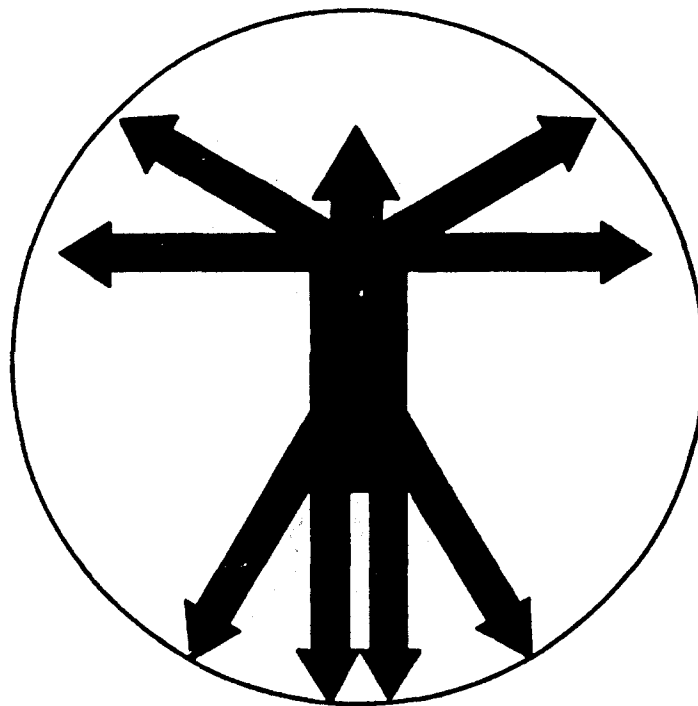


LEVEL

(1)

A COMPARISON OF SELECTED INTERNATIONAL ANTHROPOMETRIC MEASUREMENTS

AD A103181



DTIC
H

MC FILE COPY

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

81 8 18 117

(6) A COMPARISON OF SELECTED
INTERNATIONAL ANTHROPOMETRIC
MEASUREMENTS,

(11) 27 50 78

(12) 52

By
(10) R.J. Del Vecchio
G.J. Fox
R.J. Barth, Jr.

