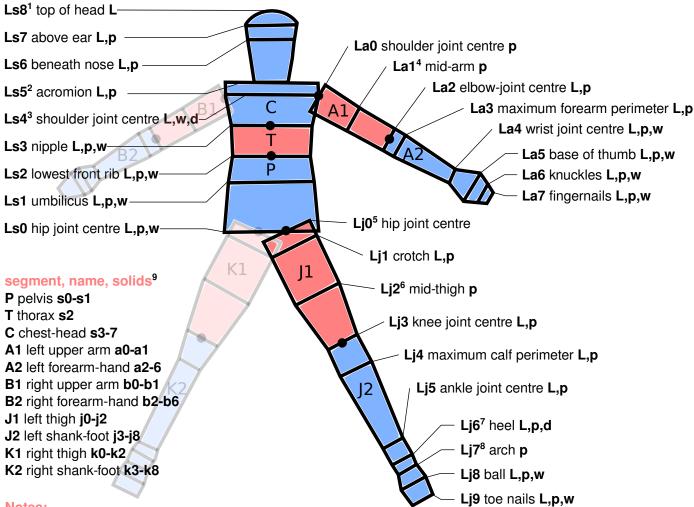# Yeadon Measurements

For use with the **yeadon** python module by C. Dembia (fitze)

Key:

● denotes a joint centre

L (on the left) denotes a level at which a stadium solid or circle is defined (except for **Ls8**)

L (on the right) denotes a length measurement

Ls1L-Ls5L measured from **Ls0**; **Ls6L-Ls8L** measured from **Ls5L**
La2L-La4L measured from **La0**; **La5L-La7L** measured from **La4L** (some for **b**)
Lj1L,Lj3-5L measured from **Lj0**; **Lj6L,Lj8L-Lj9L** measured from **Lj5L** (same for **k**)

p denotes a perimeter measurement, must have 2w < p < pi*w

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

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

level, name, measurements needed

Ls8[1] top of head **L**

Ls7 above ear **L,p**

Ls6 beneath nose **L,p**

Ls5[2] acromion **L,p**

Ls4[3] 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**

La1[4] 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**

Lj0[5] hip joint centre

Lj1 crotch **L,p**

Lj2[6] mid-thigh **p**

Lj3 knee joint centre **L,p**

Lj4 maximum calf perimeter **L,p**

Lj5 ankle joint centre **L,p**

Lj6[7] heel **L,p,d**

Lj7[8] arch **p**

Lj8 ball **L,p,w**

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

segment, name, solids[9]

P pelvis **s0-s1**
T thorax **s2**
C chest-head **s3-7**
A1 left upper arm **a0-a1**
A2 left forearm-hand **a2-6**
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 and provided to "correct" the densities used.

1 s0 is the only semi-ellipsoidal solid (with circular cross section)

2 two stadia at this level, one for s4 and one for s5. s4 stadium's parameters 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 set as half of La2L

5 stadium (circle) parameter calculated from Ls0's stadium

6 Lj2L is set as the average of Lj1L and Lj3L

7 Lj6's (and Lk6's) stadia are the only stadium oriented anterior-posteriorly

8 Lj7L is 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. (1990c). 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	Left arm	Right arm
Ls1L:	La2L:	Lb2L:
Ls2L:	La3L:	Lb3L:
Ls3L:	La4L:	Lb4L:
Ls4L:	La5L:	Lb5L:
Ls5L:	La6L:	Lb6L:
Ls6L:	La7L:	Lb7L:
Ls7L:		
Ls8L:	La0p:	Lb0p:
	La1p:	Lb1p:
Ls0p:	La2p:	Lb2p:
Ls1p:	La3p:	Lb3p:
Ls2p:	La4p:	Lb4p:
Ls3p:	La5p:	Lb5p:
Ls5p:	La6p:	Lb6p:
Ls6p:	La7p:	Lb7p:
Ls7p:		
	La4w:	Lb4w:
Ls0w:	La5w:	Lb5w:
Ls1w:	La6w:	Lb6w:
Ls2w:	La7w:	Lb7w:
Ls3w:		

	Left leg	Right leg
Ls4w:	Lj1L:	Lk1L:
	Lj3L:	Lk3L:
Ls4d:	Lj4L:	Lk4L:
	Lj5L:	Lk5L:
	Lj6L:	Lk6L:
	Lj8L:	Lk8L:
Density Correction	Lj9L:	Lk9L:
to ignore, set to 0		
Total mass (kg):	Lj1p:	Lk1p:
	Lj2p:	Lk2p:
	Lj3p:	Lk3p:
	Lj4p:	Lk4p:
	Lj5p:	Lk5p:
	Lj6p:	Lk6p:
	Lj7p:	Lk7p:
	Lj8p:	Lk8p:
	Lj9p:	Lk9p:
	Lj8w:	Lk8w:
	Lj9w:	Lk9w:
	Lj6d:	Lk6w: