

## Appendix B

### Standard Methods for Determining Body Fat Using Body Circumferences, Height, and Weight

#### B-1. Height and weight measurements

The procedures for the measurements of height, weight, and specific body circumferences for the estimation of body fat are described in this appendix. The weight for height table is listed in table B-1 followed by the body fat standards in table B-2.

a. Soldier's height: The height will be measured with the Soldier in stocking feet (without running shoes) and wearing the authorized physical fitness uniform (trunks and T-shirt). The Soldier will stand on a flat surface with the head held horizontal, looking directly forward with the line of vision horizontal and the chin parallel to the floor. The body will be straight but not rigid, similar to the position of attention. When measuring height to determine body fat percentage (see fig B-1 or fig B-2), the Soldier's height is measured to the nearest half inch. When measuring height to use the weight for height screening table (see table B-1) the Soldier's height is measured and then rounded to the nearest inch with the following guidelines:

- (1) If the height fraction is less than half an inch, round down to the nearest whole number in inches.
- (2) If the height fraction is half an inch or greater, round up to the next highest whole number in inches.

b. Soldier's weight: The weight will be measured with the Soldier in stocking feet and wearing the authorized physical fitness uniform (trunks and T-shirt); running shoes and jacket will not be worn. Scales used for weight measurement will be calibrated annually for accuracy. The measurement will be made on scales available in units and recorded to the nearest pound with the following guidelines:

- (1) If the weight fraction of the Soldier is less than one-half pound, round down to the nearest pound.
- (2) If the weight fraction of the Soldier is one half-pound or greater, round up to the next whole pound.
- (3) No weight will be deducted to account for clothing.

c. Scales used for weight measurement will be calibrated annually. The word "calibrated", is intended to ensure the personnel weight scales used at the unit level for height and weight measurements have been verified for accuracy. It is not intended to require that unit scales be calibrated by test, measurement, and diagnostic equipment personnel or biomedical technicians. Accuracy of scales will be verified by unit personnel that will be performing the height/weight screening. This may be verified by using the tare (zero) function (if available), by following the scale manufacturer's instructions for ensuring accuracy, or by using an object of fixed known weight. Following is an example of using an object of fixed weight (for example, weight labeled 5 pounds) as means to verify accuracy:

- (1) Place an object of known, fixed weight on the scale.
- (2) Compare the reading on the scale to the known weight of the object.
- (3) If the scale reading differs from the known weight of the object being weighed the scale has a calibration feature, adjust the scale until the reading matches the known weight of the object being weighed. Once the reading matches the known weight, the scale is considered to be accurate for the purpose of this regulation.
- (4) If the reading differs from the known weight of the object being weighed and the scale does not have a calibration feature the scale should not be used to determine Soldier compliance with this regulation.
- (5) Once accuracy of scale has been verified, affix a label to the scale with name, date, and signature of the individual verifying the accuracy of the scale. The unit commander will also sign as a witness.

**Table B-1**  
**Weight for height table (screening table weight)**

Height (inches)	Minimum weight <sup>1</sup> (pounds)	Male weight in pounds, by age				Female weight in pounds, by age			
		17-20	21-27	28-39	40+	17-20	21-27	28-39	40+
58	91	-	-	-	-	119	121	122	124
59	94	-	-	-	-	124	125	126	128
60	97	132	136	139	141	128	129	131	133
61	100	136	140	144	146	132	134	135	137
62	104	141	144	148	150	136	138	140	142

**Table B-1**  
**Weight for height table (screening table weight)—Continued**

		Male weight in pounds, by age				Female weight in pounds, by age			
63	107	145	149	153	155	141	143	144	146
64	110	150	154	158	160	145	147	149	151
65	114	155	159	163	165	150	152	154	156
66	117	160	163	168	170	155	156	158	161
67	121	165	169	174	176	159	161	163	166
68	125	170	174	179	181	164	166	168	171
69	128	175	179	184	186	169	171	173	176
70	132	180	185	189	192	174	176	178	181
71	136	185	189	194	197	179	181	183	186
72	140	190	195	200	203	184	186	188	191
73	144	195	200	205	208	189	191	194	197
74	148	201	206	211	214	194	197	199	202
75	152	206	212	217	220	200	202	204	208
76	156	212	217	223	226	205	207	210	213
77	160	218	223	229	232	210	213	215	219
78	164	223	229	235	238	216	218	221	225
79	168	229	235	241	244	221	224	227	230
80 <sup>2</sup>	173	234	240	247	250	227	230	233	236

Note:

<sup>1</sup> Male and female Soldiers who fall below the minimum weights shown in table B-1 will be referred by the commander for immediate medical evaluation.

<sup>2</sup> Add 6 pounds per inch for males over 80 inches and 5 pounds per inch for females over 80 inches.

## **B-2. Determining body fat using body circumference process**

*a.* Although circumferences may be looked upon by untrained personnel as easy measures, they can give erroneous results if proper technique is not followed. The individual taking the measurements must have a thorough understanding of the appropriate body landmarks and measurement techniques. Unit commanders will require that designated personnel have read the instructions regarding technique and location and obtained adequate practice before official body fat determinations are made. Individuals taking the measurements will be designated unit fitness trainers, certified in body circumference methodology, a certified master fitness trainer, and/or a NCO trained in body circumference methodology, as specified in paragraph 2-16b(1) and/or 2-17a(1). Two members of the unit will be utilized in the taking of measurements; one to place the tape measure and determine measurements and the other to assure proper placement and tension of the tape, as well as to record the measurement on the DA Form 5500 and DA Form 5501. The unit member recording the measurements is responsible for signing the DA Form 5500 and DA Form 5501 in the “prepared by” block. Soldiers should be measured by trained individuals of the same gender. If a trained individual of the same gender is not available to conduct the measurements, a female Soldier will be present when a male measures a female, and a male Soldier will be present when a female measures a male. The two will work with the Soldier between them so the tape is clearly visible from all sides. Take all circumference measurements sequentially three times and record them to the nearest half inch. If any one of the three closest measurements differs by more than 1 inch from the other two, take an additional measurement and compute a mathematical average of the three measurements with the least difference to the nearest half inch and record this value.