Prepared Under
Technical Overhead Project 105-609

(14) EG-SDAI-78-51

DTIC
ECTE
AUG 20 1981
D
H

DISTRIBUTION STATEMENT A
Approved for public release,
Distribution Unlimited

388847 *Shu*

CONTRACT REQUIREMENTS	CONTRACT ITEM	MODEL	CONTRACT NO

REPORT

NO EG-SDAI-78-51

DATE June 27, 1978

A COMPARISON OF SELECTED INTERNATIONAL ANTHROPOMETRIC MEASUREMENTS TECHNICAL OVERHEAD PROJECT 105-609

CODE 26512

R. J. Del Vecchio
R. J. Del Vecchio, Ph.D.
G. J. Fox
PREPARED BY R. J. Barth, Jr.

TECHNICAL APPROVAL

CHECKED BY

APPROVED BY: *Gerald J. Fox*
Gerald J. Fox

DEPARTMENT Engineering

APPROVED BY: Herman S. Binder *HSB*

SECTION SDA & I/Life Sciences

APPROVED BY: Fred Berger *FB*

REVISIONS

DATE	REV BY	REVISIONS & ADDED PAGES	REMARKS

CONTENTS

<u>Section</u>		<u>Page</u>
1	INTRODUCTION	1-1
2	POPULATION DESCRIPTIONS AND SURVEY REFERENCES	2-1
3	ANTHROPOMETRIC MEASUREMENTS	
	Stature	3-1
	Weight	3-2
	Functional Reach (Thumb-Tip Reach)	3-3
	Maximum Reach	3-4
	Sitting Height	3-5
	Eye Height, Seated	3-6
	Mid-Shoulder Height, Seated	3-7
	Popliteal Height (Height under Knee, Seated)	3-8
	Knee Height, Seated	3-9
	Buttock Popliteal Length (Upper Leg Length, Seated)	3-10
	Buttock to Knee Length, Seated	3-11
	Buttock-Leg Length, Seated	3-12
	Elbow-Fingertip Length	3-13
	Shoulder to Elbow Length	3-14
	Elbow Rest Height	3-15
	Shoulder Breadth (Bideloid Diameter)	3-16
	Elbow to Elbow Breadth	3-17
	Hip Breadth, Seated	3-18
	Knee to Knee Breadth	3-19
	Hand Length	3-20
	Palm Length	3-21
	Palm Breadth at Knuckle	3-22
	Foot Length	3-23
	Instep Length	3-24
	Foot Breadth	3-25

CONTENTS (contd)

<u>Section</u>	<u>Page</u>
Heel Breadth	3-26
Ankle (Bi-Malleolus) Breadth	3-27
Grip Diameter, Inside	3-28
Grip Diameter, Outside	3-29
Ear Height, Standing (Tragion Height)	3-30
Cervicale Height	3-31
Suprasternal Height	3-32
Nipple Height	3-33
Waist (Omphalion) Height	3-34
Gluteal Furrow Height	3-35
Crotch Height	3-36
Patella Height, Top	3-37
Chest Breadth	3-38
Waist (Omphalion) Breadth	3-39
Note on Grip Diameter Estimation	3-40



1 - INTRODUCTION

This compilation was undertaken to facilitate the acquisition of international anthropometric data in those dimensions most extensively used by Grumman. Thirty-nine different anthropometric measurements on subjects from twenty-four groups were compiled. In the data section, the group and survey year are followed by values for the third, fifth, fiftieth, ninety-fifth and ninety-eighth percentiles. For each measurement, a description of how the measurement was taken and a pictorial representation of the dimension is given.

For clarification purposes, a population description and survey reference section is included. Arranged in the order that they appear in the data section, the population groups are followed by the reference from which the data appearing in the report was obtained. Also included is a brief description of the composition and number of subjects measured in each survey.

Since not every population was measured in all the dimensions included in this report, some values could not be obtained. These are marked in the data section by a dash (-). Many surveys only included values for certain percentiles. In many cases, values for the percentiles most useful for our purposes had to be calculated from mean and standard deviation values. This calculation was done by standard statistical techniques based on the assumption that the data follow a normal distribution. Although normal distributions were rarely attained, it is the opinion of leading researchers in the field that ^{for} for most applications, estimates of percentiles derived from this technique can be used with reasonable confidence.* (See Garrett, J. W., et al., A Collation of Anthropometry, AMRL-TR-68-1, 1971, p.5.) ↗

The technique is summarized as follows:

- 3rd percentile = $\bar{X} - 1.88 \times \text{S.D.}$
- 5th percentile = $\bar{X} - 1.65 \times \text{S.D.}$
- 50th percentile = $\bar{X}$
- 95th percentile = $\bar{X} + 1.65 \times \text{S.D.}$
- 98th percentile = $\bar{X} + 2.05 \times \text{S.D.}$

All values calculated in this manner are indicated by an asterisk (*). All measurements are expressed in inches except for weight, which is in pounds. Any measurement which was not done in the manner previously specified is marked by a dagger and the method of

measurement is given. In addition, some measurements have been estimated by adding or subtracting other dimensions (e.g., tragon height = stature - distance from tragon to top of head). These estimations are also marked.

In summary, it should be kept in mind that, although the data in this report have been compiled from the latest available surveys, population dimensions do change over time. However, the general increase in body dimensions which was observed during the early half of this century has, evidently, been diminishing as of late. (For a numerical example of these changes as reflected in the R.A.F., C.B. Bolton, et al., An Anthropometric Survey of 2000 Royal Air Force Aircrew, 1970/71, NATO, AGARD - AG-181 1974, p. iii).

2 - POPULATION DESCRIPTIONS AND SURVEY REFERENCES

U.S. NAVY AVIATORS

Gifford, E. C., et al.

