillary lines at the level of the maximum protrusion of the buttocks.

- 186** - Buttock Depth - The depth of the torso at the level of the maximum posterior protrusion of the buttock.
- 187** - Buttock-Heel Length - The distance from the base of the heel to a wall against which the subject sits erect with the legs maximally extended forward along the sitting surface.
- 188** - Buttock Height - The vertical distance between a standing surface and the level of the maximum protrusion of the right buttock is measured with an anthropometer at the right side of the thigh. The subject stands erect with the heels together.
- 194** - Buttock-Knee Length - The horizontal distance between a buttock plate placed at the most posterior point on either buttock and the anterior point of the right knee is measured with an anthropometer. The subject sits erect. The thighs are parallel and the knees flexed 90° with the feet in line with the thighs.
- 200** - Buttock-Popliteal Length - The horizontal distance between a buttock plate placed at the most posterior point on either buttock and the back of the right is measured with an anthropometer. The subject sits erect. The thighs are parallel and the knees flexed 90° with the feet in line with the thighs.

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- 207** - Calf Circumference - The maximum horizontal circumference of the right calf is measured with a tape. The subject stands erect with the heels approximately 10 cm apart and the weight distributed equally on both feet.
- 209** - Calf Circumference - left-previous measurement repeated on opposite leg
- 215** - Calf Height - The vertical distance between a standing surface and the level of the maximum circumference of the right calf is measured with an anthropometer. The subject stands erect with the heels together and the weight distributed equally on both feet.
- 219** - Cervicale Height - The vertical distance between a standing surface and the cervicale landmark on the spine at the base of the neck is measured with an anthropometer. The subject stands erect with the head in the Frankfort plane.
- 220** - Cervicale Height (Sitting) - The vertical distance between a sitting surface and the cervicale landmark on the spine at the base of the neck is measured with an anthropometer. The subject sits erect looking straight ahead. The shoulders and upper arms are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other. The thighs are parallel and the knees are flexed 90°.
- 223** - Chest Breadth - The maximum horizontal breadth of the chest at the level of the right bustpoint on women or the nipple on men is measured with a beam caliper. The subject stands erect looking straight ahead with the heels together, the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.
- 227** - Chest Breadth (bone) - The breadth of the torso at nipple level measured with pressure.
- 230** - Chest Circumference - The maximum horizontal circumference of the chest at the fullest part of the breast is measured with a tape. The subject stands erect looking straight ahead. The shoulders and upper extremities are relaxed.
- 231** - Chest Circumference at Scye - The horizontal circumference of the chest at the level of the scye at midspace landmark is measured with a tape. The subject stands erect looking straight ahead. The shoulders and upper extremities are relaxed.

- 232 - Chest circumference (below bust) - The horizontal circumference of the chest at the level of the inferior juncture of the lowest breast with the rib cage is measured with a tape. On women, the tape may lie on the bra. The subject stands erect looking straight ahead. The shoulders and upper extremities are relaxed.
- 233 - Chest Circ - Inspiration - Subject stands with arms slightly raised. Holding the tape in a horizontal position immediately below the breasts, measure the circumference of the chest at maximum inhalation.
- 235 - Chest Depth - Sitting - The subject sit erect with his or her back against a wall. At the level of the nipple, the measurement is the horizontal distance between the most anterior point of the chest and the wall.
- 236 - Chest Depth - The horizontal distance between the chest, at the level of the right bustpoint on women or the nipple on men, and the back at the same level is measured with a beam caliper. The subject stands erect looking straight ahead. The shoulders and upper extremities are relaxed.
- 237 - Chest Height - The vertical distance between a standing surface and the right bustpoint on women or the nipple on men is measured with an anthropometer. The subject stands erect looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed.
- 249 - Crotch Height - The vertical distance between the standing surface and the crotch is measured with an anthropometer. The subject stands erect looking straight ahead. The heels are together and the weight is distributed equally on both feet.
- 251 - Crotch Length (Natural Waist Indent) - The distance between the abdomen at the level of the natural indentation of the waist to the same level on the back is measured with a tape passing through the crotch to the right of the genitalia. The tape is held vertically both in front and in back. The subject stands erect looking straight ahead.
- 252 - Crotch Length (Umbilicus) - The surface distance from omphalion to the waist level on the right side of the subject's back measured through the crotch and over the middle of the buttock.
- 253 - Crotch Length (Posterior Natural) - The surface distance from the crotch at the inner thigh landmark to the back of the waist at the posterior natural-indentation landmark is measured with a tape. The tape passes between the buttocks to the back of the waist. The subject stands with the left foot on a platform so that the knee is flexed.
- 254 - Crotch Length (Posterior Omphalion) - The surface distance from the crotch at the inner thigh landmark to the back of the waist at the level of the center of the navel (omphalion) is measured with a tape. The tape passes between the buttocks to the back of the waist. The subject stands with the left foot on a platform so that the knee is flexed

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- 265 - Dactylion Height - The height of the tip of the middle finger measured with the arm, hand, and finger extended downward.
- 269 - Deltoid Arc - The surface distance from acromion to the point, just below the deltoid, where the muscle disappears from view.

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- 277 - Ear Breadth - The maximum breadth of the right ear perpendicular to its long axis is measured with a sliding caliper.

- 280** - Ear Length - The length of the right ear from its highest to lowest points on a line parallel to the long axis of the ear is measured with a sliding caliper.
- 282** - Ear Length - Above Tragon - The distance from the right tragon landmark to the top of the right ear on a line parallel to the long axis of the ear is measured with a sliding caliper.
- 285** - Ear Protrusion - The horizontal distance between the mastoid process (the bony area behind the bottom of the ear) and the outside edge of the right ear at its most lateral point is measured using a sliding caliper with its slide reversed.
- 286** - Ear-to-Ear Breadth - The horizontal distance between the most lateral extensions of the ears.
- 293** - Elbow Breadth (bone) - The distance between the medial and lateral epicondyles of the humerus measured with the flesh compressed.
- 297** - Elbow Breadth (bone - left) - Previous measurement repeated on opposite arm.
- 301** - Elbow Circ-Fully Bent - The distance around the maximum prominence of the olecranon and the inside face of the elbow measured with the elbow fully flexed and the fingers touching the shoulder.
- 303** - Elbow Circumference (extended) - The circumference of the right elbow in a plane perpendicular to the long axis of the arm is measured with a tape passing around the elbow at the level of the olecranon-center landmark. The subject stands with the arm straight and slightly away from the side.
- 305** - Elbow Circumference (flexed) - The circumference of the elbow measured over its tip and through its crotch with the arm bent 90°, the upper arm horizontal, and the fist clenched.
- 307** - Elbow-Grip Length - The distance from the tip of the bent elbow to the center of the clenched fist.
- 309** - Elbow Height - The height of the radiale.
- 312** - Elbow-Rest Height - The vertical distance between a sitting surface the olecranon landmark on the bottom of the flexed right elbow is measured with an anthropometer. The subject sits erect looking straight ahead. The shoulders and upper arms are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other.
- 318** - Elbow-Elbow Breadth - The distance across the lateral surfaces of the elbows measured with the elbows flexed and resting lightly against the body.
- 321** - Elbow Functional Reach - The subject stands erect with his or her back against a wall. The left upper arm is held horizontal and parallel to the floor with the olecranon process in light contact with the wall. The hand is positioned such that the thumb is held parallel to the forearm and the fore-finger is held in opposition to the thumb. The distance between the tips of these two fingers and the wall is recorded.
- 324** - Elbow-Wrist Length - The distance from the tip of the elbow to the tip of the styloid process of the radius.
- 325** - Elbow Span - The subject stands erect with his or her back against a wall. The arms are stretched horizontally and the forearms are held in 90° of flexion parallel with the end wall and floor. The distance between the right and left olecranon is recorded.
- 326** - External-Canthus (to Occiput) - The distance from the back of the head to the outer corner of the right eye.

- 327 - External-Canthus (to Vertex) - The vertical distance from the outer corner of the eye (external canthus) to the level of the top of the head.
- 328 - External Canthus (to Wall) - The horizontal distance from the outer corner of the eye (external canthus) to the coronal plane tangent to the back of the head
- 329 - Eye Height-Standing - The height of the inner corner of the eye.
- 330 - Eye Height (sitting) - The vertical distance between a sitting surface and the ectocanthus landmark on the outer corner of the right eye.

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- 340 - Fibula Height - The height of the superior tip of the fibula.
- 344 - Finger III Diameter - The diameter in the middle finger as determined by the smallest hole in which the finger can be inserted.
- 348 - First Phalanx III Length - With the subject's right hand held in a fist, measure the length of the first segment of the middle finger across the surfaces of the third metacarpal and the second phalanx.
- 352 - Fist Circumference - The circumference of the clenched fist (the thumb lying across the end of the fist) measured with the tape passing over the thumb and the knuckles.
- 356 - Foot breadth - The maximum breadth of the right foot is measured on a footbox scale. The subject stands with each foot in a footbox and the weight distributed equally on both feet.
- 358 - Foot Circumference (Ball of Foot) - The circumference of the foot at the first and fifth metatarsophalangeal landmarks on the ball of the right foot is measured with a tape. The subject stands with the feet about 10 cm apart and the weight distributed equally on both feet.
- 362 - Foot Length - The length of the foot measured parallel to its long axis.
- 370 - Forearm Circumference (Extended) - The maximum circumference of the lower arm.
- 371 - Forearm Circumference (Flexed) - The subject stands with the upper arm extended forward horizontally, the elbow flexed 90°, and the fist tightly clenched and held facing the head. The circumference of the flexed right forearm is measured with a tape passing across the crease at the juncture between the upper arm and the forearm. The measurement is made in a plane perpendicular to the long axis of the forearm.
- 375 - Forearm-Hand Length - The subject stands erect with the upper arms hanging at the sides and the right elbow flexed 90°. The hand is held out straight with the palm facing inward. The horizontal distance between the back of the tip of the right elbow to the tip of the right middle finger is measured with a beam caliper.
- 378 - Forearm-Forearm Breadth - The maximum horizontal distance across the upper body between the out sides of the forearms is measured with a beam caliper. The subject sits erect looking straight ahead. The shoulders and upper arms are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other.
- 386 - Functional Leg Length - Sitting erect on a chair, the subject extends his or her right leg forward with the knee straightened. The distance from the heel of the foot to the posterior waist landmark is measured along the long axis of the leg.