*b.* Soldiers will be measured for body fat in stocking feet and standard Army physical fitness uniform trunks and T-shirt. Undergarments that may serve to bind the abdomen, hip, or thigh areas are not authorized for wear when a Soldier is being measured for body fat composition. This includes, but is not limited to spandex shorts or girdle-like undergarments.

*c.* When measuring circumferences, compression of the soft tissue requires constant attention. The tape will be applied so it makes contact with the skin and conforms to the body surface being measured. It will not compress the underlying

soft tissues. However, the hip circumference measurement requires more firm pressure to compress the authorized physical fitness uniform trunks. All measurements are made in the horizontal plane (parallel to the floor), unless indicated otherwise.

d. The tape measure will be made of a non-stretchable material, preferably fiberglass; cloth or steel tapes are unacceptable. Cloth measuring tapes will stretch with usage and most steel tapes do not conform to body surfaces. The tape measure will be calibrated, that is, compared with a yardstick or a metal ruler to ensure validity. This is done by aligning the fiberglass tape measure with the quarter-inch markings on the ruler. The markings will match those on the ruler; if not, do not use that tape measure. The tape will be one-quarter to one-half inch wide (not exceeding one-half inch) and a minimum of 5 feet in length. A retractable fiberglass tape is the best type for measuring all areas.

*Note.* Tapes are currently available through the Army Supply System (Federal stock number 5210-01-238-8103 or national stock number 8315-01-238-8103). The current Army supply system or any other fiberglass tape (not to exceed one-half inch) may be used if retractable tapes cannot be purchased by unit budget funds available and if approved by installation commanders.

e. If using the circumference methodology outlined in this policy and it is determined that the Soldier's body circumference does not meet the ABCP standards, a confirmation will be completed. The above process will be completed by a different team than the completed initial set of measurement. This must occur before any actions are taken by the commander.

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**Table B-2**  
**Maximum allowable percent body fat standards**

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<b>Age group:</b> 17-20
<b>Male (% body fat):</b> 20%
<b>Female (% body fat):</b> 30%
<b>Age group:</b> 21-27
<b>Male (% body fat):</b> 22%
<b>Female (% body fat):</b> 32%
<b>Age group:</b> 28-39
<b>Male (% body fat):</b> 24%
<b>Female (% body fat):</b> 34%
<b>Age group:</b> 40 and older
<b>Male (% body fat):</b> 26%
<b>Female (% body fat):</b> 36%

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Circumference Value	Height (inches)																			
	60	60.5	61	61.5	62	62.5	63	63.5	64	64.5	65	65.5	66	66.5	67	67.5	68	68.5	69	
13.5	9	9																		
14	11	11	10	10	10	10	9	9												
14.5	12	12	12	11	11	11	11	10	10	10	10	9	9							
15	13	13	13	13	12	12	12	12	11	11	11	11	10	10	10	10	10	9	9	
15.5	15	15	15	15	15	13	13	13	13	12	12	12	12	11	11	11	11	11	10	
16	16	16	15	15	15	15	14	14	14	14	13	13	13	13	12	12	12	12	12	
16.5	17	17	16	16	16	16	15	15	15	15	14	14	14	14	14	13	13	13	13	
17	18	18	18	17	17	17	17	16	16	16	16	15	15	15	15	14	14	14	14	
17.5	19	19	19	18	18	18	18	17	17	17	17	16	16	16	16	16	15	15	15	
18	20	20	20	19	19	19	19	18	18	18	18	18	17	17	17	17	16	16	16	
18.5	21	21	21	20	20	20	20	19	19	19	19	19	18	18	18	18	17	17	17	
19	22	22	22	21	21	21	21	20	20	20	20	20	19	19	19	19	18	18	18	
19.5	23	23	23	22	22	22	22	21	21	21	21	21	20	20	20	20	19	19	19	
20	24	24	24	23	23	23	23	22	22	22	22	21	21	21	21	21	20	20	20	
20.5	25	25	25	24	24	24	24	23	23	23	23	22	22	22	22	21	21	21	21	
21	26	26	26	25	25	25	25	24	24	24	24	23	23	23	23	22	22	22	22	
21.5	27	27	27	26	26	26	26	25	25	25	24	24	24	24	23	23	23	23	23	
22	28	27	27	27	27	26	26	26	26	25	25	25	25	25	24	24	24	24	23	
22.5	29	28	28	28	28	27	27	27	27	26	26	26	26	25	25	25	25	24	24	
23	29	29	29	29	28	28	28	28	27	27	27	27	26	26	26	26	26	25	25	
23.5	30	30	30	29	29	29	29	28	28	28	28	27	27	27	27	27	26	26	26	
24	31	31	30	30	30	30	29	29	29	29	28	28	28	28	28	27	27	27	27	
24.5	32	31	31	31	30	30	30	30	30	29	29	29	29	29	28	28	28	28	27	
25	32	32	32	32	31	31	31	31	30	30	30	30	30	29	29	29	29	28	28	
25.5	33	33	33	32	32	32	32	32	31	31	31	31	30	30	30	30	29	29	29	
26	34	34	33	33	33	33	33	32	32	32	32	31	31	31	31	30	30	30	30	
26.5	35	34	34	34	34	33	33	33	33	33	32	32	32	32	31	31	31	31	30	
27	35	35	35	35	34	34	34	34	33	33	33	33	32	32	32	32	31	31	31	
27.5	36	36	36	35	35	35	35	34	34	34	34	33	33	33	33	32	32	32	32	
28	37	36	36	36	36	35	35	35	35	34	34	34	34	34	33	33	33	33	32	
28.5			37	37	36	36	36	36	35	35	35	35	34	34	34	34	34	33	33	
29					37	37	37	36	36	36	36	36	36	36	35	35	35	35	34	
29.5								37	37	36	36	36	36	36	35	35	35	35	34	
30											37	37	36	36	36	36	35	35	35	
30.5													37	37	37	36	36	36	36	
31																37	37	36	36	
31.5																			37	
32																				
32.5																				
33																				
33.5																				
34																				
34.5																				
35																				