Anthropometry of Naval Aviators - 1964. NAEC-ACEL 533,
U.S. Naval Air Engineering Center, Philadelphia, PA., 1965.

Measurements were taken on 1549 men. The sample was composed of Naval (and Marine Corps) Aviation Officers (including navigators, and other permanently designated aeronautical personnel who can expect duties involving flying during their entire careers) and Master, Senior, and Navy and Marine Corps Aviators.

USAF FLYING PERSONNEL

Grunhofer, H.J., and Kroh, G. A Review of Anthropometric Data of German Air Force and United States Air Force Flying Personnel 1967-68.
NATO, AGARD - AG-205, 1975.

The data for USAF flying personnel were taken from measurements of 2420 subjects. These data were supplied by E. Churchill, Director of Anthropology Research Project, Webb Associates, Yellow Springs, Ohio. Rated pilots constituted about half the sample, student pilots and rated navigators both constituted 20% of the sample, while student navigators constituted 8% of the sample.

USAF WOMEN

Clauser, C.E., et al. Anthropometry of Air Force Women.
AMRL-TR-70-5, 1972.

A total of 1905 women were measured in the survey. Thirty percent of these were officers and seventy percent were enlisted women. All of the women were part of the ground crew; of the officers, almost 85% were nurses. The majority of the enlisted women held medical or administrative positions. The median age of the group was 21 years.

U.S. ARMY AVIATORS

Churchill, E., et. al. Anthropometry of U.S. Army Aviators - 1970.
U.S. Army Natick Laboratories, TR 72-52-CE, 1971.

A total of 1482 flying personnel were measured. Aviators include: Master, Senior, and Army Aviators, Trainees, Machinists, Door Gunners, Mechanics, Crew Chiefs, and Instructors. The first four categories mentioned above account for over 80% of the group.

U.S. NAVY ENLISTED

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were made on 4095 Navy enlisted men.

U.S. MARINE ENLISTED

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. NASA Contract NAS9-14720.

Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 2008 U.S. Marines.

U.S. ARMY SOLDIERS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 6682 Army men which included 2639 trainees, 3429 infantry, 489 armored personnel, and 125 army aviation personnel; of the group, 6110 were enlisted men.

U.S. ADULTS - MEN

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 1012 civilian men between the ages of 25 and 40.

U.S. ADULTS - WOMEN

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 1165 civilian women between the ages of 25 and 40.

FRENCH PILOTS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 65 pilots in the French Air Force.

GERMAN AF FLYING PERSONNEL

Grunhofer, H.J., and Kroh, G. A Review of Anthropometric Data of German Air Force and USAF Flying Personnel 1967-68. NATO AGARD-AG-205, 1975.

Measurements were taken on more than 1400 subjects by a team from the German Air Force Institute of Aviation Medicine. No breakdown of flying personnel was given.

GREECE AF PILOTS

Hertzberg, H.T., et. al. Anthropometric Survey of Turkey, Greece and Italy. AGARD, NATO, Pergamon Press, New York, 1963.

Air force pilots, flying cadets, and Air Force ground service men composed the largest part of the group of 1084 subjects measured. Army and Navy personnel were also included in the group.

ITALY AF PILOTS

Hertzberg, H.T., et. al. Anthropometric Survey of Turkey, Greece and Italy. AGARD, NATO, Pergamon Press, New York, 1963.

Air Force pilots, flying cadets and Air Force ground service men composed the largest part of the group of 1357 subjects measured. Army and Navy personnel were also included in the group.

IRAN AF TOTAL

Noorani, S. and Dillard, C.N., Jr. Volume II Anthropometric Survey of the Imperial Iranian Armed Forces, 1970.

Measurements were taken on 790 members of the Iranian Air Force. Of these, 51 (6.5%) were considered flying, with the remainder categorized as non-flying.