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- 391 - Glabella to Occiput - The distance from the most anterior point of the forehead between the brow ridges to the back of the head.
- 393 - Glabella to Top of Head (Vertex) - The distance from the most anterior point of the forehead between the brow ridges to the level of the top of the head.
- 394 - Glabella to Wall - The distance from the most anterior point of the forehead between the brow ridges to wall.
- 395 - Gluteal Arc - The surface distance over the buttock from the gluteal furrow to waist level.
- 398 - Gluteal-Furrow Height - The vertical distance between a standing surface and the lowest point of the gluteal furrow(s) under the right buttock is measured with an anthropometer. The subject stands erect with the heels together and the weight distributed equally on both feet.
- 402 - Grip Diameter (Inside) - Subject holds a cone around the largest circumference that can be grasped with the thumb and middle finger just touching. Record the diameter of the cone corresponding to this maximum circumference.
- 404 - Grip Diameter (Outside) - Subject holds a cone at the largest circumference that can be grasped with the thumb and middle finger just touching. With a sliding caliper, measure from the joint of the first and second phalanges of the thumb to the knuckle of the middle finger.
- 405 - Grip-Reach Overhead - The height of a pointer held horizontal in the subject's fist when the arm is maximally extended upward.
- 407 - Grip Strength - Strength as measured on a Smeadley dynamometer.

**-H-**

- 411 - Hand Breadth at Metacarpale - The breadth of the right hand between the landmarks at metacarpale II and metacarpale V is measured with a sliding caliper. The subject places the palm on a table, the fingers together and the thumb abducted. The middle finger is parallel to the long axis of the forearm.
- 413 - Hand Breadth at Thumb - The breadth of the hand as measured across the distance of the metacarpal bones.
- 416 - Hand Circumference at Metacarpale - The hand circumference of the right hand is measured with a tape passing over the landmarks at metacarpale II and metacarpale V. The subject places the palm on a table, the fingers together, and the thumb abducted. The middle finger is parallel to the long axis of the forearm.
- 417 - Hand Circumference over Thumb - The circumference of the hand measured in a plane at right angle to the long axis of the hand, with the tape passing over the proximal joint of the thumb.
- 420 - Hand Length - The length of the right hand between the stylium landmark on the wrist and the tip of the middle finger is measured with a Poech sliding caliper. The subject places the palm on a table with the fingers together, and the thumb abducted. The middle finger is parallel to the long axis of the forearm.
- 424 - Hand Skinfold - The thickness of a skinfold picked up at the middle of the back of the right hand and following the long axis of the hand.
- 425 - Hand Thickness at Metacarpale III - The thickness of the metacarpal-phalangeal joint of the middle finger.

- 427 - Head Breadth - The maximum horizontal breadth of the head above the attachment of the ears is measured with a spreading caliper.
- 430 - Head Circumference - The maximum circumference of the head above the attachment of the ears is measured with a tape passing just above the ridges of the eyebrows and around the back of the head.
- 433 - Head Diagonal (Inion to Pronasale) - The transverse distance from the tip of the nose to the inion.
- 435 - Head Diagonal (Maximum from Menton) - The maximum transverse distance from the chin (jaw closed) and the vertex (top of head).
- 436 - Head Diagonal (Maximum from Nuchale) - The maximum transverse distance from the lowest point palpable at the base of the skull to the tip of the nose.
- 437 - Head Diagonal (Maximum from Menton to Occiput) - The maximum transverse distance from the tip of the chin to the back of the head.
- 441 - Head Length - The distance from the glabella landmark between the browridges to the posterior point on the back of the head. Measured with a spreading caliper.
- 445 - Heel Ankle Circumference - The diagonal circumference of the foot measured with the tape passing under the tip of the heel and over the instep at the foot-leg junction..
- 450 - Heel Breadth - The maximum horizontal distance between the medial and lateral points on the inside and outside of the right heel, at or posterior to the lateral malleolus landmark, is measured with a Holtain caliper.
- 457 - Hip Breadth - The horizontal distance between the lateral buttock landmarks on the sides of the hips is measured with a beam caliper. The subject stands erect with the heels together and the weight distributed equally on both feet.
- 459 - Hip Breadth (Sitting) - The distance between the lateral points of the hips or thighs (whichever are broader) is measured with a beam caliper. The subject sits erect with the feet and knees together.
- 465 - Hip Circumference at Trochanterion - The circumference of the torso measured at the level of the trochanterions.
- 466 - Hip Circumference (7 below waist) - The circumference of the lower torso measured at a level 7" below waist level.
- 468 - Hip Circumference (9 below waist) - The circumference of the lower torso measured at a level 9" below waist level.

-I-

- 489 - Iliocristale Height - The subject stands erect. The vertical distance between a standing surface and the iliocristale landmark on the top of the right side of the pelvis is measured with an anthropometer.
- 490 - Iliospinale Height - Subject stands erect. The vertical distance from the floor to the left iliospinale is recorded.
- 493 - Instep Circumference - The circumference of the foot in a plane perpendicular to the long axis of the foot at the level of the metatarsal cuneiform joint.

- 496 - Instep Length (Ball of Foot) - The distance, measured parallel to the long axis of the foot, from the level of the heel to the point of maximum medial protuberance of the foot.
- 500 - Interocular Distance - The distance between the inner corners of the eyes.
- 503 - Interpupillary Distance - The distance between the two pupils is measured with a pupilometer.
- 506 - Interscye Distance - Subject stands erect looking straight ahead. The distance across the back between the right and left posterior axillary fold landmarks. Measured with a tape. Tape is held on the skin surface except where the tape spans the hollow of the back. Shoulders and upper extremities are relaxed.
- 507 - Interscye Distance - Maximum - The tape distance across the back between the scye points measured with the subject sitting erect with his arms extended forward and horizontal.
- 508 - Interscye Distance - Mid - Subject stands erect looking straight ahead. The distance across the back between the right and left midscye landmarks is measure with a tape. The tape is held on the skin surface except where it spans the hollow of the back. Shoulders and upper extremities are relaxed.
- 510 - Interscye - Front - The surface distance across the front of the torso between points midway between the anterior edges of the armpit and the acromiale points.

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- 511 - Juxtanipple Skinfold - The thickness of a skinfold picked up just superior to the nipple and parallel to the lateral margin of the pectoral muscle.

**-K-**

- 512 - Knee Breadth (Bone) - Subject stands erect. The transverse distance between the lateral and medial femoral epicondyles of the right leg is measured with a sliding caliper.
- 513 - Knee Breadth (Bone - left) - Subject stands erect. The transverse distance between the lateral and medial femoral epicondyles of the left leg is measured with a sliding caliper.
- 515 - Knee Circumference - The horizontal circumference of the right knee at the level of the midpatella landmark at the center of the knee. Measured with a tape. Subject stands erect with the feet about 10 cm apart with weight distributed equally on both feet.
- 516 - Knee Circumference - Fully Bent - The circumference around the maximum knee prominence and through the crease behind the knee, measured with the subject in a squatting position with the knee fully flexed.
- 517 - Knee Circumference - Sitting - The maximum circumference of the right knee as measured with a tape passing over the popliteal area brought up at 45° over the knee.
- 528 - Knee Height - Flexed, supine - The height of the highest point on the knee when the subject lies supine, knees raised so that the angle between the upper and lower legs approximates 60 degrees and the toes are touching a wall.
- 529 - Knee Height - Sitting - The vertical distance between a footrest surface and the suprapatella landmark at the top of the right knee. Measured with an anthropometer. Subject sits with the thighs parallel, knees flexed to 90° and the feet in line with the thighs.
- 536 - Knee to Knee Breadth - The maximum horizontal distance across the lateral surfaces of the knees measured with the knees gently touching.

**538** - Kneeling Height - The subject kneels with his or her knees and feet together with fists clenched and on the floor in front of his or her knees. The arms are vertically positioned and the head is in line with the long axis of the body. The vertical distance from the floor to the highest point on the head is recorded.

**540** - Kneeling Leg Length - The subject kneels with the knees and feet together with fists clenched and on the floor in front of his or her knees. The distance from the most rearward point on the foot to the most forward point on the head is recorded.

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**542** - Lateral Femoral Epicondyle Height - The vertical distance between a standing surface and the lateral femoral epicondyle landmark on the outside of the right knee is measured with an anthropometer. Subject stands erect with the heels together and the weight distributed equally on both feet.

**543** - Lateral Malleolus Height - The vertical distance between a standing surface and the lateral malleolus landmark on the outside of the right ankle. Measured with a modified sliding caliper. Subject stands erect with the heels together and the weight distributed equally on both feet.

**547** - Lip Length - The distance between the corners of the mouth is measured while the facial muscles are relaxed.

**549** - Lip Length - Smiling - The distance between the corners of the mouth is measured while the subject smiles broadly.

