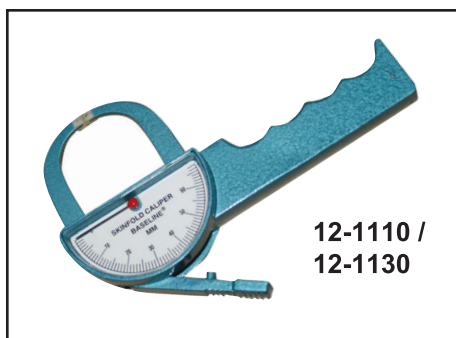


BASELINE[®]

EVALUATION INSTRUMENTS

BASELINE[®] SKINFOLD CALIPER

Operator's Manual for the Measurement of
Subcutaneous Tissue and the conversion of
this measurement to percentage of body fat.



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INTRODUCTION

The Baseline Skinfold caliper is used to measure the thickness of “skin-folds”. Measurements are taken at selected sites. The resultant skinfold thickness is then translated by means of skinfold tables to a percentage of body fat.

SKINFOLD MEASUREMENT

The Baseline Skinfold caliper is used to measure the thickness of “skin-folds”.

- take skinfold measurements directly on the skin - not through clothing
- pick-up and hold skinfold with one hand - use the other hand to measure the skinfold thickness with the Baseline Skinfold caliper
- take three measurements at each skinfold site. The final skinfold thickness at that skinfold site is the average of these readings

MEASUREMENT PROCEDURES

Locate and measure each skinfold with care. Results may vary if measurements are not consistently taken at the exact location with the same skinfold “pinch” and caliper pressure. For each skinfold location use the same measurement procedure.

- With a grease pencil, mark the measurement point on the skinfold site
- Pick-up skinfold with the thumb and forefinger of your left hand
- Apply the skinfold caliper to the site so that the grease pencil mark on the skinfold site is halfway between the caliper jaws
- Release your right thumb from the caliper lever so that the tips of the caliper jaw can exert their full force on the skinfold
- Read the skinfold measurements (in millimeters) directly from the caliper dial
- Read the measurement two more times. A total of three measurements at each site is required for accurate results
- The skinfold reading for the site is the average of the three readings.

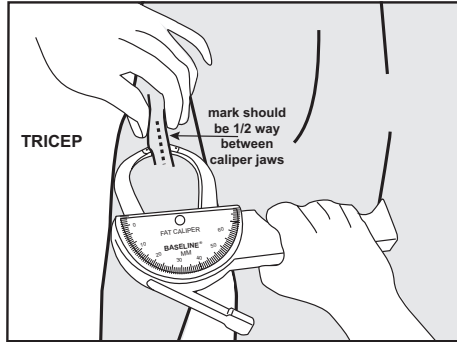
$$\text{Average skinfold readings} = (R1 + R2 + R3) / 3$$

SKINFOLD MEASUREMENT LOCATIONS

TRICEPS

Between the tip of the olecranon process of the ulna (elbow) and the acromium of the scapula (shoulder)

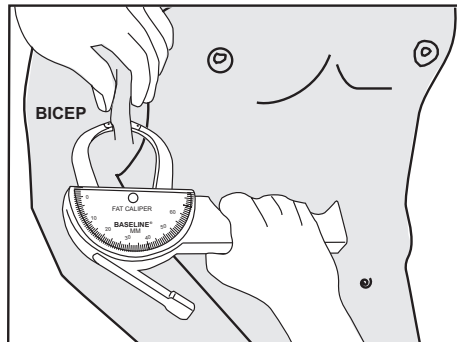
Mark the point on the back of the arm halfway between the tip of the elbow and the shoulder



BICEP

Mid point on the muscle (generally this will be opposite the nipple).

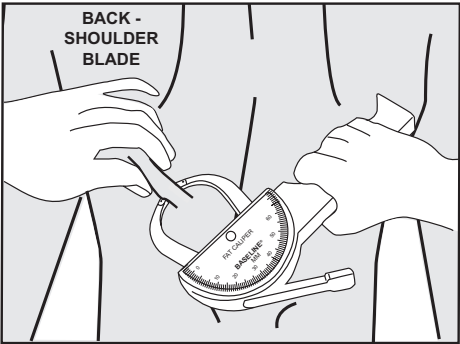
Mark the point halfway between the FLEXED bicep muscle. When taking the measurement, the muscle (arm) should be RELAXED and in a perpendicular position.



SUBSCAPULAR

Below the tip of the inferior angle of the scapular, at an angle of 45 degrees to vertical (back, just under the shoulder blade).

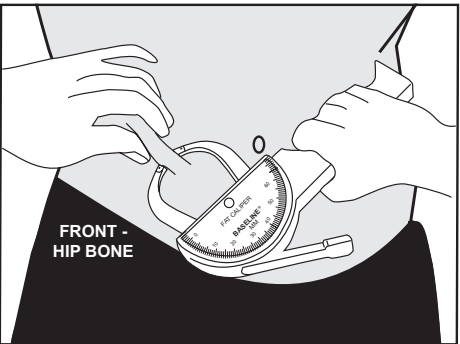
Mark the point just under the shoulder blade halfway between the spine and side. When taking the measurement, the skinfold caliper should be orientated at 45 degrees.



