

Manual

Lange Skinfold Caliper Operator's Manual

Lange Skinfold Caliper the leading caliper for the measurement of subcutaneous tissue



INTRODUCTION

The Lange Skinfold Caliper is a precision instrument specifically designed for the simple, accurate measurement of subcutaneous tissue. Exclusively manufactured by Beta Technology, it is widely recognized by medical and physical fitness professionals as a leader in the field.

This manual contains operational information on the Lange Caliper. It is not a program for alteration of body/fat composition.



Do not begin any program of body composition alteration without the advice of a physician.

USING THE LANGE SKINFOLD CALIPER

On half of body fat is located directly under the skin. An efficient and practical way to measure that fat is by measuring skinfolds. The Lange Skinfold Caliper assures you of accurate measurements necessary for valid testing.

FOR ACCURATE SKINFOLD MEASUREMENTS

- Take skinfold measurements directly on skin – not through clothing
- Pick up and hold skinfold with one hand, while measuring skinfold with caliper held by other hand.
- Take 3 measurements of each site. Average of the 3 is the measurement of that skinfold.

LOCATING AND MEASURING SKINFOLDS

Locate and measure each skinfold with care. Results may vary if measurements are not consistently taken at the exact locations.

Skinfold sites illustrated are those used to compile the tables contained in this booklet.

TRICEPS

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

1. With a grease pencil, mark the point of the back of the arm midway between the tip of the elbow and the shoulder.*
2. Pick up skinfold with thumb and forefinger of the left hand.
3. Apply jaws of the caliper to the skinfold so that the grease mark is midway between the jaws.
4. Release your thumb from the caliper handle, so that the tips of the caliper have full exertion on the skinfold. Take reading immediately after the first rapid fall.
5. Repeat steps 2 through 4 three times. Average of the 3 is skinfold measurement of this site.



* With experience marking site may be eliminated.

BICEPS

Midpoint muscle belly (This will generally be at a point on the arm just opposite the nipple.)

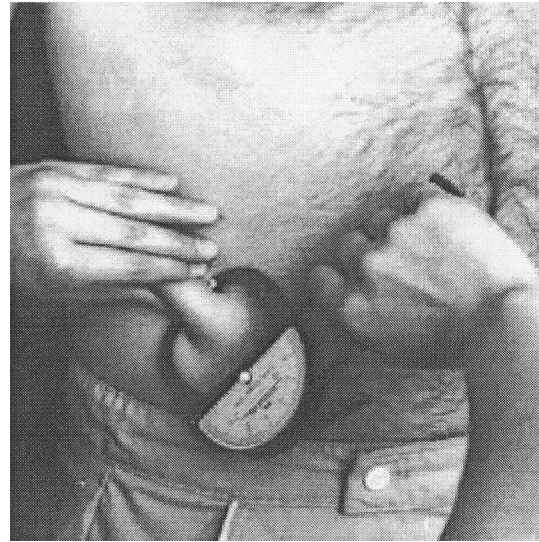
1. With grease pencil mark the point midway the flexed bicep muscle. Arm to be tested should be relaxed and in a perpendicular position before taking measurement.
2. Following natural fold, pick up skinfold with thumb and forefinger of the left hand. Proceed with steps 3, 4, and 5, in Triceps section.



SUPRAILIAC

Above iliac crest in mid-axillary line. (approximately 2.5 cm above hip bone.)

1. Pick up skinfold following the natural fold of the skin (horizontal).
2. With grease pencil, mark midway the fold. While holding the skinfold approximately 1 inch from the mark, proceed with steps 3, 4, and 5; in Triceps section.



SUBSCAPULAR

Below tip inferior angle scapula 45 degree to vertical (back – just under shoulder blade.)

1. Pick up skinfold just under the shoulder blade – following the natural fold of the skin.
2. With grease pencil, mark midway the fold. While holding the skinfold approximately 1 inch from the mark, proceed with steps 3, 4, and 5; in Triceps section.



TO CONVERT SKINFOLD MEASUREMENTS INTO PERCENT OF BODY FAT

Add the averages of all skinfold sites to arrive at a total skinfold measurement. Take this measurement to charts for determining percent of body fat.

For reference. Percent of Body Fat tables based on research involving the 4 skinfold sites illustrated (triceps, biceps, subscapular and suprailiac) follow. Tables A and B are printed with permission of The Mayo Foundation; Tables C and D are printed with permission of The American Alliance for Health, Physical Education, Recreation and Dance. Refer to publication by these organizations for further information on the subject.