**552** - Lip Protrusion to Occiput - The distance from the most anterior point of the lips to the wall (or back of head).

**553** - Lip Protrusion to Wall - The horizontal distance from the most anterior point of the lips to the coronal plane tangent to the back of the head.

**555** - Lip to Lip Length - The distance, in the midsagittal plane, from the lower margin of the lower lip to the upper margin of the upper lip.

**-M-**

**569** - Max Frontal Breadth - Forehead breadth as measured between the maximum bulges of the brow ridges at about the ends of the eyebrow.

**572** - Max Reach From Wall - The distance from the wall to the tip of the middle finger measured with the subject's back and left shoulder pressed against the wall, the right shoulder thrust as far forward possible and the arm and hand extended horizontally.

**576** - Medial Calf Skinfold - The thickness of a skinfold on the medial surface of the calf at the level of the maximum circumference picked parallel to the long axis of the lower leg. Measured with the knee flexed about 90°.

**579** - Medial Malleolus Height - The height of the most medially projected point of the medial ankle bone.

**583** - Menton-Crinion Length - The distance from the bottom surface of the chin to the midpoint of the hairline. Not measured on bald and balding.

**585** - Menton Projection - The Distance from the most forward point of the chin to the juncture of the neck and the bottom of the jaw.

- 586** - Menton-Nasal Root Depression (Sellion) - The distance between the menton landmark at the bottom of the chin and the sellion landmark at the deepest point of the nasal root depression. Measured with a sliding caliper. The teeth are lightly occluded.
- 588** - Menton to Occiput - The distance from the tip of the chin to the back of the head.
- 592** - Menton to Subnasale Length - The distance from the lower edge of the tip of the chin to the base of the nasal septum.
- 595** - Menton to Top of Head (Vertex) - The distance from the lower edge of the tip of the chin to the level of the top of the head.
- 596** - Menton to Wall - The distance from the tip of the chin to the wall.
- 601** - Metacarpale Height - The height of the knuckle where the middle finger joins the palm.
- 605** - Midaxillary Line at Umbilicus Level Skinfold - The thickness of a skinfold picked up at xiphoid level in the midaxillary line.
- 612** - Midshoulder Height (Sitting) - The vertical distance between a sitting surface and the midshoulder landmark at the top of the right shoulder is measured with an anthropometer. Subject sits erect looking straight ahead with the shoulders and upper arms relaxed. The forearms and hands are extended forward horizontally with the palms facing each other.
- 615** - Mid-Thigh Circumference - Subject stands erect. Measure is taken horizontally midway between the crotch and knees. Left side only.
- 616** - Minimum Frontal Arc - The minimum distance across the temporal crest between their points of maximum indentation.
- 618** - Minimum Frontal Breadth - The breadth of the forehead across the lateral bony ends of the brow ridges.
- N-
- 625** - Nasal Root Breadth - The breadth of the nasal root.
- 629** - Nasal Root Height - The height of the deepest point in the nasal root depression.
- 631** - Nasal Root Depression to Occiput - The distance from the deepest point in the nasal root depression to the wall (or back of head)
- 633** - Nasal Root Depression to Vertex - The distance from the deepest point in the nasal root depression (sellion) to the level of the top of the head.
- 634** - Nasal Root Depression to Wall - The horizontal distance from the nasal root depression to the coronal plane tangent to the back of the head.
- 636** - Neck Circumference (Base) - The circumference of the base of the neck is measured by a tape passing over the drawn lateral and anterior neck landmarks. The subject stands erect with the head in the Frankfort plane. Shoulders and upper extremities are relaxed.
- 637** - Neck Circumference (Below Larynx) - The maximum circumference of the neck at a point just below the bulge of the thyroid cartilage (Adam's apple). Measured with a tape.

- 639** - Neck Circumference (Over Larynx) - The circumference of the neck at the level of the infrathyroid landmark (Adam's apple). Measured with a tape.
- 641** - Neck Height (Lateral) - The vertical distance between a standing surface and the trapezius landmark on the right side of the neck. Measured with an anthropometer. Subject stands erect with the head in the Frankfort plane. Shoulders and upper extremities are relaxed.
- 644** - Neck Length (Anterior) - The surface distance from suprasternale to the junction, in the midsagittal plane, of the jaw and neck.
- 647** - Neck Length (Posterior - Nuchale) - The surface distance from the nuchale (the lowest palpable point of the surface distance along the spine from cervicale to the occiput) to the cervicale.
- 648** - Neck - Bustpoint (Thelion) Length - The distance between the trapezius landmark at the right side of the neck and the right bustpoint landmark on women or the right nipple (thelion) on men. Measured with a tape. Subject stands erect looking straight ahead. Shoulders and upper extremities are relaxed.
- 649** - Nose Length - The distance from the nasal root depression (sellion) to the bottom of the nose.
- 651** - Nose breadth - Maximum breadth of the nose
- 652** - Nose Protrusion - The maximum anterior protrusion of the nose.

**-O-**

- 653** - Overhead Reach - The vertical distance between a standing surface and the tip of the right middle finger when the arm is extended overhead. Subject stands facing a wall-mounted scale with both arms extended overhead parallel to each other. The toes are 20 cm from the wall and the feet are about 10 cm apart. The palms of the hands rest on the wall.
- 654** - Overhead Reach - Sitting - The height of the tip of the middle finger above the sitting surface measured with the subject sitting erect, right side against a wall, left hand in lap, and the right arm and hand extended upward with the palm against the wall.
- 655** - Overhead Reach - Forward - Subject stands with heels 23 centimeters apart and toes 15 centimeters from the wall. Arms are extended overhead, fists touching and against the wall, with the first phalanges horizontal. Mark the highest point on the first phalanges on the wall and record the height of the mark.
- 656** - Overhead Reach - Extended - The vertical distance between a standing surface and the tip of the right middle finger when the arm is extended overhead as high as possible. The subject stands on his/her toes facing a wall-mounted scale with both arms parallel and extended overhead as high as possible. The toes are 20 cm from the wall and the feet are about 10 cm apart. Palms of the hands rest on the wall.

**-P-**

- 657** - Palm Length - The distance from the base of the hand to the furrow where the middle finger folds upon the palm.
- 663** - Patella Bottom Height - The height of the bottom edge of the kneecap.
- 666** - Patella Top Height - The height of the top edge of the kneecap
- 670** - Penale Height - The height of the upper edge of the junction of the penis with the abdomen.

- 674 - Philtrum Length - The distance from the edge of the upper membranous lip to the base of the nasal septum.
- 678 - Popliteal Height - Sitting - The vertical distance from a footrest surface to the back of the right knee. Measured with an anthropometer. The subject sits with the thighs parallel, the feet in line with the thighs, and the knees flexed 90°.
- 690 - Pronasale to Occiput - The distance from the tip of the nose to the back of the head.
- 692 - Pronasale to Vertex (Top of Head) - The distance from the tip of the nose to the level of the top of the head.
- 694 - Pronasale to Wall - The distance from the tip of the nose to the wall.

**-R-**

- 698 - Radiale-Stylian Length - The distance between the radiale landmark on the right elbow and the stylian landmark on the right wrist. Measured with a beam caliper held parallel to the long axis of the forearm. Subject stands with the arms relaxed at the sides. The hand and fingers are held straight in line with the long axis of the forearm.

**-S-**

- 705 - Sagittal-Arc (Nuchale) - The distance over the top of the head from the glabella (between the brow ridges) to nuchale at the base of the skull.
- 732 - Scye Circumference over Acromion - The vertical circumference of the right upper arm (scye). Measured with a tape passing through the armpit and over the acromion landmark on the tip of the shoulder. The subject stands erect looking straight ahead. The shoulders and upper extremities are relaxed with the palms facing the thighs.
- 737 - Scye depth - The surface distance along the spine between the cervicale landmark on the base of the back of the neck and the scye-level-at-midspine landmark is measured with a tape. The subject stands erect with the head in the Frankfort Plane. The shoulders and upper extremities are relaxed.
- 743 - Shoulder Breadth - Bowed - The maximum breadth of the shoulders measured as the subject stands, feet 12 inches apart, the palms of the hands on the kneecaps, and the head as close to the Frankfort Plane as possible.
- 745 - Shoulder Breadth - Reaching Overhead - Subject stands with heels 23 centimeters apart and toes 15 centimeters from the Wall. Arms are extended overhead, fists together and against the wall with the first phalanges horizontal. Measure the maximum horizontal distance across the arms or shoulders, whichever is widest.
- 747 - Shoulder Circumference - The horizontal circumference of the shoulders at the level of the maximum protrusion of the right deltoid muscle is measured with a tape. Subject stands erect looking straight ahead. Shoulders and upper extremities are relaxed with the palms facing the thighs.
- 751 - Shoulder-Elbow Length - The distance between the acromion landmark on the tip of the right shoulder and the olecranon landmark on the bottom of the right elbow. Measured with a beam caliper parallel to the long axis of the upper arm. Subject stands with the right upper arm hanging at the side and the elbow flexed 90°. The hand is straight and the palm faces inward.