Figure B-1. Percent fat estimates for males

Circumference Value	Height (inches)																				
	69.5	70	70.5	71	71.5	72	72.5	73	73.5	74	74.5	75	75.5	76	76.5	77	77.5	78	78.5	79	79.5
13.5																					
14																					
14.5																					
15																					
15.5	10	10	10	9	9	9															
16	11	11	11	11	10	10	10	10	10	9	9										
16.5	12	12	12	12	12	11	11	11	11	11	10	10	10	10	10	9	9				
17	14	13	13	13	13	13	12	12	12	12	11	11	11	11	11	10	10	10	10	10	9
17.5	15	14	14	14	14	14	13	13	13	13	13	12	12	12	12	12	11	11	11	11	11
18	16	15	15	15	15	15	14	14	14	14	14	13	13	13	13	13	12	12	12	12	12
18.5	17	17	16	16	16	16	15	15	15	15	15	14	14	14	14	14	13	13	13	13	13
19	18	18	17	17	17	17	16	16	16	16	16	15	15	15	15	15	14	14	14	14	14
19.5	19	18	18	18	18	18	17	17	17	17	17	16	16	16	16	16	15	15	15	15	15
20	20	19	19	19	19	19	18	18	18	18	18	17	17	17	17	17	16	16	16	16	16
20.5	21	20	20	20	20	19	19	19	19	19	18	18	18	18	18	17	17	17	17	17	16
21	21	21	21	21	21	20	20	20	20	20	19	19	19	19	19	18	18	18	18	18	17
21.5	22	22	22	22	21	21	21	21	21	20	20	20	20	20	19	19	19	19	19	18	18
22	23	23	23	23	22	22	22	22	22	21	21	21	21	20	20	20	20	20	20	19	19
22.5	24	24	24	23	23	23	23	23	22	22	22	21	21	20	20	20	20	20	20	19	19
23	25	25	24	24	24	24	24	23	23	23	23	23	22	22	22	22	22	21	21	21	21
23.5	26	25	25	25	25	25	24	24	24	24	24	23	23	23	23	23	22	22	22	22	22
24	26	26	26	26	26	25	25	25	25	25	24	24	24	24	24	23	23	23	23	23	22
24.5	27	27	27	27	26	26	26	26	26	25	25	25	25	25	24	24	24	24	24	23	23
25	28	28	28	27	27	27	27	26	26	26	26	26	25	25	25	25	25	24	24	24	24
25.5	29	29	28	28	28	28	27	27	27	27	27	26	26	26	26	26	25	25	25	25	25
26	29	29	29	29	29	28	28	28	28	28	27	27	27	27	27	26	26	26	26	26	25
26.5	30	30	30	30	29	29	29	29	29	28	28	28	28	28	27	27	27	27	27	26	26
27	31	31	30	30	30	30	30	29	29	29	29	29	29	28	28	28	28	28	27	27	27
27.5	32	31	31	31	31	30	30	30	30	30	29	29	29	29	29	28	28	28	28	28	27
28	32	32	32	32	31	31	31	31	31	30	30	30	30	29	29	29	29	29	29	28	28
28.5	33	33	32	32	32	32	32	31	31	31	31	31	30	30	30	30	30	29	29	29	29
29	34	33	33	33	33	32	32	32	32	32	31	31	31	31	31	30	30	30	30	30	29
29.5	34	34	34	34	33	33	33	33	32	32	32	32	32	31	31	31	31	31	30	30	30
30	35	35	34	34	34	34	34	33	33	33	33	32	32	32	32	32	31	31	31	31	31
30.5	35	35	35	35	35	34	34	34	34	34	33	33	33	33	32	32	32	32	32	32	31
31	36	36	36	35	35	35	35	35	34	34	34	34	33	33	33	33	33	33	33	32	32
31.5	37	36	36	36	36	36	35	35	35	35	34	34	34	34	34	33	33	33	33	33	33
32		37	37	37	36	36	36	36	36	35	35	35	35	34	34	34	34	34	33	33	33
32.5					37	37	36	36	36	36	36	35	35	35	35	35	34	34	34	34	34
33								37	37	36	36	36	36	36	35	35	35	35	35	34	34
33.5											37	37	36	36	36	36	36	35	35	35	35
34													37	37	37	36	36	36	36	36	35
34.5																37	37	37	36	36	36
35																		37	37	36	36