USING THE TABLES

Adults:

Table A or B

Read sum of 4 skinfolds in far left column. Read across the line to appropriate age column. Figure in that column indicates what percentage of total body weight is fat.

Youth:

Table C and D

Same as above, except read sum of 2 skinfolds – Triceps and Subscapular.

Body Fat and Skinfolds

The equivalent fat content, as a percentage of body weight, for a range of values for the sum of four skinfolds

(biceps, triceps, subscapular and suprailiac) of males and females of different ages.

Table A: Males

| Skinfolds mm | Ages | | | |
|-----------------|---------|---------|---------|-------|
| | 17 - 29 | 30 - 39 | 40 - 49 | 50+ |
| 15 | 4.8 | - | - | - |
| 20 | 8.1 | 12.2 | 12.2 | 12.6 |
| 25 | 10.5 | 14.2 | 15.0 | 15.6 |
| 30 | 12.9 | 16.2 | 17.7 | 18.6 |
| 35 | 14.7 | 17.7 | 19.6 | 20.8 |
| 40 | 16.4 | 19.2 | 21.4 | 22.9 |
| 45 | 17.7 | 20.4 | 23.0 | 24.7 |
| 50 | 19.0 | 21.5 | 24.6 | 26.5 |
| 55 | 20.1 | 22.5 | 25.9 | 27.9 |
| 60 | 21.2 | 23.5 | 27.1 | 29.2 |
| 65 | 22.2 | 24.3 | 28.2 | 30.4 |
| 70 | 23.1 | 25.1 | 29.3 | 31.6 |
| 75 | 24.0 | 25.9 | 30.3 | 32.7 |
| 80 | 24.8 | 26.6 | 31.2 | 33.8 |
| 85 | 25.5 | 27.2 | 32.1 | 34.8 |
| 90 | 26.2 | 27.8 | 33.0 | 35.8 |
| 95 | 26.9 | 28.4 | 33.7 | 36.6 |
| 100 | 27.6 | 29.0 | 34.4 | 37.4 |
| 105 | 28.2 | 29.6 | 35.1 | 38.2 |
| 110 | 28.8 | 30.1 | 35.8 | 39.0 |
| 115 | 29.4 | 30.6 | 36.4 | 39.7 |
| 120 | 30.0 | 31.1 | 37.0 | 40.4 |
| 125 | 30.5 | 31.5 | 37.6 | 41.1 |
| 130 | 31.0 | 31.9 | 38.2 | 41.8 |
| 135 | 31.5 | 32.3 | 38.7 | 42.4 |
| 140 | 32.0 | 32.7 | 39.2 | 43.0 |
| 145 | 32.5 | 33.1 | 39.7 | 43.6 |
| 150 | 32.9 | 33.5 | 40.2 | 44.1 |
| 155 | 33.3 | 33.9 | 40.7 | 44.6 |
| 160 | 33.7 | 34.3 | 41.2 | 45.1 |
| 165 | 34.1 | 34.6 | 41.6 | 45.6 |
| 170 | 34.5 | 34.8 | 42.0 | 46.10 |
| 175 | 34.9 | - | - | - |
| 180 | 35.3 | - | - | - |
| 185 | 35.6 | - | - | - |
| 190 | 35.9 | - | - | - |
| 195 | - | - | - | - |
| 200 | - | - | - | - |
| 205 | - | - | - | - |
| 210 | - | - | - | - |