- 754** - Shoulder Length - The surface distance between the trapezius landmark at the base of the side of the neck and the acromion landmark on the tip of the right shoulder. Measured with a tape. The subject stands looking straight ahead. The shoulders and upper extremities are relaxed.
- 758** - Sitting Height - The vertical distance between a sitting surface and the tip of the head. Measured with an anthropometer. The subject sits erect with the head in the Frankfort plane. The shoulders and upper arms are relaxed and the forearms and hands are extended forward horizontally with the palms facing each other. The thighs are parallel and the knees are flexed **90°** with the feet in line with the thighs.
- 760** - Sitting Height - Relaxed - The vertical distance from the sitting surface to the top of the head is measured with the subject sitting relaxed.
- 764** - Sleeve-Inseam Length - The distance from the anterior edge of the armpit to the base of the thumb.
- 797** - Sleeve - Outseam Length - The straight line distance between the acromion landmark on the tip of the right shoulder and the stylium landmark on the right wrist. Measured with a tape. Subject stands erect with both arms straight at the side and the palms facing forward.
- 799** - Span - The distance between the tips of the right and left middle fingers when the subject's arms are maximally extended laterally.
- 801** - Sphyrion Height - The height of sphyrion.
- 802** - Spine to Elbow Length (SL) - The horizontal surface distance between the midspine landmark and the olecranon-center landmark on the tip of the raised elbow is measured with a tape. The subject holds his/her arms up in a horizontal position parallel to the standing surface and joins them by bringing the fists together at the metacarpophalangeal and proximal interphalangeal knuckles. The forearms and fists are in a straight line.
- 803** - Spine to Scye Length (SL) - The horizontal surface distance between the midspine landmark and the right posterior-diagonal-scyelandmark at the back of the raised right arm near the armpit is measured with a tape. The subject holds his/her arms up in a horizontal position parallel to the standing surface and joins them by bringing the fists together at the metacarpophalangeal and proximal interphalangeal knuckles. The forearms and fists are in a straight line.
- 804** - Spine to Wrist Length (SL) - The horizontal surface distance from the midspine landmark, across the olecranon-center landmark at the tip of the raised right elbow, to the dorsal wrist landmark is measured with a tape. The subject holds his/her arms up in a horizontal position parallel to the standing surface and joins them by bringing the fists together at the metacarpophalangeal and proximal interphalangeal knuckles. The forearms and fists are in a straight line.
- 805** - Stature - The vertical distance from a standing surface to the top of the head. Measured with an anthropometer. The subject stands erect with the head in the Frankfort plane. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.
- 806** - Stature (Clothed) - The distance from the floor to the top of the head measured with the subject wearing normal indoor apparel.
- 807** - Stature (Maximum) - The height of the top of the head measured when the subject has, after taking a deep breath, maximally extended himself vertically while keeping his feet flat on the floor.
- 808** - Stature (Reported) - The height as given by the subject immediately prior to being measured.

- 814** - Stomion-to-Occiput - The distance from the point of contact of the lips in the midsagittal plane to the back of the head.
- 815** - Stomion to Top of Head (Vertex) - The distance from the point of contact of the lips in the midsagittal plane to the level of the top of the head.
- 816** - Stomion to Wall - The horizontal distance from the wall to the stomion (the point of contact of the lips in the midsagittal plane).
- 821** - Strap Length - The surface distance from the right bustpoint landmark on women or the right nipple is measured with a tape passing over the left and right lateral neck landmarks. The subject stands erect with the head in the Frankfort plane. The shoulders and upper extremities are relaxed.
- 825** - Subnasale to Nasal Root Depression (Sellion) - The distance from the base of the nasal septum to the plane of the top of the head.
- 829** - Subnasale to Occiput - The distance from the base of the nasal septum to the back of the head
- 830** - Subnasale to Top of Head (Vertex) - The distance from the base of the nasal septum to the plane of the top of the head.
- 831** - Subnasale to Wall - The distance from the base of the nasal septum to the wall.
- 833** - Subscapular Skinfold - The thickness of a skinfold picked up just below the inferior angle of the right scapula and parallel to the tension lines of the skin.
- 834** - Subscapular Skinfold II - The previous measurement repeated on the opposite side.
- 837** - Substernale Height - The height of the midpoint of the lower edge of the breast bone.
- 841** - Suprasternale Height - The vertical distance between a standing surface and the suprasternale landmark on the notch at the top of the breastbone is measured with an anthropometer. Subject stands erect looking straight ahead. The shoulders and upper extremities are relaxed.
- 844** - Suprailiac Skinfold - The thickness of a skinfold picked up in the midaxillary line at the level of the crest of the ilium.
- 845** - Suprailiac Skinfold II - The previous measurement repeated on the opposite side.
- 848** - Suprapatella Skinfold - The thickness of a skinfold picked up on the lower thigh above the patella.

-T-

- 850** - Tenth Rib Height - The vertical distance between a standing surface and the tenth rib landmark at the bottom of the right side of the rib cage is measured with an anthropometer. The subject stands erect looking straight ahead. The shoulders and upper extremities are relaxed.
- 851** - Thigh Circumference (Distal) - The circumference of the right thigh just above the knee.
- 852** - Thigh Circumference (Proximal) - The circumference of the right thigh at its juncture with the buttock. Measured with a tape. The measurement is made perpendicular to the long axis of the thigh. The subject stands erect with the weight distributed equally on both feet. The legs are spread apart just enough so that the thighs do not touch.

- 853** - Thigh Circumference (Proximal - Sitting) - The circumference of the thigh as measured as high in the crotch as possible. The measurement is made in a plane perpendicular to the long axis of the upper leg.
- 856** - Thigh Clearance - The vertical distance between a sitting surface and the highest point on the top of the right thigh. Measured with an anthropometer. The subject sits with the thighs parallel, knees flexed 90° and the feet in line with the thighs.
- 859** - Thigh-Thigh Breadth (Sitting) - The maximum breadth across the thighs.
- 862** - Thumb Breadth - The maximum breadth of the right thumb perpendicular to its long axis is measured with a Holtain caliper. The thumb is held straight and held away from the hand at about a 45° angle.
- 863** - Thumb-Crotch Length - The distance from the skinfold at the base of the thumb to the notch between the 1st and 2nd fingers, measured with calipers held parallel to the main axis of the hand.
- 867** - Thumb-Tip Reach - The horizontal distance from a back wall to the tip of the right thumb. Measured on a wall scale. Subject stands erect in a corner looking straight ahead with the feet together and the heels 20 cm from the back wall. The buttocks and shoulders are against the wall. The right arm and hand, palm down, are stretched forward horizontally along a scale on the side wall. The thumb continues the horizontal line of the arm and the index finger curves around to touch the pad at the end of the thumb. The subject's right shoulder is held against the rear wall.
- 868** - Thumb-Tip Reach (Sitting) - Subject is seated in an erect position with his or her back against a wall. The arm is extended parallel to the floor with the thumb parallel to the arm and the forefinger in opposition. The distance between the arm and the tip of the thumb and forefinger is recorded.
- 869** - Thumb-Tip Reach (Extended) - The distance from the wall to the tip of the right thumb measured with the left shoulder extended as far as possible, the arm held horizontal and the tip of the index finger touching the pad of the thumb.
- 873** - Tibiale Height - The height of the proximal medial margin of the tibia.
- 877** - Tragion Height. - The height of the tragion (cartilage flap on the ear).
- 880** - Tragion to Occiput - The distance from the tragion to the back of the head.
- 882** - Tragion to Top of Head (Vertex) - The distance from the tragion to the level of the top of the head.
- 884** - Tragion to Wall - The distance from the tragion to the wall.
- 888** - Triceps Skinfold - The thickness of a skinfold on the back of the arm halfway between acromion and the tip of the elbow, picked up parallel to the long axis of the upper arm.
- 890** - Triceps Skinfold II - The previous measurement repeated on the opposite arm.
- 894** - Trochanterion Height - The vertical distance between a standing surface and the trochanterion landmark on the upper side of the right thigh. Measured with an anthropometer. The subject stands erect looking straight ahead. The heels are together with the weight distributed equally on both feet.
- 896** - Trunk Depth - The depth of the chest below the bust or the abdomen, whichever is larger.
- 898** - Trunk Height - The height of the suprasternale above the sitting surface.

**914** - Vertical Trunk Circumference-Midbuttock (ASCC) - The vertical circumference of the torso is measured with a tape passing between the buttocks, to the right of the genitalia, over the right bustpoint landmark on women or the nipple (thelion) on men, and across the midshoulder landmark. The subject stands erect looking straight ahead with the right arm hanging relaxed at the side. The measurement is taken at the midpoint of quiet respiration.

**916** - Vertical Trunk Circumference (USA) - The vertical circumference of the torso is measured with a tape passing over the maximum protrusion of the right buttock, to the right of the genitalia, over the right bustpoint landmark on women or the nipple (thelion) on men, and across the midshoulder landmark. The subject stands erect looking straight ahead with the right arm hanging relaxed at the side. The measurement is taken at the maximum point of quiet respiration.

**917** - Vertical Trunk Circumference (sitting) - The previous measurement repeated with the subject sitting

-W-

**919** - Waist Back Length (Natural) - The surface distance between the cervicale landmark on the back of the neck and the posterior-waist (natural indentation) landmark. Measured with a tape. The subject stands erect with the head in the Frankfort plane. The shoulders and upper extremities are relaxed.

**921** - Waist Back Length (Omphalion) - The surface distance between the cervicale landmark at the back of the neck and the posterior-waist (omphalion) landmark at the level of the navel. Measured with a tape. The subject stands erect with the head in the Frankfort plane. The shoulders and upper extremities are relaxed.

**924** - Waist Breadth (Natural) - Breadth of the waist at the level of the natural indentation of the waist.

**928** - Waist Breadth (Omphalion) - The horizontal breadth of the waist at the level of the omphalion. Measured with a beam caliper. The subject stands erect looking straight ahead.

**931** - Waist Circumference (Natural) - The horizontal circumference of the waist at the level of its natural indentation. measured with a tape passing over right and left waist (natural indentation) landmarks. The subject stands erect looking straight ahead.