Figure B-1. Percent fat estimates for males-Continued

Circumference Value	Height (inches)																			
	58	58.5	59	59.5	60	60.5	61	61.5	62	62.5	63	63.5	64	64.5	65	65.5	66	66.5	67	67.5
45	19																			
45.5	20	20	19																	
46	21	20	20	20	19															
46.5	21	21	21	20	20	20	19	19												
47	22	22	22	21	21	20	20	20	19	19										
47.5	23	23	22	22	22	21	21	21	20	20	19	19								
48	24	23	23	23	22	22	22	21	21	21	20	20	20	19						
48.5	24	24	24	23	23	23	23	22	22	22	21	21	21	20	20	19				
49	25	25	24	24	24	23	23	23	22	22	22	21	21	21	20	20	20	19	19	
49.5	26	26	25	25	24	24	24	23	23	23	22	22	22	21	21	21	20	20	20	19
50	27	26	26	26	25	25	24	24	24	23	23	23	22	22	22	22	21	21	21	20
50.5	27	27	27	26	26	26	25	25	25	24	24	23	23	23	22	22	22	22	21	21
51	28	28	27	27	27	26	26	26	25	25	25	24	24	24	23	23	22	22	22	22
51.5	29	28	28	28	27	27	27	26	26	26	25	25	25	24	24	24	23	23	23	22
52	29	29	29	28	28	28	27	27	27	26	26	26	25	25	25	24	24	24	23	23
52.5	30	30	29	29	29	28	28	28	27	27	27	26	26	26	25	25	25	24	24	24
53	31	30	30	30	29	29	29	28	28	28	27	27	27	26	26	26	25	25	25	24
53.5	31	31	31	30	30	30	29	29	29	28	28	28	27	27	27	26	26	25	25	25
54	32	32	31	31	31	30	30	30	29	29	29	28	28	28	27	27	27	26	26	26
54.5	33	32	32	32	31	31	31	30	30	30	29	29	29	28	28	28	27	27	27	26
55	33	33	33	32	32	32	31	31	31	30	30	30	29	29	29	28	28	28	27	27
55.5	34	34	33	33	33	32	32	32	31	31	31	30	30	30	29	29	29	28	28	28
56	35	34	34	34	33	33	33	32	32	31	31	31	30	30	30	29	29	29	29	28
56.5	35	35	35	34	34	34	33	33	32	32	32	31	31	31	30	30	30	29	29	29
57	36	36	35	35	34	34	34	33	33	33	32	32	32	31	31	31	30	30	30	29
57.5	37	36	36	35	35	35	34	34	34	33	33	33	32	32	32	31	31	31	30	30
58	37	37	36	36	36	35	35	35	34	34	34	33	33	33	32	32	32	32	31	31
58.5	38	37	37	37	36	36	36	35	35	35	34	34	34	33	33	33	32	32	32	31
59	38	38	38	37	37	37	36	36	36	35	35	35	34	34	34	33	33	33	32	32
59.5	39	39	38	38	38	37	37	36	36	36	35	35	35	34	34	34	33	33	33	33
60	40	39	39	38	38	38	37	37	37	36	36	36	35	35	35	34	34	34	33	33
60.5	40	40	39	39	39	38	38	38	37	37	37	36	36	36	35	35	35	34	34	34
61	41	40	40	40	39	39	39	38	38	38	37	37	37	36	36	36	35	35	35	34
61.5	41	41	41	40	40	40	39	39	38	38	38	37	37	37	36	36	36	35	35	35
62	42	42	41	41	40	40	40	39	39	39	38	38	38	37	37	37	36	36	36	35
62.5	42	42	42	41	41	41	40	40	40	39	39	39	38	38	38	37	37	37	36	36
63	43	43	42	42	42	41	41	41	40	40	40	39	39	39	38	38	38	37	37	37
63.5	44	43	43	42	42	42	41	41	41	40	40	40	39	39	39	38	38	38	37	37
64	44	44	43	43	43	42	42	42	41	41	41	40	40	40	39	39	39	38	38	38
64.5	45	44	44	44	43	43	43	42	42	42	41	41	41	41	40	40	40	39	39	38
65	45	45	45	44	44	43	43	43	42	42	42	41	41	41	40	40	40	39	39	39
65.5	46	45	45	45	44	44	44	43	43	43	42	42	42	41	41	41	40	40	40	39
66	46	46	46	45	45	45	44	44	43	43	43	42	42	42	41	41	41	41	40	40
66.5	47	46	46	46	45	45	45	44	44	43	43	43	42	42	42	41	41	41	41	40
67			47	46	46	46	45	45	45	44	44	44	43	43	43	42	42	42	41	41
67.5				47	46	46	46	45	45	45	44	44	44	43	43	43	42	42	42	41
68					47	47	46	46	46	45	45	45	44	44	44	43	43	43	42	42
68.5						47	46	46	46	45	45	45	44	44	44	43	43	43	43	43
69							47	47	46	46	46	45	45	45	44	44	44	44	43	43
69.5									47	46	46	46	45	45	45	44	44	44	44	44
70										47	47	46	46	46	45	45	45	44	44	44
70.5												47	46	46	46	46	45	45	45	45
71													47	47	46	46	46	46	45	45
71.5															47	47	46	46	46	46
72																47	47	46	46	46
72.5																	47	47	46	46
73																			47	47
73.5																				
74																				
74.5																				
75																				
75.5																				
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78																				
78.5																				
79																				