ISRAEL AF PILOTS + NAVIGATORS

Haas, A., and Fictor, Y. Anthropometric Survey of Flight Crew. Flight Medics Center, Air Force Command, May, 1977.

Measurements were taken on 133 pilots and navigators in the Israeli Air Force.

JAPAN AF PILOTS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976. (Based on "Anthropometry of JASDF personnel and Its Application For Human Engineering", Aeromedical Laboratory, 1972).

Measurements were taken on 210 pilots of the Japanese Air Force. Statistics for Air Force navigators were also included. However, the navigator's data are not reported in this compilation because their measurements are nearly identical to the pilots'.

KOREA - ROKAF PILOTS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 264 South Korean Air Force pilots.

RAF AIRCREW

Bolton, C.B., et. al. An Anthropometric Survey of 2000 Royal Air Force Aircrew, 1970/71. NATO, AGARD-AG-181, 1974.

Measurements were taken on 2000 subjects, including 1028 pilots, 613 navigators, and 359 other flight deck aircrew.

RAAF AIRCREW RATED

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 385 trained personnel in the Royal Australian Air Force.

RCAF PILOTS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 314 pilots in the Royal Canadian Air Force.

RNZAF FLYING PERSONNEL

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 238 members of the Royal New Zealand Air Force, including 127 pilots, 38 navigators, and 73 other aircrew.

SWEDEN AF FLYING PERSONNEL

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 240 Swedish flying personnel.

TURKEY AF PILOTS

Hertzberg, H. T., et. al. Anthropometric Survey of Turkey, Greece and Italy.
AGARD, NATO, Pergamon Press, New York, 1963.

Air Force pilots, flying cadets, and Air Force ground service men composed the largest part of the group of 915 subjects measured. Army and Navy personnel were also included in the group.

U.S. ARMY WOMEN

Churchill, E., et. al. Anthropometry of Women of the U.S. Army - 1977, Report No. 2 - The Basic Univariate Statistics. Technical Report NATICK/TR-77/024, 1977.

Over 1300 women were measured in this survey. Twenty-six percent of the sample were officers. The remaining 74% were enlisted women.

3 - ANTHROPOMETRIC MEASUREMENTS

Dimension Name: STATURE

Subject stands erect looking directly forward (head oriented in the Frankfort plane). With the anthropometer arm touching the scalp, measure the vertical distance from the standing surface to the top of the head.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	65.79	66.22	69.87	73.91	74.78
USAF FLYING PERSONNEL	1967	65.29	65.85	69.78	73.90	74.89
U.S. AIR FORCE WOMEN	1968	59.55	59.99	63.77	67.77	68.79
U.S. ARMY AVIATORS	1970	64.09	64.64	68.73	72.84	74.01
U.S. NAVY ENLISTED	1966	64.19*	64.96	68.94	73.43	74.20*
U.S. MARINE CORPS ENLISTED	1966	64.05*	64.76	68.66	72.99	73.82*
U.S. ARMY SOLDIERS	1966	63.82*	64.49	68.66	73.07	74.04*
U.S. ADULTS - MEN	1960-62	63.92*	64.60	69.02	73.23	74.35*
U.S. ADULTS - WOMEN	1960-62	59.01*	59.57	63.74	67.68	68.71*
FRENCH PILOTS	1973	63.81*	64.32	67.98	71.64	72.53*
GERMAN AF FLYING PERSONNEL	1967-68	65.22	65.74	69.58	73.72	74.60
GREECE AF PILOTS	1960-61	62.87	63.35	67.13	70.98	72.01
ITALY AF PILOTS	1960-61	62.56	63.07	67.20	71.14	72.24
IRAN AF TOTAL	1970	62.18	62.65	66.22	70.05	70.99
ISRAEL AF PILOTS + NAVIG.	1977	64.80	65.47	68.94	72.76	73.74
JAPAN AF PILOTS	1972	62.10*	62.87	65.79	69.25	70.02*
KOREA - ROKAF PILOTS	1961	63.00*	62.83	65.20	68.39	70.12*
RAF AIRCREW	1970-71	65.17	65.68	69.69	73.70	74.88
RAAF AIRCREW RATED	1973	63.24*	66.22	69.92	73.58	76.54*
RCAF PILOTS	(1)	65.35*	66.06	69.76	73.98	74.77*
RNZAF FLYING PERSONNEL	1974	64.87*	65.47*	69.67*	73.87*	74.90*
SWEDEN AF FLYING PERSONNEL	1971	66.16*	66.70*	70.32*	73.98*	74.85*
TURKEY AF PILOTS	1960-61	62.83	63.23	66.54	70.55	71.38
U.S. ARMY WOMEN	1977	59.48	60.06	64.07	68.54	69.60