**932** - Waist Circumference (Omphalion) - The horizontal circumference of the waist at the level of the center of the navel (omphalion). Measured with a tape. The subject stands erect looking straight ahead. The heels are together with the weight distributed equally on both feet.

**935** - Waist Circumference (Omphalion-sitting) - The previous measure repeated with the subject sitting.

**939** - Waist Depth (Natural) - The depth of the waist at the level of the natural indentation.

**943** - Waist Depth (Omphalion) - The horizontal distance between the front and back of the waist at the level of the center of the navel (omphalion). Measured with a beam caliper. The subject stands erect looking straight ahead. The heels are together with the weight distributed equally on both feet.

**945** - Waist Front Length (Natural) - The surface distance between the anterior-neck landmark and the anterior-waist (natural indentation) landmark. Measured with a tape. The subject stands erect with the head in a Frankfort plane. The measurement is made at the maximum point of quiet respiration.

**946** - Waist Front Length (Omphalion) - The surface distance between the anterior-neck landmark and the center of the navel (omphalion). Measured with a tape. The subject stands erect with the head in the Frankfort plane.

- 947 - Waist Hip Length - The surface distance between the right waist (omphalion) landmark and the right lateral-buttock point landmark on the side of the hip. Measured with a tape. The subject stands erect looking straight ahead.
- 949 - Waist Height (Natural) - The vertical distance between a standing surface and the landmark at the natural indentation of the right waist. Measured with an anthropometer. The subject stands erect looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed.
- 950 - Waist Height (Omphalion) - The vertical distance between a standing surface and the center of the navel (omphalion). Measured with an anthropometer. The subject stands erect looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed.
- 951 - Waist Height (Natural - Sitting) - The vertical distance from a sitting surface to the landmark at the natural indentation of the right waist. Measured with an anthropometer. The subject sits erect looking straight ahead. The knees are flexed 90°.
- 952 - Waist Height Sitting (Umbilicus) - The vertical distance from a sitting surface to the center of the navel (omphalion). Measured with an anthropometer. The subject sits erect looking straight ahead. The knees are flexed 90°.
- 954 - Waist Natural to Waist - Umbilicus - The surface distance between the right waist (natural indentation) and the right waist (omphalion). Measured with a tape. Subject stands erect looking straight ahead. The heels are together with the weight distributed equally on both feet.
- 957 - Weight - The weight of the subject taken to the nearest tenth of a kilogram. Subject stands on the platform of a scale.
- 958 - Weight (Clothed) - The weight of the subject wearing normal indoor apparel.
- 960 - Weight (Reported) - Weight as reported by the subject immediately prior to being measured.
- 964 - Wrist Breadth (Bone) - The distance between the radial and ulnar styloid prominence of the wrist measured with the flesh compressed.
- 967 - Wrist Circumference (Minimum) - The measurement taken as the minimum circumference between the styloid processes of the radius and the ulna and the carpals. Left side only.
- 970 - Wrist Circumference (Stylian) - The circumference of the wrist perpendicular to the long axis of the forearm. Measured with a tape passing over the stylian landmark on the wrist. The subject extends the right arm forward with the palm up.
- 973 - Wrist Height - The vertical distance between a standing surface and the stylian landmark on the right wrist. Measured with an anthropometer. Subject stands erect looking straight ahead. Shoulders are relaxed and the arms are extended downwards with the elbow, wrist, and fingers held rigidly straight. The arms lightly touch the sides.
- 974 - Wrist Height (Sitting) - The vertical distance between the floor and the stylian landmark on the right wrist of a seated subject. Measured with an anthropometer. Subject sits erect looking straight ahead. The shoulders are relaxed and the arms are extended downwards with the elbow, wrist, and fingers held rigidly straight. The arms lightly touch the sides.
- 976 - Wrist to Center of Grip Length - The horizontal distance between the stylian landmark on the right wrist and the center of a dowel (1 1/4" diameter) gripped in the right hand. Measured with a Poech caliper. The subject sits grasping a dowel in the right hand. The base of the dowel is flush with the

bottom of the fist. The subject puts the bottom of the fist on a flat surface in such a way that the base of the dowel rests on the surface. The fist is in line with the long axis of the forearm.

- 977** - Wrist to Index Finger Length - The distance between the stylium landmark on the right wrist and the tip of the right index finger. Measured with a Poech caliper. The subject places the palm on a table, the fingers together, and the thumb abducted. The middle finger is parallel to the long axis of the forearm.
- 978** - Wrist to Thumbtip Length - The horizontal distance between the stylium landmark on the right wrist and the tip of the right thumb is measured with a Poech caliper. The subject rests the little finger side of the hand on a flat surface. The thumb is held straight and in line with the long axis of the forearm. The thumb rests on the first knuckle of the curved index finger.
- 979** - Wrist to Wall Length - The horizontal distance between a back wall and the stylium landmark on the right wrist of the outstretched arm. Measured on a wall scale. Subject stands erect in a corner looking straight ahead with the feet together and the heels 20 cm from the back wall. The buttocks and shoulders are against the wall. The right arm and hand with the palm down are stretched forward horizontally against a scale on the side wall. The thumb continues the horizontal line of the arm and the index finger curves around to touch the pad at the end of the thumb. The subject's right shoulder is held against the rear wall.
- 980** - Wrist to Wall Length (Extended) - The horizontal distance between a back wall and the stylium landmark on the right wrist of the maximally outstretched arm. Measured on a wall scale. Subject stands erect in a corner looking straight ahead with the feet together and the heels 20 cm from the back wall. The buttocks and shoulders are against the wall. The right arm and hand with the palm down are stretched forward horizontally as far as possible against the side wall. The thumb continues the horizontal line of the arm and the index finger curves around to touch the pad at the end of the thumb. The subject's left shoulder is held against the rear wall.

## **STRENGTH MEASUREMENTS**

Nine sets of static strength measurements were made. Three types of handles were used for these measures: a long handle, a short handle, and a D-ring. The grips of both handles and the D-ring were metal cylinders approximately 2.5 centimeters in diameter around which several layers of tape were wound. All measures were made at fixed distances above the ground.

Forces were measured in pounds on a strain gauge and recorded and displayed on a lifting force meter which recorded a peak and average strength score. For each type of measurement, four measures were recorded: Average 1, Average 2, Peak 1, and Peak 2.

- 1501 - 1504** - Strength - One hand Pull, Seated - 45 cm. Subject sits erect, with feet 55 cm apart. Using the dominant hand, the subject is instructed to grasp, from the underside, a D-ring that is attached 45 cm above the platform just forward of the chair in the vertical plane. Keeping the shoulders square with the non-dominant arm placed on the lap and feet firmly planted on the platform, the subject is to pull the D-ring upward.
- 1505 - 1508** - Strength - Side, One hand Pull, Seated - 45 cm. Subject sits erect, with feet 55 cm apart. Using the dominant hand, the subject is instructed to grasp, from the underside, a D-ring that is attached 45 cm above the platform and a short distance to the right (or left, as is appropriate). Keeping the shoulders square with the non-dominant arm placed on the lap and feet firmly planted on the platform, the subject is to pull the D-ring upward.
- 1509 - 1512** - Strength, One hand Pull, Standing, 100 cm. Subject stands erect, with feet 15 cm apart. Using the dominant hand (right, if ambidextrous), the subject is instructed to grasp, from the underside, a D-ring that is attached 100 cm above the platform and at a point just to the right (or left, as is appropriate) of his or her body. Keeping the shoulders square with the non-dominant arm relaxed and the feet firmly planted on the platform, the subject is to pull the D-ring upward.
- 1513 - 1516** - Strength, Two hand Pull, Seated - 38 cm. Subject sits erect, with feet 55 cm apart. Using both hands, the subject is instructed to grasp a short handle that is attached 38 cm above the platform at a point just forward of the chair in the vertical plane. Leaning slightly forward and primarily using the arms and shoulders while keeping the feet flat, the subject is instructed to pull upward on the handle.
- 1517 - 1520** - Strength, Two hand Pull, Seated - 50 cm. Subject sits erect, with feet 55 cm apart. Using both hands, the subject is instructed to grasp a short handle that is attached 50 cm above the platform at a point just forward of the chair in the vertical plane. Leaning slightly forward and primarily using the arms and shoulders while keeping the feet flat, the subject is instructed to pull upward on the handle.
- 1521 - 1524** - Strength - Two hand Pull, Standing - 38 cm. Subject stands with feet 45 cm apart. Using both hands, the subject is instructed to grasp a short handle that is attached 38 cm above the platform and directly in front of the subject. Bending at the waist and primarily using the arms and shoulders, but also using the legs by extending them upward, the subject is instructed to pull upward on the handle.
- 1525 - 1528** - Strength - Two hand Pull, Standing - 50 cm. Subject stands with feet 45 cm apart and knees straight. Using both hands, the subject is instructed to grasp a long handle that is attached 50 cm above the platform and directly in front of the subject. Bending at the waist and primarily using the arms and shoulder, the subject is instructed to pull upward on the handle.
- 1529 - 1532** - Strength - Two hand Pull, Standing - 100 cm. Subject stands erect, with feet 45 cm apart. Using both hands, the subject is instructed to grasp a long handle that is attached 100 cm above the platform and directly in front of the subject. While keeping the knees straight and the feet firmly planted on the platform, the subject is instructed to pull upward on the handle.

**1533 - 1536** - Strength - Two hand Push, Standing - 150 cm. Subject stands erect, with feet 45 cm apart. Using both hands, the subject is instructed to grasp a long handle that is attached 150 cm above the platform and directly in front of the subject. While keeping the knees straight and the feet firmly planted on the platform, the subject is instructed to push the handle straight upward using the arms and shoulders.