Figure B-2. Percent fat estimates for females

Circumference Value	Height (inches)													
	66	66.5	67	67.5	68	68.5	69	69.5	70	70.5	71	71.5	72	72.5
45														
45.5														
46														
46.5														
47														
47.5														
48														
48.5														
49	20	19	19											
49.5	20	20	20	19	19									
50	21	21	21	20	20	20	19							
50.5	22	22	21	21	21	20	20	20	19	19				
51	23	22	22	22	22	22	21	21	21	20	20	20	20	19
51.5	23	23	23	22	22	22	21	21	21	20	20	20	20	19
52	24	24	23	23	23	22	22	22	21	21	21	21	20	20
52.5	25	24	24	24	23	23	23	22	22	22	22	21	21	21
53	25	25	25	24	24	24	23	23	23	22	22	22	22	21
53.5	26	26	25	25	25	24	24	24	23	23	23	23	22	22
54	27	26	26	26	25	25	25	24	24	24	24	23	23	23
54.5	27	27	27	26	26	26	25	25	25	24	24	24	24	23
55	28	28	27	27	27	26	26	26	25	25	25	25	24	24
55.5	29	28	28	28	27	27	27	26	26	25	25	25	25	25
56	29	29	29	28	28	28	27	27	27	26	26	26	25	25
56.5	30	29	29	29	29	28	28	28	27	27	27	26	26	26
57	30	30	30	29	29	29	29	28	28	28	27	27	27	26
57.5	31	31	30	30	30	29	29	29	29	28	28	28	27	27
58	32	31	31	31	30	30	30	29	29	29	29	28	28	28
58.5	32	32	32	31	31	31	30	30	30	29	29	29	29	28
59	33	33	32	32	32	31	31	31	30	30	30	29	29	29
59.5	33	33	33	33	32	32	32	31	31	31	30	30	30	29
60	34	34	33	33	33	32	32	32	32	31	31	31	30	30
60.5	35	34	34	34	33	33	33	32	32	32	32	31	31	31
61	35	35	35	34	34	34	33	33	33	32	32	32	32	31
61.5	36	36	35	35	35	34	34	34	33	33	33	32	32	32
62	36	36	36	35	35	35	35	34	34	34	33	33	33	32
62.5	37	37	36	36	36	35	35	35	34	34	34	34	33	33
63	38	37	37	37	36	36	36	35	35	35	34	34	34	34
63.5	38	38	37	37	37	37	36	36	36	35	35	35	34	34
64	39	38	38	38	37	37	37	36	36	36	36	35	35	35
64.5	39	39	39	38	38	38	37	37	37	36	36	36	36	35
65	40	39	39	39	38	38	38	38	37	37	37	36	36	36
65.5	40	40	40	39	39	39	38	38	38	37	37	37	37	36
66	41	41	40	40	40	39	39	39	38	38	38	37	37	37
66.5	41	41	41	40	40	40	39	39	39	39	38	38	38	37
67	42	42	41	41	41	40	40	40	39	39	39	39	38	38
67.5	42	42	42	41	41	41	41	40	40	40	39	39	39	38
68	43	43	42	42	42	41	41	41	40	40	40	40	39	39
68.5	43	43	43	43	42	42	42	41	41	41	40	40	40	39
69	44	44	43	43	43	42	42	42	41	41	41	41	40	40
69.5	44	44	44	44	43	43	43	42	42	42	41	41	41	41
70	45	45	44	44	44	43	43	43	43	42	42	42	41	41
70.5	46	45	45	45	44	44	44	43	43	43	42	42	42	42
71	46	46	45	45	45	44	44	44	44	43	43	43	42	42
71.5	47	46	46	46	45	45	45	44	44	44	43	43	43	43
72	47	47	46	46	46	45	45	45	45	44	44	44	43	43
72.5			47	47	46	46	46	45	45	45	44	44	44	44
73					47	46	46	46	45	45	45	45	44	44
73.5						47	47	46	46	46	45	45	45	44
74								47	46	46	46	46	45	45
74.5									47	47	46	46	46	45
75											47	46	46	46
75.5												47	47	46
76														47

Figure B-2. Percent fat estimates for females-Continued

### B-3. Description of circumference sites and their anatomical landmarks and technique

a. All circumference measurements will be taken three times and recorded to the nearest half inch (or 0.50). Each sequential measurement should be within 1 inch of the next or previous measurement. If the measurements are within 1 inch of each other, derive a mathematical average to the nearest half of an inch. If any one of the three measurements differs by more than 1 inch, take an additional measurement. Then, average the three closest measures.

b. Each set of measurements will be completed sequentially to discourage assumption of repeated measurement readings. For males, complete one set of neck and abdomen measurements, not three neck circumferences followed by three abdomen circumferences. Continue the process by measuring the neck and abdomen in series until three sets of measurements have been completed. For females, complete one set of neck, waist (abdomen), and hip measurements, not three neck circumferences followed by three waist (abdomen) circumferences, and so on. Continue the process by measuring neck, waist (abdomen), and hip series until three sets of measurements have been completed.

c. Instructions for computing body fat are at tables B-3 (males) and B-4 (females). Percent fat estimates are shown in figures B-1 (males) and B-2 (females). Illustrations of each tape measurement are at figures B-3 (males) and B-4 (females).

d. All circumference measurement information will be recorded on a DA Form 5500 (male)/5501 (female).