(1) No date is shown for this group because the survey data was not dated.

Dimension Name: WEIGHT



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	136.24	140.32	171.10	203.58	213.47
USAF FLYING PERSONNEL	1967	135.82	140.15	172.42	210.75	220.94
U.S. AIR FORCE WOMEN	1968	99.77	102.29	126.08	156.38	166.90
U.S. ARMY AVIATORS	1970	128.86	133.09	170.53	211.65	222.57*
U.S. NAVY ENLISTED	1966	114.01*	125.24	154.57	201.32	205.52*
U.S. MARINE CORPS ENLISTED	1966	123.22*	130.98	158.32	195.14	200.51*
U.S. ARMY SOLDIERS	1966	115.21*	126.35	156.33	201.98	206.98*
U.S. ADULTS - MEN	1960-62	116.04*	127.45	166.70	218.96	226.87*
U.S. ADULTS - WOMEN	1960-62	78.43	101.43	130.32	197.13	202.01*
FRENCH PILOTS	1973	129.60*	133.62	163.83	194.70	199.78*
GERMAN AF FLYING PERSONNEL	1967-68	133.51	136.80	163.78	195.41	202.68
GREECE AF PILOTS	1960-61	120.17	123.04	146.41	177.50	185.66
ITALY AF PILOTS	1960-61	123.92	127.01	153.47	187.43	197.79
IRAN AF TOTAL	1970	110.77	113.66	137.64	184.74	198.50
ISRAEL AF PILOTS + NAVIG.	1977	127.45	131.64	158.54	206.17	213.44
JAPAN AF PILOTS	1972	111.33*	118.63	136.27	162.51	166.88*
KOREA - ROKAF PILOTS	1961	111.45*	117.09	136.71	168.90	168.12*
RAF AIRCREW	1970-71	131.08	135.38	164.15	198.45	206.97
RAAF AIRCREW RATED	1973	126.43*	112.46	160.97	209.48	215.68*
RCAF PILOTS		127.53*	131.42	167.80	202.86	213.14*
RNZAF FLYING PERSONNEL	1974	129.51*	134.06*	165.99*	198.01*	205.77*
SWEDEN AF FLYING PERSONNEL	1971	127.30*	131.20*	157.94*	184.78	191.35*
TURKEY AF PILOTS	1960-61	112.46	115.76	140.68	174.64	185.44
U.S. ARMY WOMEN	1977	99.36	102.80	131.35	164.29	175.72

Dimension Name: FUNCTIONAL REACH (THUMB TIP REACH)

Subject stands erect, his back against a wall, his right arm extended forward parallel to the floor, the tip of his index finger touching the tip of his extended thumb, the thumb in the plane of the extended arm, and his right shoulder relaxed and touching the wall. Using the anthropometer, measure the horizontal distance from the wall to the tip of the thumb.