## **LANDMARK GOLSSARY**

**-A-**

1. Abdominal - Pertaining to the abdomen, particularly the region below the rib cage and above the pelvis.
2. Acromial - Pertaining to acromion, a point on the shoulder, which is also called acromiale.
3. Acromiale - The highest point on the lateral edge of the acromial process of the scapula; also called the acromion.
4. Ankle Height - The height of the marked point indicating the smallest horizontal circumference of the ankle.
5. Anterior - Pertaining to the front of the body.
6. Anterior Neck Point - The point in the midsagittal plane where the ascending column of the neck intersects the horizontal flesh under the jaw. This point may be obscured by fat.
7. Auricular - Pertaining to the ear.
8. Axillary - Pertaining to the region of the axilla or armpit.

**-B-**

9. Base of Hand - The line of demarcation drawn between the hand and the lower arm. This line usually coincides with the skin crease at the proximal edge of the palm.
10. Base of Thumb - The point at which the extended base of hand line intersects the radial border of the wrist.
11. Biceps - The large muscle on the anterior side of the upper arm.
12. Brow Ridges - The bony elevations, just above the orbits, on the frontal bone of the skull.
13. Buttock Height - The height of the landmark that indicates the maximum posterior protrusion of the right buttock.

**-C-**

14. Calf Height - The height of the landmark that indicates the maximum circumference of the right calf.
15. Canthus - The corner or angle formed by the meeting of the eyelids.
16. Cervicale - The protrusion of the spinal column at the base of the neck, caused by the dorsal tip of the spine of the 7<sup>th</sup> cervical vertebrae.
17. Cornea - The transparent outer layer of the eyeball in the anterior plane.
18. Coronal Plane- A vertical, lateral plane parallel to the coronal suture of the skull.
19. Crinion - The point in the midplane where the hairline meets the forehead.

**-D-**

20. Dactylion - The point, when the subject stands erect with extended and hand by his side, at the distal tip of the middle finger.
21. Deltoid - The widest protrusion of the deltoid muscle.
22. Deltoid Muscle - The large muscle on the lateral border of the upper arm in the shoulder region.
23. Distal - The end of a body segment farthest from the head; opposed to proximal.

**-E-**

24. Epicondyle - Primarily the lateral, but also the medial, protrusion of the humerus at the elbow.
25. External - Away from the midsagittal plane of the body; lateral; opposed to medial.
26. External Canthus - The external corner or angle formed by the juncture of the upper and lower eye lid.

**-F-**

27. Frankfort Plane - The standard horizontal plane of orientation of the head, containing trignon and the lowest point of the orbit. This is closely approximated when the subject looks directly forward with his or her line of vision parallel with the floor.

**-G-**

28. Glabella - The most anterior point of the forehead between the brow ridges, in the midsagittal plane.
29. Gluteal Furrow - The furrow formed by the protrusion of the buttock beyond the back of the leg.
30. Gonial Angle - The obtuse angle at the back of the lower jaw formed by the intersection of the vertical and horizontal portions of the jaw.

**-H-**

31. Helix - The rolled outer portion of the ear.
32. Humerus - The bone of the upper arm.

**-I-**

33. Inion - A small bony bump often found at the rearmost part of the head.
34. Inseam - A tailoring term indicating the inside length of sleeve or trouser, measured on the medial side of the arm or leg.
35. Instep Throat - The anterior juncture of the ankle with the right foot as determined by palpation and visual inspection.
36. Internal - Near the midsagittal plane of the body.

**-K-**

37. Knuckle - The joint formed by the meeting of a finger bone (phalanx) with a bone of the palm of the hand (metacarpal).

-L-

38. Larynx - The cartilaginous walled cavity at the top of the windpipe in the front of the neck which contains the vocal cords.
39. Lateral - Lying toward the sides of the body; opposed to medial.
40. Lower Arm Circumference Level - The level of maximum protrusion of the brachio-radialis muscle when the arm is flexed, and the subject is making a fist.
41. Lower Thigh Level - The level above the knee of the lower edge of the vastus lateralis muscle when the thigh is relaxed.

-M-

42. Malleolar - Referring to the malleolus.
43. Malleolus - The bony protrusion, either lateral or medial, of the ankle.
44. Mandible - The lower jaw.
45. Mastoid Process - The bony protrusion directly behind the ear.
46. Medial - Lying near the midsagittal plane of the body; opposed to lateral.
47. Menton - The lowest point of the tip of the chin in the midsagittal plane.
48. Metacarpal Bone - A bone of the palm of the hand.
49. Metacarpale - The joint of juncture of a bone of the palm (metacarpal) with the first bone (phalanx) of the finger.
50. Metatarsal - A bone of the instep of the foot.
51. Metatarsal-Phalageal Joint - The distal junction of the 1<sup>st</sup> metatarsal with its phalanx as determined by palpation.
52. Mid-Shoulder - A point on the superior border of the shoulder midway between acromion and the juncture of the neck and shoulder.
53. Midaxillary - A vertical line originating from the center of the axillary (armpit) space as determined by visual inspection.
54. Midplane - Same as midsagittal plane.
55. Midsagittal Plane - The vertical plane which divides the body into symmetrical right and left sections.
56. Minimum Frontal Points - The points on the left and right sides of the forehead which immediately overlie the deepest indentation of the temporal crests, just above the lateral ends of the brow ridges.

-N-

57. Nasal Root Depression - The area of greatest indentation where the bridge of the nose meets the forehead. (also called the sellion)

- 58. Nasal Septum - The cartilaginous wall separating the right nostril from the left.
- 59. Natural Waist Line - The level of greatest lateral indentation to the abdomen region. If no Natural Waist Line is visible the level at which the belt is worn is used instead.
- 60. Navicular Bone - The small bone of the hand just distal to the bend of the wrist or the base of the thumb.
- 61. Neck Point - The point marking the intersection of the right side of the neck with the trapezius muscle of the right shoulder. This may be difficult to locate accurately in either corpulent or underdeveloped individuals.
- 62. Nuchale - The lowest point in the midsagittal plane of the occiput that can be palpated among the nuchal muscles. This point is often visually obscured by hair.

**-O-**

- 63. Occipital Region - The back of the head.
- 64. Occiput - The bone at the back of the skull; the region of the back of the head.
- 65. Ocular - Of or pertaining to the eyes.
- 66. Olecranon - The bony tip of the elbow.
- 67. Omphalion - The midpoint of the umbilicus or navel.

**-P-**

- 68. Patella - The kneecap.
- 69. Patella (top) - The superior edge of the knee cap as determined by palpation.
- 70. Phalangeal - Pertaining to a phalanx or the phalanges, referring to the fingers or toes.
- 71. Phalanx - (plural, phalanges) a bone of the fingers or toes.
- 72. Philtrum - The vertical groove running from the upper membranous lip to the base of the nasal septum.
- 73. Popliteal Area - The hollowed out region of the leg directly behind the knee, involving both the bottom of the thigh and the top of the calf.
- 74. Posterior - Pertaining to the back of the body.
- 75. Pronasale - The most anterior tip of the nose.
- 76. Proximal - The end of a body segment nearest the head; opposed to distal.
- 77. Pupillary - Pertaining to the pupil of the eye.

**-R-**

- 78. Radiale - The highest point on the proximal head of the radius, near the midpoint of the elbow joint on the posterior side of the arm.
- 79. Radial - Pertaining to the radius.

80. Radius - One of the two bones of the lower arm. This bone extends from the lateral side of the elbow to the wrist at the base of the thumb.

81. Ramus - The vertical portion of the lower jaw bone (mandibular).

-S-

82. Scye - The point marking the upper end of the posterior axillary fold, either right or left, which is the furrow formed by the juncture of the upper arm and upper back.

83. Sellion - The point of maximum indentation where the bridge of the nose meets the forehead (also called the Nasal Root Depression).

84. Sits Erect - Subject sits on a flat horizontal surface, his or her weight distributed equally, with his or her back held in and his shoulders held back. This position requires holding the torso straight but not rigid.

85. Sphyrion - The most distal point on the tibia; it lies at the tip of the malleolar process.

86. Stands Erect - Subject stands on a flat surface, his or her weight distributed equally, with the back held in and the shoulders held back and the legs fully straightened. This position requires holding the body straight but not rigid.

87. Sternum - The breastbone.

88. Stomion - The point of contact in the midsagittal plane between the upper and lower lips.

89. Stylion - The point at the anterior distal end of the radius.

90. Submandibular - Pertaining to the region under the mandible or lower jaw.

91. Subnasale - The point where the base of the nasal septum meets the philtrum.

92. Suprasternale - The lowest point of the jugular notch on the sternum as determined by palpation.

-T-

93. Temporal Region - The area on the side of the head between and above the eyes and ears.

94. Temporal Crest - A narrow, bony ridge running along the side of the head, curving up from the upper lateral margin of the eye socket, above and past the ear and downward, ending behind the ear. This serves as the area of attachment for the temporal muscles.

95. Temporal Muscles - The muscles of the temple region.

96. Tibiale - The uppermost point on the medial superior surface of the tibia.

97. Thelion - The right nipple.

98. Tragion - The point located at the notch just above the tragus of the ear. This point corresponds approximately to the upper edge of the ear hole.

99. Tragus - The small cartilaginous flap of flesh in front of the ear hole.

100. Trapezius Muscle - The large muscle at the back of the neck and shoulder.

101. Trochanterion - The top of the bony lateral protrusion of the proximal end of the femur.

-U-

102. Ulna - One of the two bones of the lower arm; this bone runs from the tip of the elbow to the wrist on the same side as the little finger

103. Ulnar - Referring to the ulna.

-V-

104. Vertex - The top of the head in the midsagittal plane when the head is held in the Frankfort Plane.

-W-

105. Waist Height (Omphalion) - The height of the horizontal plane through the omphalion, or the middle of the umbilicus.

106. Wrist - The styloid process of the ulna (center of the small bone which protrudes at the outside of the wrist).

-Z-

107. Zygomatic Arch - The bony arch extending horizontally along the side of the head from the cheekbone nearly to the external ear.

## **LIST OF MEASUREMENTS**

<b>CODE</b>	<b>MEASURE</b>
6	ABDOMINAL DEPTH-SITTING
7	ABDOMINAL-EXT-BRTH-SITTING
8	ABDOMINAL-EXT-CIRC
10	ABDOMINAL-EXT-DEPTH
11	ABDOMINAL-EXT-DEPTH-SIT
18	ABDOMINAL-EXT-HT
23	ACROMION HT
25	ACROMION HT - SITTING
39	ACROMION-RADIALE LNTH
42	ACROMION TO BICEPS CIRC LEVEL
48	AGE
58	ANKLE CIRC
64	ANKLE HT
70	ARM CIRC-AXILLARY
72	ARM CIRC-BICEPS RELAXED
73	ARM CIRC-BICEPS RELAXED-LEFT
77	ARM CIRC-BICEPS FLEXED
78	ARM CIRC-BICEPS FLEXED-LEFT
80	ARM REACH FROM WALL
81	ARM REACH FROM WALL - SITTING
90	AXILLA HT
91	AXILLA TO WAIST
92	BACK CURVATURE
93	BACK ARC - BUST
95	BACK ARC- WAIST
103	BIACROMIAL BRTH
110	BICEPS SKF
122	BIDELTOID BRTH
126	BIGONIAL BRTH
130	BIILIOCRISTALE BRTH
134	BIMALLEOLAR BRTH
138	BIOCULAR BRTH
140	BISPINOUS BRTH
142	BITRAGION BRTH
144	BITRAGION-CORONAL ARC
146	BITRAGION-CRINION ARC
150	BITRAGION-MENTON ARC
152	BITRAGION-MINIMUM FRONTAL ARC
153	BITRAGION-POSTERIOR ARC
156	BITRAGION-SUBMANDIBULAR ARC
158	BITRAGION-SUBNASALE ARC
161	BITROCHANTERION BRTH
165	BIZYGOMATIC BRTH
167	BODY LNTH-SUPINE-KNEES FLEXED
169	BOWED TORSO HT
172	BUSTPOINT TO BUSTPOINT BRTH

178	BUTTOCK CIRC
179	BUTTOCK CIRC-SITTING
185	BUTTOCK CURVATURE
186	BUTTOCK DEPTH
187	BUTTOCK-HEEL LNTH
188	BUTTOCK HT
194	BUTTOCK-KNEE LNTH
200	BUTTOCK-POPLITEAL LNTH
207	CALF CIRC
209	CALF CIRC-LEFT
215	CALF HT
219	CERVICALE HT
220	CERVICALE HT-SITTING
223	CHEST BRTH
227	CHEST BRTH-BONE
230	CHEST CIRC
231	CHEST CIRC-AT SCYE
232	CHEST CIRC-BELOW BUST
233	CHEST CIRC-INSPIRATION
235	CHEST DEPTH-SITTING
236	CHEST DEPTH
237	CHEST HT
249	CROTCH HT
251	CROTCH LNTH (NATURAL WAIST)
252	CROTCH LNTH-UMBILICUS
253	CROTCH LNTH-POSTERIOR-NATURAL
254	CROTCH LNTH-POSTERIOR-OMPHALION
265	DACTYLION HT
269	DELTOID ARC
277	EAR BRTH
280	EAR LNTH
282	EAR LNTH-ABOVE TRAGION
285	EAR PROTRUSION
286	EAR TO EAR BRTH
293	ELBOW BRTH-BONE
297	ELBOW BRTH-BONE LEFT
301	ELBOW CIRC-FULLY BENT
303	ELBOW CIRC-EXTENDED
305	ELBOW CIRC-FLEXED
307	ELBOW-GRIP LNTH
309	ELBOW HT
312	ELBOW REST HT
318	ELBOW-ELBOW BRTH
321	ELBOW FUNCTIONAL REACH
324	ELBOW-WRIST LNTH
325	ELBOW SPAN
326	EXTERNAL CANTHUS TO OCCIPUT
327	EXTERNAL CANTHUS TO VERTEX
328	EXTERNAL CANTHUS TO WALL

329	EYE HEIGHT-STANDING
330	EYE HT-SITTING
340	FIBULA HT
344	FIBULA HT
348	FIRST PHALANX III LENGTH
356	FOOT BRTH
358	FOOT CIRC
362	FOOT LNTH
370	FOREARM CIRC-EXTENDED
371	FOREARM CIRC-FLEXED
375	FOREARM-HAND LNTH
378	FOREARM TO FOREARM BRTH
386	FUNCTIONAL LEG LNTH
391	GLABELLA TO OCCIPUT
393	GLABELLA TO TOP OF HEAD
394	GLABELLA TO WALL
395	GLUTEAL ARC
402	GRIP DIAMETER (INSIDE)
404	GRIP DIAMETER (OUTSIDE)
398	GLUTEAL-FURROW HT
402	GRIP DIAMETER (INSIDE)
404	GRIP DIAMETER (OUTSIDE)
405	GRIP REACH-OVERHEAD
407	GRIP STRENGTH
411	HAND BRTH AT METACARPALE
413	HAND BRTH-AT THUMB
416	HAND CIRC AT METACARPALE
417	HAND CIRC-OVER THUMB
420	HAND LNTH
424	HAND SKF
425	HAND THICKNESS AT METACARPALE III
427	HEAD BRTH
430	HEAD CIRC
433	HEAD DIAG-INION TO PRONASALE
435	HEAD DIAG-MAX FROM MENTON
436	HEAD DIAG-MAX FROM NUCHALE
437	HEAD DIAG-MENTON TO OCCIPUT
441	HEAD LNTH
445	HEEL ANKLE CIRC
450	HEEL BRTH
457	HIP BRTH
459	HIP BRTH-SITTING
465	HIP CIRC AT TROCHANTERION
466	HIP CIRC-7 BELOW WAIST
468	HIP CIRC-9 BELOW WAIST
489	ILIOCRISTALE HT
490	ILIOSPINALE HT
493	INSTEP CIRC
496	INSTEP LNTH

500	INTEROCULAR DIST
503	INTERPUPILLARY DIST
506	INTERSCYE DIST
507	INTERSCYE DIST-MAX
508	INTERSCYE DIST-MID
510	INTERSCY - FRONT
511	JUXTANIPPLE SKF
512	KNEE BRTH-BONE
513	KNEE BRTH BONE-LEFT
515	KNEE CIRC
516	KNEE CIRC-FULLY BENT
517	KNEE CIRC - SITTING
528	KNEE HT-FLEXED SUPINE
529	KNEE HT - SITTING
536	KNEE-KNEE BRTH
538	KNEELING HT
540	KNEELING-LEG LNTH
542	LATERAL FEMORAL EPICONDYLE HT
543	LATERAL-MALLEOUS HT
547	LIP LNTH
549	LIP LNTH-SMILING
552	LIP PROTRUSION TO OCCIPUT
553	LIP PROTRUSION TO WALL
555	LIP TO LIP LNTH
569	MAX FRONTAL BRTH
572	MAX REACH FROM WALL
576	MEDIAL CALF SKF
579	MEDIAL MALLEOUS HT
583	MENTON-CRINION LNTH
585	MENTON PROJECTION
586	MENTON TO NASAL ROOT DEP LNTH
588	MENTON TO OCCIPUT
592	MENTON-SUBNASALE LNTH
595	MENTON TO TOP OF HEAD
596	MENTON TO WALL
601	METACARPALE HT
612	MIDSHOULDER HT-SITTING
615	MID-THIGH CIRC
616	MINIMUM FRONTAL ARC
618	MIN FRONTAL BRTH
625	NASAL ROOT BRTH
629	NASAL ROOT HT
631	NASAL ROOT DEPRESSION TO OCCIPUT
633	NASAL ROOT DEPRESSION TO TOP OF HEAD
634	NASAL ROOT DEPRESSION TO WALL
636	NECK CIRC-BASE
637	NECK CIRC-BELOW LARYNX
639	NECK CIRC-OVER LARYNX
641	NECK HT-LATERAL