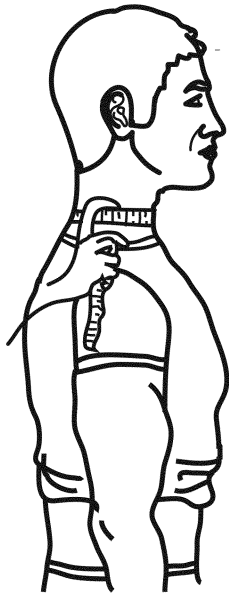
**Table B-3**  
**Instructions for completing DA Form 5500 (male)**

NAME	Print the Soldier's last name, first name, and middle initial in NAME block.
RANK	Print rank in the RANK box.
HEIGHT	Measure the Soldier's height as described in this appendix to the nearest half inch and record the measurement in HEIGHT block.
WEIGHT	Measure the Soldier's weight as described in this appendix to the nearest pound and record in WEIGHT block.
<i>Note: Follow the rounding rules for rounding height and weight measurement as described earlier in this appendix.</i>	
AGE	Print age in years in AGE block.
STEP 1	Neck measurement. Measure Soldier's neck circumference at a point just below the larynx (Adam's apple and perpendicular to the long axis of the neck). The Soldier should look straight ahead during the measurement, with shoulders down (not hunched). Round the neck measurement up to nearest half inch and record in block labeled FIRST.
STEP 2	Abdominal measurement. Measure the Soldier's abdominal circumference to nearest half inch. Round down to nearest half inch and record in block labeled FIRST.
<i>Note: Repeat STEPS 1 and 2 in series until you have completed three sets of neck and abdomen circumference measurements.</i>	
STEP 3	Average neck measurement. Find mathematical average of FIRST, SECOND, and THIRD neck circumference by adding them together and dividing by three. Place this number to nearest half inch in block marked AVERAGE for STEPS 1 and 3.
STEP 4	Average abdominal measurement. Find mathematical average of FIRST, SECOND, and THIRD abdominal circumference by adding them together and dividing by three. Place this number to nearest half inch in block marked AVERAGE for STEPS 2 and 4.
STEP 5	Circumference value equals abdominal circumference (STEP 4) minus neck circumference (STEP 3). Subtract STEP 4 from STEP 3 and enter results in STEP 5.
STEP 6	Height factor. Enter the height in inches to the nearest half inch.
<i>Note: Follow the rules for rounding of height and weight measurements as described earlier in this appendix.</i>	
STEP 7	Percent body fat. Determine percent body fat by finding Soldier's circumference value (value listed in STEP 5) and height in inches (value listed in STEP 6) in figure B-1. The percent body fat is the value that intercepts with circumference value and height in inches as listed in figure B-1. This is the Soldier's PERCENT BODY FAT.
<i>Note: Go to figure B-1 to locate the circumference value (abdomen minus neck difference) in the left-hand column.</i>	



**Table B-4**  
**Instructions for completing DA Form 5501 (female)—Continued**

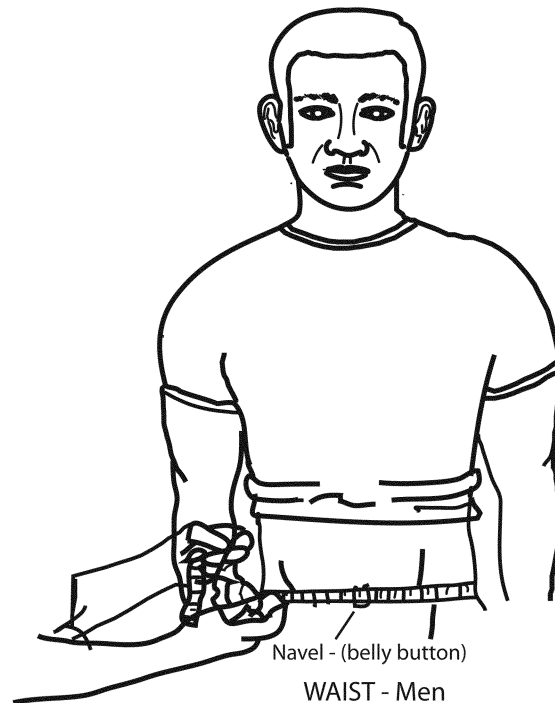
NAME	Print Soldier's last name, first name, and middle initial in NAME block.
RANK	Print rank in RANK block.
HEIGHT	Measure Soldier's height as described in this appendix to nearest half inch and record the measurement in HEIGHT block.
WEIGHT	Measure Soldier's weight as described in this appendix to nearest pound and record in WEIGHT block.
<i>Note: Follow the rules for rounding of height and weight measurement as described earlier in this appendix.</i>	
AGE	Print age in years in AGE block.
STEP 1	Neck measurement. Measure Soldier's neck circumference at a point just below the larynx (Adam's apple and perpendicular to the long axis of the neck). The Soldier should look straight ahead during the measurement, with shoulders down (not hunched). Round the neck measurement up to nearest half inch and record in block labeled FIRST.
STEP 2	Waist (abdomen) measurement. Measure Soldier's natural waist circumference against the skin at the point of minimal abdominal circumference, usually located about halfway between the navel and lower end of sternum (breastbone). If site is not easily visible, take several measurements at probable sites and use the smallest value. Ensure tape is level and parallel to floor. Soldier's arms must be at the sides. Take measurements at the end of Soldier's normal relaxed exhalation. Round the natural waist measurement down to nearest half inch and record in block labeled FIRST.
STEP 3	Hip measurement. Measure Soldier's hip circumference while facing Soldier's right side by placing the tape around the hips so that it passes over the greatest protrusion of the gluteal muscles (buttocks) as viewed from the side. Ensure tape is level and parallel to floor. Apply sufficient tension on tape to minimize effect of clothing without compressing the underlying soft tissue. Round hip measurement down to nearest half inch and record in block labeled FIRST.
	Repeat STEPS 1, 2, and 3 in series until you have completed three sets of neck, waist (abdomen), and hip circumference measurements. Find mathematical average of FIRST, SECOND, and THIRD circumference in STEPS 1, 2, and 3 by adding them together and dividing by three for each step. Place this number to nearest half inch in block marked AVERAGE for each step.
STEP 4	Calculations.
Line A	Waist (abdomen) circumference. Enter value from STEP 2 in line 4A.
Line B	Hip circumference. Enter value from STEP 3 in line 4B.
Line C	Total ( $4A+4B=4C$ ). Add waist circumference (line 4A) and hip circumference (line 4B). Enter result in line 4C.
Line D	Neck circumference. Enter value from STEP 1 in line 4D.
Line E	Circumference value ( $4C-4D=4E$ ). Subtract value in line 4C from value in line 4D. Enter result in line 4E.
Line F	Enter the height in inches to the nearest half inch in line 4F.
<i>Note: Follow the rules for rounding of height and weight measurements as described earlier in this appendix.</i>	
Line G	Percent body fat. Determine percent body fat by finding Soldier's circumference value (value listed in line 4E) and height in inches (line 4F) in figure B-2. Percent body fat is the value that intercepts with circumference value and height in inches as listed in figure B-2. This is the Soldier's PERCENT BODY FAT.
<i>Note: Go to figure B-2 to locate the circumference value in the left-hand column.</i>	