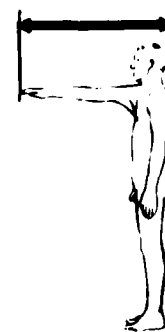


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	29.07	29.33	31.40	34.04	34.70
USAF FLYING PERSONNEL	1967	28.77	29.08	31.58	34.27	35.02
U.S. AIR FORCE WOMEN	1968	26.30	26.64	29.19	31.67	32.32
U.S. ARMY AVIATORS	1970	28.47	28.77	31.12	34.15	35.03
U.S. NAVY ENLISTED	1966	28.63*	29.13	32.05	35.16	35.84*
U.S. MARINE CORPS ENLISTED	1966	28.08*	28.62	31.57	34.88	35.49*
U.S. ARMY SOLDIERS	1966	28.93*	29.49	32.48	35.79	36.43*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	28.38	28.77	31.49	34.31	35.03
GREECE AF PILOTS	1960-61	27.40	27.68	29.76	32.01	32.76
ITALY AF PILOTS	1960-61	27.01	27.32	29.61	32.13	32.76
IRAN AF TOTAL	1970	26.97	27.31	29.66	32.24	32.81
ISRAEL AF PILOTS + NAVIG.	1977	29.06	29.53	31.73	35.35	36.18
JAPAN [†] AF PILOTS	1972	26.30	26.80	28.50	30.60	31.00
KOREA - ROKAF PILOTS	1961	24.16*	24.49	27.40	29.72	30.68*
RAF AIRCREW	1970-71	28.96	29.31	31.50	33.83	34.57
RAAF AIRCREW RATED	1973	29.03*	28.19	31.06	33.90	34.60*
RCAF PILOTS		28.80*	29.37	31.57*	34.37	34.77
RNZAF FLYING PERSONNEL	1974	29.06*	29.45*	32.10*	34.76*	35.41*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	27.36	27.64	29.65	32.20	32.99
US ARMY WOMEN	1977	24.67*	25.21	27.95	31.08	31.67*

[†] Estimated Value: obtained by subtracting 3 inches from maximum reach; at best, values are ± 1 inch.

Dimension Name: MAXIMUM REACH

Subject stands erect in a corner looking straight ahead, both shoulders against the back wall, his right arm horizontal and held against the scale, mounted on the side wall. With a block touching the dactylion (tip of middle finger), measure on the wall scale the distance from the back wall to the dactylion.

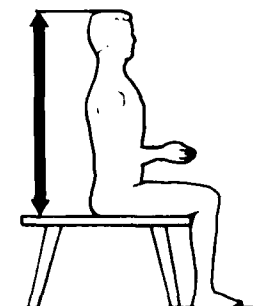


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	-	-	-	-	-
USAF FLYING PERSONNEL	1967	-	-	-	-	-
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS	1970	-	-	-	-	-
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	-	-	-	-	-
GREECE AF PILOTS	1960-61	-	-	-	-	-
ITALY AF PILOTS	1960-61	-	-	-	-	-
IRAN AF TOTAL	1970	31.08	31.43	33.58	36.03	36.68
ISRAEL AF PILOTS + NAVIG.	1977	32.76	32.83	35.08	38.46	39.29
JAPAN AF PILOTS	1972	29.29*	29.76	31.50	33.62	34.04*
KOREA - ROKAF PILOTS	1961	27.61*	27.87	30.43	32.83	33.56*
RAF AIRCREW †	1966	30.39*	30.67	33.43	35.79	36.73*
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		30.42*	30.98	33.27	36.18	36.71*
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	-	-	-	-	-
U.S. ARMY WOMEN	1977	-	-	-	-	-