644	NECK LNTH-ANTERIOR
647	NECK LNTH-POST-NUCHALE
648	NECK TO BUSTPOINT LNTH
649	NOSE LNTH
651	NOSE BRTH
652	NOSE PROTRUSION
653	OVERHEAD REACH
654	OVERHEAD REACH SITTING
655	OVERHEAD REACH-FORWARD
656	OVERHEAD REACH-EXTENDED
657	PALM LNTH
663	PATELLA-BOTTOM HT
666	PATELLA-TOP HT
670	PENALE HT
674	PHILTRUM LNTH
678	POPLITEAL HT-SITTING
690	PRONASALE TO OCCIPUT
692	PRONASALE TO TOP OF HEAD
694	PRONASALE TO WALL
698	RADIALE-STYLION LNTH
705	SAGITTAL ARC-NUCHALE
732	SCYE CIRC-OVER ACROMION
737	SCYE DEPTH
743	SHOULDER BRTH-BOWED
745	SHOULDER BRTH-REACH OVERHEAD
747	SHOULDER CIRC
751	SHOULDER-ELBOW LNTH
754	SHOULDER LNTH
758	SITTING HT
760	SITTING HT-RELAXED
764	SLEEVE-INSEAM LNTH
797	SLEEVE-OUTSEAM LNTH
799	SPAN
801	SPHYRION HT
802	SPINE TO ELBOW LNTH (SL)
803	SPINE TO SCYE LNTH (SL)
804	SPINE TO WRIST LNTH (SL)
805	STATURE
806	STATURE-CLOTHED
807	STATURE-MAXIMUM
808	STATURE-REPORTED
814	STOMION TO OCCIPUT
815	STOMION TO TOP OF HEAD
816	STOMION TO WALL
821	STRAP LNTH
825	SUBNASALE TO NASAL ROOT DEP
829	SUBNASALE TO OCCIPUT
830	SUBNASALE TO TOP OF HEAD
831	SUBNASALE TO WALL

833	SUBSCAPULAR SKF
834	SUBSCAPULAR SKF II
837	SUBSTERNALE HT
841	SUPRASTERNALE HT
844	SUPRAILIAC SKF
845	SUPRAILIAC SKF II
848	SUPRAPATELLA SKF
850	TENTH RIB
851	THIGH CIRC-DISTAL
852	THIGH CIRC-PROXIMAL
853	THIGH CIRC-PROXIMAL-SIT
856	THIGH CLEARANCE
859	THIGH TO THIGH BRTH-SIT
862	THUMB BRTH
863	THUMB-CROTCH LNTH
867	THUMB-TIP REACH
868	THUMB-TIP REACH-SITTING
869	THUMB-TIP REACH-EXTENDED
873	TIBIALE HT
877	TRAGION HT
880	TRAGION TO OCCIPUT
882	TRAGION TO TOP OF HEAD
884	TRAGION TO WALL
888	TRICEPS SKF
890	TRICEPS SKF II
894	TROCHANTERION HT
896	TRUNK DEPTH
898	TRUNK HT
900	UMBILICUS SKF
914	VERTICAL TRUNK CIRC-MIDBUTTOCK
916	VERTICAL TRUNK CIRC
917	VERTICAL TRUNK CIRC-SITTING
919	WAIST BACK LNTH-NATURAL
921	WAIST BACK LNTH-OMPHALION
924	WAIST BRTH-NATURAL
928	WAIST BRTH-OMPHALION
931	WAIST CIRC - NATURAL
932	WAIST CIRC-OMPHALION
935	WAIST CIRC-OMPHALION-SITTING
939	WAIST DEPTH-NATURAL
943	WAIST DEPTH-OMPHALION
945	WAIST FRONT LNTH-NATURAL
946	WAIST FRONT LNTH-OMPHALION
947	WAIST HIP LNTH
949	WAIST HT-NATURAL
950	WAIST HT-OMPHALION
951	WAIST HT-NATURAL-SITTING
952	WAIST HT-UMBILICUS-SITTING
954	WAIST NATURAL TO WAIST UMBILICUS

957	WEIGHT
958	WEIGHT-CLOTHED
960	WEIGHT-REPORTED
964	WRIST BRTH-BONE
967	WRIST CIRC-MIN
970	WRIST CIRC-STYLION
973	WRIST HT
974	WRIST HT-SITTING
976	WRIST TO CENTER OF GRIP LNTH
977	WRIST TO INDEX FINGER LNTH
978	WRIST TO THUMB TIP LNTH
979	WRIST TO WALL LNTH
980	WRIST TO WALL LNTH-EXTENDED
1003	BLOOD TYPE
1004	RH FACTOR
1005	HANDEDNESS
1501	STRENGTH-CENTER-SIT-ONE HAND PULL-45-AVG1
1502	STRENGTH-CENTER-SIT-ONE HAND PULL-45-AVG2
1503	STRENGTH-CENTER-SIT-ONE HAND PULL-45-PEAK1
1504	STRENGTH-CENTER-SIT-ONE HAND PULL-45-PEAK2
1505	STRENGTH-SIDE-SIT-ONE HAND PULL-45-AVG1
1506	STRENGTH-SIDE-SIT-ONE HAND PULL-45-AVG2
1507	STRENGTH-SIDE-SIT-ONE HAND PULL-45-PEAK1
1508	STRENGTH-SIDE-SIT-ONE HAND PULL-45-PEAK2
1509	STRENGTH-ONE HAND PULL-STD-100-AVG1
1510	STRENGTH-ONE HAND PULL-STD-100-AVG2
1511	STRENGTH-ONE HAND PULL-STD-100-PEAK1
1512	STRENGTH-ONE HAND PULL-STD-100-PEAK2
1513	STRENGTH-TWO HAND PULL-SIT-38-AVG1
1514	STRENGTH-TWO HAND PULL-SIT-38-AVG2
1515	STRENGTH-TWO HAND PULL-SIT-38-PEAK1
1516	STRENGTH-TWO HAND PULL-SIT-38-PEAK2
1517	STRENGTH-TWO HAND PULL- SIT-50-AVG1
1518	STRENGTH-TWO HAND PULL-SIT-50-AVG2
1519	STRENGTH-TWO HAND PULL-SIT-50-PEAK1
1520	STRENGTH-TWO HAND PULL-SIT-50-PEAK2
1521	STRENGTH-TWO HAND PULL-STD-38-AVG1
1522	STRENGTH-TWO HAND PULL-STD-38-AVG2
1523	STRENGTH-TWO HAND PULL-STD-38-PEAK1
1524	STRENGTH-TWO HAND PULL-STD-38-PEAK2
1525	STRENGTH-TWO HAND PULL-STD-50-AVG1
1526	STRENGTH-TWO HAND PULL-STD-50-AVG2
1527	STRENGTH-TWO HAND PULL-STD-50-PEAK1
1528	STRENGTH-TWO HAND PULL-STD-50-PEAK2
1529	STRENGTH-TWO HAND PULL-STD-100-AVG1
1530	STRENGTH-TWO HAND PULL-STD-100-AVG2
1531	STRENGTH-TWO HAND PULL-STD-100-PEAK1
1532	STRENGTH-TWO HAND PULL-STD-100-PEAK2
1533	STRENGTH-TWO HAND PUSH-STD-150-AVG1

1534	STRENGTH-TWO HAND PUSH-STD-150-AVG2
1535	STRENGTH-TWO HAND PUSH-STD-150-PEAK1
1536	STRENGTH-TWO HAND PUSH-STD-150-PEAK2

**SURVEY SPECIFIC MEASUREMENTS**

<b>CODE</b>	<b>MEASURE</b>
1006	BIRTHPLACE - SUBJECT - AIR FORCE FLYERS 1967
1007	BIRTHPLACE - FATHER - AIR FORCE FLYERS 1967
1008	BIRTHPLACE - MOTHER - AIR FORCE FLYERS 1967
1015	AERORATING - AIR FORCE FLYERS 1967
1016	AIRCRAFT CATEGORY - AIR FORCE FLYERS 1967
1017	COMMAND - AIR FORCE FLYERS 1967
1023	BOOT SIZE-LNTH - ARMY PERSONNEL 1966
1024	BOOT SIZE-WDTH - ARMY PERSONNEL 1966
1025	RANK - ARMY PERSONNEL 1966
1026	PAY GRADE - ARMY PERSONNEL 1966
1027	SERVICE - ARMY PERSONNEL 1966
1028	EDUCATION - ARMY PERSONNEL 1966
1029	MARITAL STATUS - ARMY PERSONNEL 1966
1030	BIRTHPLACE - SUBJECT - ARMY PERSONNEL 1966
1031	BIRTHPLACE - FATHER - ARMY PERSONNEL 1966
1032	BIRTHPLACE - MOTHER - ARMY PERSONNEL 1966
1033	RESIDENCE - LONGER - ARMY PERSONNEL 1966
1034	NATIONAL EXTRACTION - ARMY PERSONNEL 1966
1035	TOE BIGGEST - ARMY PERSONNEL 1966
1036	GLASSES - ARMY PERSONNEL 1966
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## HSIAC Anthropometric Data Archive Survey List

### U.S. Military

#### **Air Force**

- 1990 Air Force Male Flyers
- 1968 Survey of Air Force Women
- 1967 Survey of Flying Personnel – Male
- 1965 USAF Male Personnel
- 1950 Survey of USAF Flying Personnel

#### **Army**

- 1988 Anthropometric Survey of the U.S. Army Female Working Data Set
- 1988 Anthropometric Survey of the U.S. Army Male Working Data Set
- 1970 Army Aviators
- 1959 Survey of Army Aviators
- 1946 Survey of Army Female Separates

#### **Navy/Marines**

- 1966 Survey of Marine Personnel
- 1966 Survey of Navy Personnel

### Other Military

- 1976 Anthropometric Survey of Royal Transport Corpsmen
- 1975 Survey of English Guardsmen
- 1974 Canadian Forces Survey
- 1972-1975 British Army
- 1972 Survey of 500 Royal Air Force Aircrew Heads
- 1971 Survey of Royal Air Force Crewmen
- 1971 Royal Australian Air Force
- 1969 Imperial Iranian Armed Forces
- 1968 German Air Force
- 1963 Vietnam Military
- 1960-61 NATO Anthropometric Survey
- 1959 Survey of Latin American Military

### Civilian

- 1975 Law Enforcement Officers
- 1972 American Airline Stewardesses
- 1960-62 The Health Examination Survey
- 1961 Air Traffic Controllers