NECK - Men



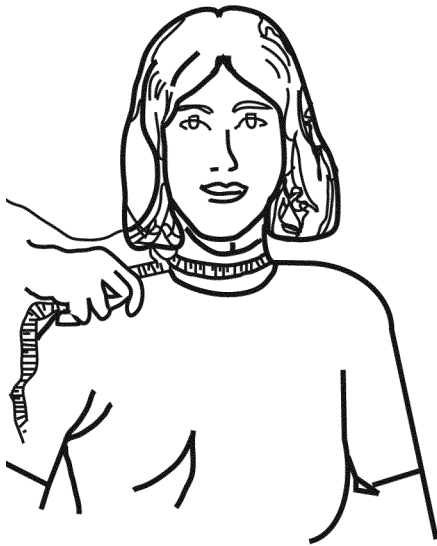
NECK - Men



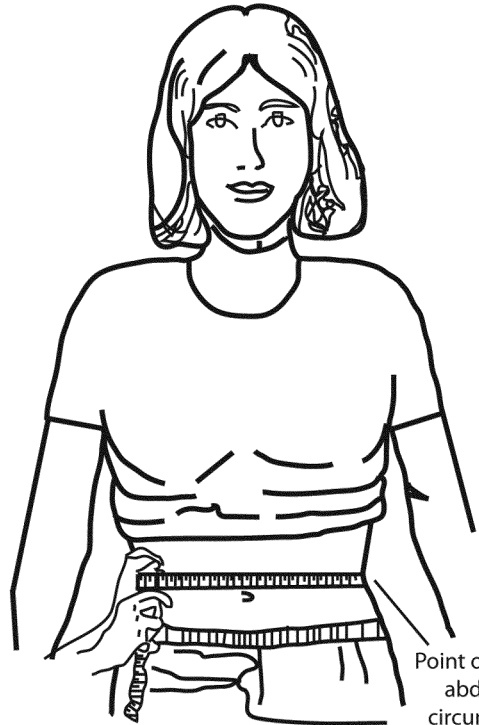
WAIST - Men

Figure B-3. Male tape measurement illustration

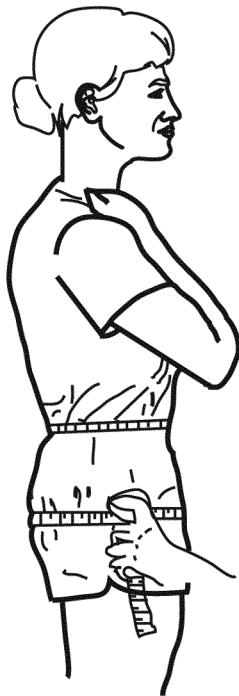
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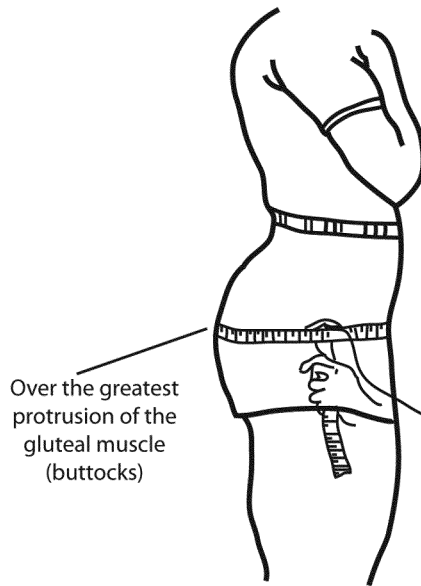
NECK - Women



WAIST - Women



HIP - Women  
side measurement



HIP - Women  
side measurement

Figure B-4. Female tape measurement illustration

#### **B-4. Circumference sites and landmarks for males**

*a. Neck.* Measure the neck circumference at a point just below the larynx (Adam's apple) and perpendicular to the long axis of the neck. Do not place the tape measure over the Adam's apple. Soldier will look straight ahead during measurement, with shoulders down (not hunched). The tape will be as close to horizontal as anatomically feasible (the tape line in the front of the neck will be at the same height as the tape line in the back of the neck). Care will be taken to ensure the shoulder/neck muscles (trapezius) are not involved in the measurement. Round neck measurement up to the nearest half inch and record (for example, round "161/4 inches" to "161/2 inches").