SUPRAILIAC

Above the iliac crest in mid-axillary line (about one inch above the hip bone at an angle of 45 degrees to vertical)

Mark the point about one inch above the hip bone. When taking the measurement, the skinfold caliper should be orientated at 45 degrees.



CHILD TABLES

The American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) suggests that national percentage norms are the best reference for skinfold measurements and body fat content in children under 17 years of age. AAHPERD suggests that the ideal is the 50th percentile: those below the 25th percentile should be encouraged to reduce the amount of body fat, while those above the 90th percentile should not be encouraged to lose body fat.

To find the appropriate percentile for boys and girls:

1. add the two (2) average skinfold readings (triceps and subscapular)
2. Find your **PERCENTILE** by reading down the appropriate age column until you intersect with the skinfold reading. Then read the percentile by looking to the left in that row.

See Boys/Girls Percentile Table on next page

BODY FAT AND SKINFOLD PERCENTILE TABLE

BOYS/GIRLS

Percentile	AGE																
	6	7	8	9	10	11	12	13	14	15	16	17					
	1st number - average of triceps and subscapular reading for BOYS / 2nd number - average of triceps and subscapular reading for GIRLS																
99	7/8	7/8	7/8	7/9	7/9	8/8	7/9	7/10	7/10	8/11	8/11	8/12					
95	8/9	9/10	9/10	9/10	9/10	9/11	9/11	9/12	9/13	9/14	9/14	9/15					
90	9/10	9/11	9/11	10/12	10/12	10/12	10/12	10/13	9/15	10/16	10/16	10/16					
85	10/11	10/12	10/12	10/12	11/13	11/13	10/13	10/14	10/16	11/17	11/18	11/18					
80	10/12	10/12	10/12	11/13	11/13	12/14	11/14	11/15	11/17	11/18	11/19	11/19					
75	11/12	11/12	11/13	11/14	12/14	12/15	11/15	12/16	11/18	12/20	12/20	12/20					
70	11/12	11/13	11/14	12/15	12/15	12/16	12/16	12/17	12/19	12/21	12/21	13/22					
65	11/13	11/13	12/14	12/15	13/16	13/16	13/17	12/18	12/20	13/22	13/22	13/22					
60	12/13	12/14	12/15	13/16	13/17	14/17	13/17	13/19	13/21	13/23	13/23	14/24					
55	12/14	12/15	13/16	13/16	14/18	15/18	14/19	14/20	13/22	14/24	14/24	14/26					
50	12/14	12/15	13/16	14/17	14/18	16/19	15/19	15/20	14/24	14/25	14/25	15/27					
45	13/15	13/16	14/17	14/18	15/20	16/20	15/21	16/22	14/25	15/26	15/27	16/28					
40	13/15	13/16	14/18	15/19	16/20	17/21	16/22	17/23	15/26	16/28	16/29	16/30					
35	13/16	14/17	15/19	16/20	17/22	19/22	17/24	18/25	16/27	18/29	14/30	17/32					
30	13/16	14/18	16/20	17/22	18/24	20/23	19/25	19/27	18/30	18/32	18/32	19/34					
25	14/17	15/19	17/21	18/24	19/25	22/25	21/27	22/30	20/32	20/34	20/34	21/36					
20	14/18	16/20	18/23	20/26	21/28	24/28	24/31	25/33	23/35	22/37	22/37	24/40					
15	16/19	17/22	19/25	23/29	24/31	28/31	27/35	29/39	27/39	25/42	24/42	26/42					
10	18/22	18/25	21/30	26/34	28/35	33/36	33/40	36/43	31/42	30/48	29/46	30/46					
5	20/26	24/28	28/36	34/40	33/41	38/42	44/48	46/51	37/52	40/56	37/57	38/58					

* **To find the appropriate percentile for boys and girls:** Add the two (2) average skinfold readings (triceps and subscapular, i.e. 11/14). Find your **PERCENTILE** by reading down the appropriate age column until you intersect with the skinfold reading. Then read the percentile by looking to the left in that row. (example: age 9, average skinfold readings 11/14, percentile would be 75).

PERCENTAGE OF BODY FAT FROM SKINFOLD MEASUREMENTS

After the skinfold measurements have been taken, these measurements can be translated to BODY FAT CONTENT AS A PERCENTAGE OF BODY WEIGHT. These percentage figures vary with age and sex.

ADULT TABLES

To find the equivalent fat content, as a percentage of body weight, for adult males and females:

- 1. add the four (4) average skinfold readings (biceps, triceps, subscapular and suprailiac)
- 2. Use the appropriate percentage of body weight table (male or female). Find your body fat as a percentage of body weight at the intersection of the appropriate AGE BRACKET column and SUM OF SKINFOLD row.