Table B: Females

| Skinfolds mm | Ages | | | |
|-----------------|---------|---------|---------|------|
| | 16 - 29 | 30 - 39 | 40 - 49 | 50+ |
| 15 | 10.5 | - | - | - |
| 20 | 14.1 | 17.0 | 19.8 | 21.4 |
| 25 | 16.8 | 19.4 | 22.2 | 24.0 |
| 30 | 19.5 | 21.8 | 24.5 | 26.6 |
| 35 | 21.5 | 23.7 | 26.4 | 28.5 |
| 40 | 23.4 | 25.5 | 28.2 | 30.3 |
| 45 | 25.0 | 26.9 | 29.6 | 31.9 |
| 50 | 26.5 | 28.2 | 31.0 | 33.4 |
| 55 | 27.8 | 29.4 | 32.1 | 34.6 |
| 60 | 29.1 | 30.6 | 33.2 | 35.7 |
| 65 | 30.2 | 31.6 | 34.1 | 36.7 |
| 70 | 31.2 | 32.5 | 35.0 | 37.7 |
| 75 | 32.2 | 33.4 | 35.9 | 38.7 |
| 80 | 33.1 | 34.3 | 36.7 | 39.6 |
| 85 | 34.0 | 35.1 | 37.5 | 40.4 |
| 90 | 34.8 | 35.8 | 38.3 | 41.2 |
| 95 | 35.6 | 36.5 | 39.0 | 41.9 |
| 100 | 36.4 | 37.2 | 39.7 | 42.6 |
| 105 | 37.1 | 37.9 | 40.4 | 43.3 |
| 110 | 37.8 | 38.6 | 41.0 | 43.9 |
| 115 | 38.4 | 39.1 | 41.5 | 44.5 |
| 120 | 39.0 | 39.6 | 42.0 | 45.1 |
| 125 | 39.6 | 40.1 | 42.5 | 45.7 |
| 130 | 40.2 | 40.6 | 43.0 | 46.2 |
| 135 | 40.8 | 41.1 | 43.5 | 46.7 |
| 140 | 41.3 | 41.6 | 44.0 | 47.2 |
| 145 | 41.8 | 42.1 | 44.5 | 47.7 |
| 150 | 42.3 | 42.6 | 45.0 | 48.2 |
| 155 | 42.8 | 43.1 | 45.4 | 48.7 |
| 160 | 43.3 | 43.6 | 45.8 | 49.2 |
| 165 | 43.7 | 44.0 | 46.2 | 49.6 |
| 170 | 44.1 | 44.4 | 46.6 | 50.0 |
| 175 | - | 44.8 | 47.0 | 50.4 |
| 180 | - | 45.2 | 47.4 | 50.8 |
| 185 | - | 45.6 | 47.8 | 51.2 |
| 190 | - | 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 |

In two-thirds of the instances the error was within +/-3% of the body weight as fat for the woman and +/-5% for the men.

Modified from Durman J.V.G.A., and Womersley.J. Body fat assessed from total body density and its estimation from skinfold thickness. Measurements on 481 men and women aged from 16 to 72 years. Br. J. Nutr...32.7797.1974 by permission of the Nutritional Society.

From tables on page 279 of Mayo Clinic Diet Manual Fifth Edition published by W.B. Saunders Company of Philadelphia 1981; by permission of Mayo Foundation and Cambridge University Press, publishers of the British Journal of Nutrition.

The relationship of skinfold thickness to body fat in children and individuals under 17 is address by The

American Alliance for Health, Physical Education, Recreation and Dance in the publication Lifetime Health Related Physical Fitness Test Manual. They suggest that national percentile norms provide the best reference. They further suggest that the ideal is at the 50th percentile. Those below 25 percent should be encouraged to reduce amount of body fat, while those above 90 percentile should not be encouraged to lose body fat.

Table C: Percentile Norms. Ages 6 – 18 for Sum of Triceps plus Subscapular Skinfolts (mm) for Boys***

| % | Age | | | | | | | | | | | |
|----|-----|----|----|----|----|----|----|----|----|----|----|----|
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 99 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 7 | 7 | 8 | 8 | 8 |
| 95 | 8 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| 90 | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 10 |
| 85 | 10 | 10 | 10 | 10 | 11 | 11 | 10 | 10 | 10 | 11 | 11 | 11 |
| 80 | 10 | 10 | 10 | 11 | 11 | 12 | 11 | 11 | 11 | 11 | 11 | 12 |
| 75 | 11 | 11 | 11 | 11 | 12 | 12 | 11 | 12 | 11 | 12 | 12 | 12 |
| 70 | 11 | 11 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 13 |
| 65 | 11 | 11 | 12 | 12 | 13 | 13 | 13 | 12 | 12 | 13 | 13 | 13 |
| 60 | 12 | 12 | 12 | 13 | 13 | 14 | 13 | 13 | 13 | 13 | 13 | 14 |
| 55 | 12 | 12 | 13 | 13 | 14 | 15 | 14 | 14 | 13 | 14 | 14 | 14 |
| 50 | 12 | 12 | 13 | 14 | 14 | 16 | 15 | 15 | 14 | 14 | 14 | 15 |
| 45 | 13 | 13 | 14 | 14 | 15 | 16 | 15 | 16 | 14 | 15 | 15 | 16 |
| 40 | 13 | 13 | 14 | 15 | 16 | 17 | 16 | 17 | 15 | 16 | 16 | 16 |
| 35 | 13 | 14 | 15 | 16 | 17 | 19 | 17 | 18 | 16 | 18 | 17 | 17 |
| 30 | 14 | 14 | 16 | 17 | 18 | 20 | 19 | 19 | 18 | 18 | 18 | 19 |
| 25 | 14 | 15 | 17 | 18 | 19 | 22 | 21 | 22 | 20 | 20 | 20 | 21 |
| 20 | 15 | 16 | 18 | 20 | 21 | 24 | 24 | 25 | 23 | 22 | 22 | 24 |
| 15 | 16 | 17 | 19 | 23 | 24 | 28 | 27 | 29 | 27 | 25 | 24 | 26 |
| 10 | 18 | 18 | 21 | 26 | 28 | 33 | 33 | 36 | 31 | 30 | 29 | 30 |
| 5 | 20 | 24 | 28 | 34 | 33 | 38 | 44 | 46 | 37 | 40 | 37 | 38 |