*b. Abdomen.* Measure abdominal circumference against the skin at the navel (belly button) level and parallel to the floor. Arms are at the sides. Record the measurement at the end of Soldier's normal, relaxed exhalation. Round abdominal measurement down to the nearest half inch and record (for example, round "34 3/4 inches" to "34 1/2 inches").

#### **B-5. Circumference sites and landmarks for females**

*a. Neck.* This procedure is the same as for males.

*b. Waist (abdomen).* Measure the natural waist circumference, against the skin, at the point of minimal abdominal circumference. The waist circumference is taken at the narrowest point of the abdomen, usually about halfway between the navel and the end of the sternum (breastbone). When this site is not easily observed, take several measurements at probable sites and record the smallest value. The Soldier's arms must be at the sides. Take measurements at the end of Soldier's normal relaxed exhalation. Tape measurements of the waist will be made directly against the skin. Round the natural waist measurement down to the nearest half inch and record (for example, round "28 5/8 inches" to "28 1/2 inches").

*c. Hip.* The Soldier taking the measurement will view the person being measured from the side. Place the tape around the hips so that it passes over the greatest protrusion of the gluteal muscles (buttocks), keeping the tape in a horizontal plane (parallel to the floor). Check front to back and side to side to be sure the tape is level to the floor on all sides before the measurements are recorded. Because the Soldier will be wearing authorized physical fitness uniform trunks, the tape can be drawn snugly without compressing the underlying soft tissue to minimize the influence of the shorts on the size of the measurement. Round the hip measurement down to the nearest half inch and record (for example, round "44 3/8 inches" to "44 inches").

#### **B-6. Preparation of DA Form 5500 and DA Form 5501**

It is extremely important that the following instructions are read before attempting to complete DA Form 5500 and/or DA Form 5501. Have a copy of the form available when reading these instructions.

*a.* Tables B-3 and B-4 and figures B-1 through B-4 will provide information needed to prepare DA Form 5500 and DA Form 5501. The instructions for the forms are written in a stepwise fashion. The measurements and computation processes are different for males and females.

*b.* A DA Form 5500 (male) or DA Form 5501 (female) must be completed for Soldiers who exceed the weight for height table (table B-1). The purpose of this form is to help determine the Soldier's percent body fat using the circumference technique described in this regulation.

*c.* Before starting, have a thorough understanding of the measurements to be made as outlined in this appendix. A scale for measuring body weight, a device for measuring height, and a measuring tape (see specifications in para B-2d) for the circumference measurements are also required.

*d.* If any of the measurements are not listed in figure B-1 or B-2, see table B-5 for guidance on how to calculate body fat percentage.

*Note.* A scientific calculator, which can be found on computers, must be used. On the computer, pull up 'calculator' from 'programs' and then click on 'view' and choose 'scientific'. Commanders are responsible for the accuracy of all calculations. Use of auto calculators is not authorized.

*e.* The DA Form 5500 or DA Form 5501 requires two signatures. The first signature is the "prepared by" which is the unit member serving to assure proper placement and tension of the tape, as well as to record the measurement on the DA Form 5500 and DA Form 5501. The second signature, "approved by supervisor," should be signed by the commander/supervisor of the Soldier being measured.

*Note.* All measurements must be in inches. Use normal rounding rules for all measurements and calculations unless otherwise specified.

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**Table B-5**  
**Sample body fat calculations—Continued**

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**SAMPLE (WOMEN)**

Measurements: Neck = 15 inches; Waist = 42 inches; Hip = 44 inches; Height = 64 inches

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The equation for women is:

$$\% \text{ body fat} = [163.205 \times \text{Log}_{10}(\text{waist} + \text{hip} - \text{neck})] - [97.684 \times \text{Log}_{10}(\text{height})] - 78.387$$

---

- A. Solve:  $[163.205 \times \text{Log}_{10}(71)]$ . Take the  $\text{Log}_{10}(71) = 1.85$  (when using a calculator, be careful not to use  $\ln$  (natural log)). Instead, enter 71 and press the LOG key.
- 
- B. Solve:  $[97.684 \times \text{Log}_{10}(64)]$ . Take the  $\text{Log}_{10}(64) = 1.81$  (when using a calculator, be careful not to use the  $\ln$  (natural log)). Instead, enter 64 and press the LOG key.
- 
- C. Solve the equation:  
 $\% \text{ body fat} = (163.205 \times 1.85) - (97.684 \times 1.81) - 78.387$   
 $= 301.93 - 176.81 - 78.387$   
 $= 47\%$  (actual number is 46.73%; round to the nearest whole %) 2-16
- 

**SAMPLE (MEN)**

Measurements: Neck = 16 inches; Waist = 49 inches; Height = 69 inches

---

The equation for men is:

$$\% \text{ body fat} = [86.010 \times \text{Log}_{10}(\text{waist} - \text{neck})] - [70.041 \times \text{Log}_{10}(\text{height})] + 36.76$$

---

- A. Solve:  $[86.010 \times \text{Log}_{10}(33)]$ . Take the  $\text{Log}_{10}(33) = 1.52$  (when using a calculator, be careful not to use  $\ln$  (natural log)). Instead, enter 33 and press the LOG key.
- 
- B. Solve:  $[70.041 \times \text{Log}_{10}(69)]$ . Take the  $\text{Log}_{10}(69) = 1.84$  (when using a calculator, be careful not to use the  $\ln$  (natural log)). Instead, enter 69 and press the LOG key.
- 
- C. Solve the equation:  
 $\% \text{ body fat} = (86.010 \times 1.521) - (70.041 \times 1.841) + 36.76$   
 $= 130.74 - 128.88 + 36.76$   
 $= 39\%$  (actual number is 38.62%; round to the nearest whole %)
-