PERCENTAGE OF BODY FAT -- MALES / FEMALES

sum of 4 average skinfolds mm	AGES			
	17-29	30-39	40-49	50+
	males / females	males / females	males / females	males / females
15	4.8 / 10.5	- / -	- / -	- /
20	8.1 / 14.1	12.2 / 17.0	12.2 / 19.8	12.6 / 21.4
25	10.5 / 16.8	14.2 / 19.4	15.0 / 22.2	15.6 / 24.0
30	12.9 / 19.5	16.2 / 21.8	17.7 / 24.5	18.6 / 26.0
35	14.7 / 21.5	17.7 / 23.7	19.6 / 26.4	20.8 / 28.5
40	16.4 / 23.4	19.2 / 25.5	21.4 / 28.2	22.9 / 30.3
45	17.7 / 25.0	20.4 / 26.9	23.0 / 29.6	24.7 / 31.9
50	19.0 / 26.5	21.5 / 28.2	24.6 / 31.0	26.5 / 33.4
55	20.1 / 27.8	22.5 / 29.4	25.9 / 32.1	27.9 / 34.6
60	21.2 / 29.1	23.5 / 30.6	27.1 / 33.2	29.2 / 35.7
65	22.2 / 30.2	24.3 / 31.6	28.2 / 34.1	30.4 / 36.7
70	23.1 / 31.2	25.1 / 32.5	29.3 / 35.0	31.6 / 37.7
75	24.0 / 32.2	25.9 / 33.4	30.3 / 35.9	32.7 / 38.7
80	24.8 / 33.1	26.6 / 34.3	31.2 / 36.7	33.8 / 39.6
85	25.5 / 34.0	27.2 / 35.1	32.1 / 37.5	34.8 / 40.4
90	26.2 / 34.8	27.8 / 35.8	33.0 / 38.3	35.8 / 41.2
95	26.9 / 35.6	28.4 / 36.5	33.7 / 39.0	36.6 / 41.9
100	27.6 / 36.4	29.0 / 37.2	34.4 / 39.7	37.4 / 42.6
105	28.2 / 37.1	29.6 / 37.9	35.1 / 40.4	38.2 / 43.3
110	28.8 / 37.8	30.1 / 38.6	35.8 / 41.0	39.0 / 43.9
115	29.4 / 38.4	30.6 / 39.1	36.4 / 41.5	39.7 / 44.5
120	30.0 / 39.0	31.1 / 39.6	37.0 / 42.0	40.4 / 45.1
125	30.5 / 39.6	31.5 / 40.1	37.6 / 42.5	41.1 / 45.7
130	31.0 / 40.2	31.9 / 40.6	38.2 / 43.0	41.8 / 46.2
135	31.5 / 40.8	32.3 / 41.1	38.7 / 43.5	42.5 / 46.7
140	32.0 / 41.3	32.7 / 41.6	39.2 / 44.0	43.0 / 47.2
145	32.5 / 41.8	33.1 / 42.1	39.7 / 44.5	43.6 / 47.7
150	32.9 / 42.3	33.5 / 42.6	40.2 / 45.0	44.1 / 48.2
155	33.3 / 42.8	33.9 / 43.1	40.7 / 45.5	44.6 / 48.7
160	33.7 / 43.3	34.3 / 43.6	41.2 / 45.8	45.1 / 49.2
165	34.1 / 43.7	34.6 / 44.0	41.6 / 46.2	45.6 / 49.6
170	34.5 / 44.1	34.8 / 44.4	42.0 / 46.6	46.1 / 50.0
175	34.9 / -	- / 44.8	- / 47.0	- / 50.4
180	35.3 / -	- / 45.2	- / 47.4	- / 50.8
185	35.6 / -	- / 45.6	- / 47.8	- / 51.2
190	35.9 / -	- / 45.9	- / 48.2	- / 51.6
195	- / -	- / 46.2	- / 48.5	- / 52.0
200	- / -	- / 46.5	- / 48.8	- / 52.4
205	- / -	- / -	- / 49.1	- / 52.7
210	- / -	- / -	- / 49.4	- / 53.0

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hand dynamometer



pinch gauge



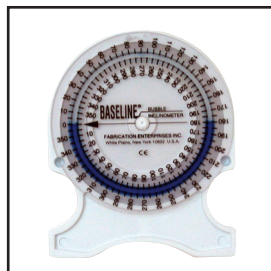
push-pull dynamometer



wrist dynamometer



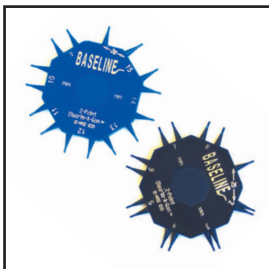
goniometer



bubble inclinometer



finger goniometer



2-point discrimination



skinfold caliper