* The norms for age 17 may be used for age 18.

** Based on data from Johnston F.E., D.V. Hamill and S. Lemeshow (1) *Skinfold Thickness of Children 6-11 Years (Series, II, No. 120, 1972)*, and (2) *Skinfold Thickness of Youths 12 – 17 Years (Series II, No. 132, 1974)*. U.S. National Center for Health Statistics, U.S. Department of HEW, Washington D.C.

Table D: Percentile Norms. Ages 6 – 18 for Sum of Triceps plus Subscapular Skinfolts (mm) for Girls***

| % | Age | | | | | | | | | | | |
|----|-----|----|----|----|----|----|----|----|----|----|----|----|
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 99 | 8 | 8 | 8 | 9 | 9 | 8 | 9 | 10 | 10 | 11 | 11 | 12 |
| 95 | 9 | 10 | 10 | 10 | 10 | 11 | 11 | 12 | 13 | 14 | 14 | 15 |
| 90 | 10 | 11 | 11 | 12 | 12 | 12 | 12 | 13 | 15 | 16 | 16 | 16 |
| 85 | 11 | 12 | 12 | 12 | 13 | 13 | 13 | 14 | 16 | 17 | 18 | 18 |
| 80 | 12 | 12 | 12 | 13 | 13 | 14 | 14 | 15 | 17 | 18 | 19 | 19 |
| 75 | 12 | 12 | 13 | 14 | 14 | 15 | 15 | 16 | 18 | 20 | 20 | 20 |
| 70 | 12 | 13 | 14 | 15 | 15 | 16 | 16 | 17 | 19 | 21 | 21 | 22 |
| 65 | 13 | 13 | 14 | 15 | 16 | 16 | 17 | 18 | 20 | 22 | 22 | 23 |
| 60 | 13 | 14 | 15 | 16 | 17 | 17 | 17 | 19 | 21 | 23 | 23 | 24 |
| 55 | 14 | 15 | 16 | 16 | 18 | 18 | 19 | 20 | 22 | 24 | 24 | 26 |
| 50 | 14 | 15 | 16 | 17 | 18 | 19 | 19 | 20 | 24 | 25 | 25 | 27 |
| 45 | 15 | 16 | 17 | 18 | 20 | 20 | 21 | 22 | 25 | 26 | 27 | 28 |
| 40 | 15 | 16 | 18 | 19 | 20 | 21 | 22 | 23 | 26 | 28 | 29 | 30 |
| 35 | 16 | 17 | 19 | 20 | 22 | 22 | 24 | 25 | 27 | 29 | 30 | 32 |
| 30 | 16 | 18 | 20 | 22 | 24 | 23 | 25 | 27 | 30 | 32 | 32 | 34 |
| 25 | 17 | 19 | 21 | 24 | 25 | 25 | 27 | 30 | 32 | 34 | 34 | 36 |
| 20 | 18 | 20 | 23 | 26 | 28 | 28 | 31 | 33 | 35 | 37 | 37 | 40 |
| 15 | 19 | 22 | 25 | 29 | 31 | 31 | 35 | 39 | 39 | 42 | 42 | 42 |
| 10 | 22 | 25 | 30 | 34 | 35 | 36 | 40 | 43 | 42 | 48 | 46 | 46 |
| 5 | 26 | 28 | 36 | 40 | 41 | 42 | 48 | 51 | 52 | 56 | 57 | 58 |

* The norms for age 17 may be used for age 18.

