

Yeadon Measurements

Key:

● denotes a joint centre

Segments P, T, C, A1, A2, B1, B2, J1, J2, K1, K2 are separated by alternating colors.

Levels are denoted as **L<s>#** with <s> roughly denoting a body part, and # denoting the #-th level in the segment.

Measurements are denoted as **L<s>#<t>**, with <t> denoting the type of measurement.

There are 4 types of measurements:

L denotes a length measurement, not necessarily measured from previous level:

Ls1L-Ls5L measured from **Ls0**; **Ls6L-Ls8L** measured from **Ls5**

La2L-La4L measured from **La0**; **La5L-La7L** measured from **La4** (same for segment b)

Lj1L, Lj3L-Lj5L measured from **Lj0**; **Lj6L, Lj8L-Lj9L** measured from **Lj5** (same for segment k)

p denotes a perimeter measurement, must have $2 < p/w < \pi$

w denotes a width (medio-lateral, or side to side) measurement

d denotes a depth (anterior-posterior, or front to back) measurement

level, label, measurements needed

Ls8¹ top of head **L**

Ls7 above ear **L,p**

Ls6 beneath nose **L,p**

Ls5² acromion **L,p**

Ls4³ shoulder joint centre **L,w,d**

Ls3 nipple **L,p,w**

Ls2 lowest front rib **L,p,w**

Ls1 umbilicus **L,p,w**

Ls0 hip joint centre **L,p,w**

La0 shoulder joint centre **p**

La1⁴ mid-arm **p**

La2 elbow-joint centre **L,p**

La3 maximum forearm perimeter **L,p**

La4 wrist joint centre **L,p,w**

La5 base of thumb **L,p,w**

La6 knuckles **L,p,w**

La7 fingernails **L,p,w**

Lj0⁵ hip joint centre

Lj1 crotch **L,p**

Lj2⁶ mid-thigh **p**

Lj3 knee joint centre **L,p**

Lj4 maximum calf perimeter **L,p**

Lj5 ankle joint centre **L,p**

Lj6⁷ heel **L,p,d**

Lj7⁸ arch **p**

Lj8 ball **L,p,w**

Lj9 toe nails **L,p,w**

segment, label, solids⁹

C chest-head **s3-s7**

T thorax **s2**

P pelvis **s0-s1**

A1 left upper arm **a0-a1**

A2 left forearm-hand **a2-s6**

B1 right upper arm **b0-b1**

B2 right forearm-hand **b2-b6**

J1 left thigh **j0-j2**

J2 left shank-foot **j3-j8**

K1 right thigh **k0-k2**

K2 right shank-foot **k3-k8**

Notes:

Total mass can be measured in order to scale the default densities used for the solids (otherwise, mass is estimated).

1 s0 is the only semi-ellipsoidal solid.

2 two stadia at this level, one for s4 and one for s5. The parameters for the s4 stadium are calculated from Ls4's stadium. Ls5 perimeter measured around neck.

3 depth is measured in lieu of perimeter since arms interfere.

4 La1L is not measured, but is instead set as half of La2L.

5 stadium (circle) parameter calculated from the stadium at Ls0.

6 Lj2L is not measured, but is instead set as the average of Lj1L and Lj3L.

7 Lj6's (and Lk6's) stadia are the only stadia oriented anteroposteriorly.

8 Lj7L is not measured, but is instead set as the average of Lj6L and Lj8L.

9 Yeadon's 1990 paper indexes the solids from 1, while this formulations indexes from 0.

Yeadon, M. R. (1990). The simulation of aerial movement-ii. a mathematical inertia model of the human body. Journal of Biomechanics, 23:67-74.

Unit conversion

Name:

Date:

measToMeters (number to convert from measurement units into meters):

Measurement input

Torso

Ls1L:

Ls2L:

Ls3L:

Ls4L:

Ls5L:

Ls6L:

Ls7L:

Ls8L:

Ls0p:

Ls1p:

Ls2p:

Ls3p:

Ls5p:

Ls6p:

Ls7p:

Ls0w:

Ls1w:

Ls2w:

Ls3w:

Ls4w:

Ls4d:

Left arm

La2L:

La3L:

La4L:

La5L:

La6L:

La7L:

La0p:

La1p:

La2p:

La3p:

La4p:

La5p:

La6p:

La7p:

La4w:

La5w:

La6w:

La7w:

Left leg

Lj1L:

Lj3L:

Lj4L:

Lj5L:

Lj6L:

Lj8L:

Lj9L:

Lj1p:

Lj2p:

Lj3p:

Lj4p:

Lj5p:

Lj6p:

Lj7p:

Lj8p:

Lj9p:

Lj8w:

Lj9w:

Lj6d:

Right arm

Lb2L:

Lb3L:

Lb4L:

Lb5L:

Lb6L:

Lb7L:

Lb0p:

Lb1p:

Lb2p:

Lb3p:

Lb4p:

Lb5p:

Lb6p:

Lb7p:

Lb4w:

Lb5w:

Lb6w:

Lb7w:

Right leg

Lk1L:

Lk3L:

Lk4L:

Lk5L:

Lk6L:

Lk8L:

Lk9L:

Lk1p:

Lk2p:

Lk3p:

Lk4p:

Lk5p:

Lk6p:

Lk7p:

Lk8p:

Lk9p:

Lk8w:

Lk9w:

Lk6d:

Density Correction

to ignore, set to 0

Total mass (kg):