

## Tabelle “Standard Man”

**Table 1.5** A description of the “Standard Man”

Age	30 yr
Height	1.72 m (5 ft 8 in)
Mass	70 kg
Weight	690 N (154 lb)
Surface area	1.85 m <sup>2</sup>
Body core temperature	37.0 °C
Body skin temperature	34.0 °C
Heat capacity	0.83 kcal/kg-°C (3.5 kJ/kg-°C)
Basal metabolic rate	70 kcal/h (1,680 kcal/day, 38 kcal/m <sup>2</sup> -h, 44 W/m <sup>2</sup> )
Body fat	15%
Subcutaneous fat layer	5 mm
Body fluids volume	51 L
Body fluids composition	53% intracellular; 40% interstitial, lymph; 7% plasma
Heart rate	65 beats/min
Blood volume	5.2 L
Blood hematocrit	0.43
Cardiac output (at rest)	5.0 L/min
Cardiac output (in general)	3.0 + 8 × O <sub>2</sub> consumption (in L/min) L/min
Systolic blood pressure	120 mmHg (16.0 kPa)
Diastolic blood pressure	80 mmHg (10.7 kPa)
Breathing rate	15/min
O <sub>2</sub> consumption	0.26 L/min
CO <sub>2</sub> production	0.21 L/min
Total lung capacity	6.0 L
Vital capacity	4.8 L
Tidal volume	0.5 L
Lung dead space	0.15 L
Lung mass transfer area	90 m <sup>2</sup>
Mechanical work efficiency	0–25%

There are wide variations about these typical values for body parameters. Also, these values are different for different regions; the ones in the table typify American males in the mid-1970s. Values for women are different than for men; for example, their typical heights and weights are lower and their percentage of body fat is higher

Using data from [7, 41]

**Table 1.6** Body segment lengths. Also see Fig. 1.15

Segment	Segment length <sup>a</sup> /body height $H$
Head height	0.130
Neck height	0.052
Shoulder width	0.259
Upper arm	0.186
Lower arm	0.146
Hand	0.108
Shoulder width	0.259
Chest width	0.174
Hip width/leg separation	0.191
Upper leg (thigh)	0.245
Lower leg (calf)	0.246
Ankle to bottom of foot	0.039
Foot breadth	0.055
Foot length	0.152

<sup>a</sup>Unless otherwise specified

Using data from [42]

**Table 1.7** Masses and mass densities of body segments

Segment	Segment mass/total body mass $m_b$	Mass density ( $\text{g/cm}^3$ )
Hand	0.006	1.16
Forearm	0.016	1.13
Upper arm	0.028	1.07
Forearm and hand	0.022	1.14
Total arm	0.050	1.11
Foot	0.0145	1.10
Lower leg (calf)	0.0465	1.09
Upper leg (thigh)	0.100	1.05
Foot and lower leg	0.061	1.09
Total leg	0.161	1.06
Head and neck	0.081	1.11
Trunk	0.497	1.03

Using data from [42]

**Table 1.8** Distance of the center of mass from either segment end, normalized by the segment length

Segment	Center of mass from	
	Proximal	Distal
Hand	0.506	0.494
Forearm	0.430	0.570
Upper arm	0.436	0.564
Forearm and hand	0.682	0.318
Total arm	0.530	0.470
Foot	0.50	0.50
Lower leg (calf)	0.433	0.567
Upper leg (thigh)	0.433	0.567
Foot and lower leg	0.606	0.394
Total leg	0.447	0.553
Head and neck	1.00	–
Trunk	0.50	0.50

Using data from [42]

**Table 1.9** Radius of gyration of a segment, about the center of mass and either end, normalized by the segment length

Segment	Radius of gyration about		
	C of M	Proximal	Distal
Hand	0.297	0.587	0.577
Forearm	0.303	0.526	0.647
Upper arm	0.322	0.542	0.645
Forearm and hand	0.468	0.827	0.565
Total arm	0.368	0.645	0.596
Foot	0.475	0.690	0.690
Lower leg (calf)	0.302	0.528	0.643
Upper leg (thigh)	0.323	0.540	0.653
Foot and lower leg	0.416	0.735	0.572
Total leg	0.326	0.560	0.650
Head and neck	0.495	0.116	–

Using data from [42]

Table C6.1 Moment of inertia values of selected body segments about the transverse axis through the centre of gravity of the segment

<i>Segment</i>	<i>Moment of inertia (kg.m<sup>2</sup>)</i>
Head	0.024
Trunk	1.261
Upper arm	0.021
Forearm	0.007
Hand	0.0005
Upper leg (thigh)	0.105
Lower leg	0.050
Foot	0.003

Table C6.2 Anthropometric data where m is body mass in kg

Hand	$0.006 \times \text{body mass (m)}$
Forearm	0.016
Upper arm	0.028
Forearm and hand	0.022
TOTAL ARM	0.050
Foot	0.0145
Lower leg	0.0465
Upper leg	0.100
Foot and lower leg	0.061
TOTAL LEG	0.161

Table D1.1 Radii of gyration as percentages of segment length

<i>Segment</i>	<i>From the proximal end %</i>	<i>From the distal end %</i>
Head, neck and trunk	83.0	60.7
Arm (upper)	54.2	64.5
Forearm	52.6	64.7
Hand	58.7	57.7
Upper limb	64.5	59.6
Forearm and hand	82.7	56.5
Thigh	54.0	65.3
Leg	52.8	64.3
Foot	69.0	69.0
Lower limb	56.0	65.0
Leg and foot	73.5	57.2