† From Anthropometric Source Book

Dimension Name: SITTING HEIGHT

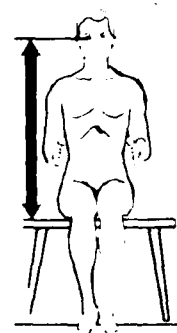
Subject sits erect, his head in the Frankfort Plane, and his feet resting on a surface adjusted so that his knees are bent at about right angles. With the anthropometer arm firmly touching the scalp, measure vertically from the sitting surface to the top of the head.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	33.96	34.24	36.27	38.36	38.95
USAF FLYING PERSONNEL	1967	34.44	34.70	36.65	38.80	39.31
U.S. AIR FORCE WOMEN	1968	31.41	31.66	33.68	35.79	36.30
U.S. ARMY AVIATORS	1970	33.41	33.73	35.79	37.91	38.46
U.S. NAVY ENLISTED	1966	33.52*	33.86	36.02	38.35	38.83*
U.S. MARINE CORPS ENLISTED	1966	33.21*	33.54	35.83	38.15	38.67*
U.S. ARMY SOLDIERS	1966	33.00*	33.35	35.75	38.07	38.66*
U.S. ADULTS - MEN	1960-62	33.45*	33.66	36.06	38.35	38.76*
U.S. ADULTS - WOMEN	1960-62	31.26*	31.46	33.82	35.98	36.37*
FRENCH PILOTS	1973	33.65*	33.91*	35.79*	37.67*	38.13*
GERMAN AF FLYING PERSONNEL	1967-68	33.30	33.58	35.79	37.96	38.43
GREECE AF PILOTS	1960-61	33.35	33.62	35.51	37.48	37.91
ITALY AF PILOTS	1960-61	32.83	33.15	35.31	37.32	37.83
IRAN AF TOTAL	1970	32.75	33.03	35.09	37.08	37.67
ISRAEL AF PILOTS + NAVIG.	1977	33.78	34.06	36.02	38.19	38.66
JAPAN AF PILOTS	1972	33.81*	34.17	35.94	37.76	38.27*
KOREA - ROKAF PILOTS	1961	33.68*	33.90	35.71	37.52	38.02*
RAF AIRCREW	1970-71	34.19	34.54	36.59	38.60	39.08
RAAF AIRCREW RATED	1973	33.58*	33.62	35.98	38.35	39.09*
RCAF PILOTS		34.42*	34.57	36.70	38.66	39.13*
RNZAF FLYING PERSONNEL	1974	33.44*	33.74*	35.87*	37.60*	38.52*
SWEDEN AF FLYING PERSONNEL	1971	34.79*	35.08*	37.00*	38.94*	39.40*
TURKEY AF PILOTS	1960-61	33.15	33.39	35.28	37.44	37.95
U.S. ARMY WOMEN	1977	30.74	31.11	33.53	35.76	36.23

Dimension Name: EYE HEIGHT, SEATED

Subject sits erect, his head in the Frankfort plane, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the vertical distance from the sitting surface to the inner corner of the right eye.

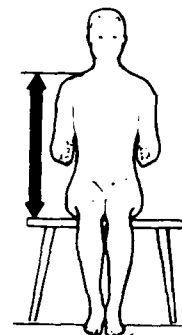


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	29.41	29.70	31.52	33.61	34.16
USAF FLYING PERSONNEL	1967	28.71	29.98	31.83	33.90	34.43
U.S. AIR FORCE WOMEN	1968	26.79	27.06	29.00	31.03	31.57
U.S. ARMY AVIATORS	1970	28.67	28.98	31.02	33.09	33.66
U.S. NAVY ENLISTED	1966	29.10*	29.45	31.42	33.54	34.01*
U.S. MARINE CORPS ENLISTED	1966	28.49*	28.70	31.02	33.07	33.66*
U.S. ARMY SOLDIERS	1966	28.35*	28.66	31.02	33.31	33.87*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	28.86	29.13	31.40	33.46	33.97
GREECE AF PILOTS	1960-61	28.62	28.80	30.71	32.60	32.99
ITALY AF PILOTS	1960-61	28.46	28.74	30.71	32.64	33.19
IRAN AF TOTAL	1970	28.26	28.54	30.67	32.69	33.23
ISRAEL AF PILOTS + NAVIG.	1977	29.92	30.08	32.09	34.33	35.16
JAPAN AF PILOTS	1972	29.16*	29.49	31.26	33.07	33.59*
KOREA - ROKAF PILOTS	1961	28.83*	29.13	31.10	33.35	33.74*
RAF AIRCREW †	1970-71	30.11	30.40	32.42	34.35	34.95
RAAF AIRCREW RATED	1973	29.30*	29.57	31.77	33.98	34.30*
RCAF PILOTS	-	-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	29.24*	29.57*	31.72*	33.90*	34.43*
SWEDEN AF FLYING PERSONNEL	1971	30.30*	30.59*	32.66*	34.72*	35.24*
TURKEY AF PILOTS	1960-61	28.27	28.50	30.51	32.52	33.07
U.S. ARMY WOMEN	1977	26.31	26.65	29.04	31.15	31.72