** Based on data from Johnston F.E., D.V. Hamill and S. Lemeshow (1) *Skinfold Thickness of Children 6-11 Years (Series, II, No. 120, 1972)*, and (2) *Skinfold Thickness of Youths 12 – 17 Years (Series II, No. 132, 1974)*. U.S. National Center for Health Statistics, U.S. Department of HEW, Washington D.C.

Tables from *Lifetime Health Related Physical Fitness Test Manual, AAHPERD, Reston, VA., 1980*. With permission of The American Alliance for Health, Physical Education, Recreation and Dance.

STANDARDS AND EVALUATIONS

You have taken skinfold measurement as illustrated and have converted the information into percent of body fat. Knowing what percent of total body weight is fat allows you to evaluate and structure weight control and exercise programs to individual needs. Use this information to monitor individual progress.

The percentage of body fat you strive for will be dependent upon the program you are following. No evidence found indicates a particular percentage of body fat constitutes optimal health.

However, for purposes of comparison, much information is available. Dr. Kenneth Cooper addresses ideal percentages of body fat from an aerobic and athletic standpoint in these publications, while the Mayo Clinic Manual approaches the subject from a nutritional viewpoint. Other information is available from the Government Printing Office and your local library.

Referring to publications written by authorities in the health and physical fitness field will aid you in estimating guidelines for "ideal" percentages of body fat.

CALIBRATION

Lange Skinfold Caliper is calibrated to accuracy of +/- 1 mm. Calibration may be checked with a Gauge Block, P/N 010729 which is included with each caliper. Unit is not field adjustable. If the unit is not calibrated properly, return to Beta Technology for recalibration (see Warranty section).

CLEANING



Do not submerge Caliper in water. Do not subject to steam or excessive heat. Caliper may be surface cleaned with mild detergent and water. When necessary, tips may be cleaned with alcohol.

SELECTED REFERENCES

AAHPERD *Lifetime Health Related Physical Fitness Test Manual*, The America Alliance for Health, Physical Education, Recreation and Dance; Reston, VA, 1980.

Cooper, Kenneth H., M.D., M.P.H., *The Aerobics Way*, M. Evans and Company, Inc., New York, 1977.

Lindner, Peter, M.D., F.I.C.A., F.R.S.H., and Daisy, R.N., C.R.T., *How to Assess Degrees of Fatness*. Peter Lindner, M.D., Beta Technology, Santa Cruz, CA. U.S.A. 1973.

Mayo Clinic Diet Manual, The Mayo Foundation, W.B. Saunders, Co., Phil. PA, 1981

REPAIRS

Units in warranty are repaired at no charge. Out of warranty repairs are made on a flat rate basis. Service includes all necessary repairs, including cleaning, lubricating, calibrating, and replacing the crystal. Contact Customer Service at (800) 858-2382 or (831) 426-0882 for Return Authorization.

Publication is printed in China.

GAUGE BLOCK, CODE 010729, FOR THE LANGE SKINFOLD CALIPER

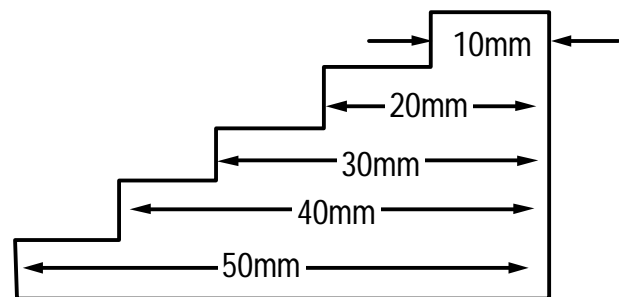


Figure 1. Gauge Block

This gauge block is used to check the Calibration of the Lange Skinfold Caliper code #014921.

INSTRUCTIONS

Open the pivoted tips and place tips on block steps as shown in Figure 1. Compare needle indication on dial face at various steps of the block.

If the unit is not calibrated properly, return to:

Beta Technology
2841 Mission Street
Santa Cruz, CA 95060-2142



Beta Technology
2841 Mission Street
Santa Cruz • CA
U.S.A. • 95060-2142

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Beta Technology is ISO 9001 Certified