† Measured from floor to pupil of eye, not corner.

Dimension Name: MID-SHOULDER HEIGHT, SEATED

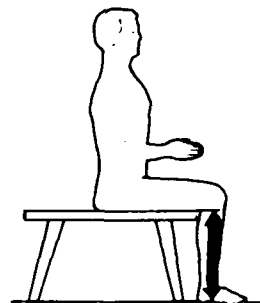
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the vertical distance from the sitting surface to the mid-shoulder landmark.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	21.81	22.03	23.80	25.54	26.02
USAF FLYING PERSONNEL	1967	-	-	-	-	-
U.S. AIR FORCE WOMEN	1968	20.98	21.15	22.80	24.61	25.05
U.S. ARMY AVIATORS	1970	22.70	22.97	24.76	26.58	27.01
U.S. NAVY ENLISTED	1966	22.46*	22.76	24.69	26.70	27.12*
U.S. MARINE CORPS ENLISTED	1966	22.20*	22.52	24.57	26.65	27.13*
U.S. ARMY SOLDIERS	1966	22.21*	22.48	24.57	26.61	27.13*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	21.93	22.24	24.39	26.30	26.78
GREECE AF PILOTS	1960-61	22.36	22.60	24.21	25.91	26.34
ITALY AF PILOTS	1960-61	22.20	22.44	24.13	25.87	26.26
IRAN AF TOTAL	1970	22.40	22.62	24.29	26.02	26.48
ISRAEL AF PILOTS + NAVIG.	1977	22.44	22.60	24.37	25.87	26.70
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	-	-	-	-	-
RAF AIRCREW	1970-71	24.19	24.46	26.20	27.90	28.31
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS	-	23.28*	23.46	25.28	27.09	27.44*
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	22.20	22.40	24.06	25.91	26.34
U.S. ARMY WOMEN	1977	-	-	-	-	-

Dimension Name: HEIGHT UNDER KNEE (POPLITEAL HEIGHT),
SEATED

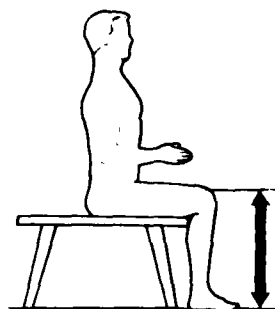
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the vertical distance from the footrest surface to the underside of the right tendon of the biceps femoris muscle where it joins the calf.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	15.74	15.93	17.29	18.78	19.09
USAF FLYING PERSONNEL	1967	15.56	15.77	17.20	18.68	19.07
U.S. AIR FORCE WOMEN	1968	14.72	14.95	16.16	17.37	17.76
U.S. ARMY AVIATORS	1970	14.89	15.11	16.64	18.33	18.80
U.S. ENLISTED NAVY	1966	15.36*	15.55	17.24	18.82	19.26*
U.S. MARINE CORPS ENLISTED	1966	16.23*	16.57	17.95	19.69	19.94*
U.S. ARMY SOLDIERS	1966	15.71*	15.98	17.52	19.21	19.58*
U.S. ADULTS - MEN	1960-62	15.57*	15.71	17.64	19.37	19.64*
U.S. ADULTS - WOMEN	1960-62	13.85*	14.09	15.75	17.44	17.79
FRENCH PILOTS	1973	16.82*	16.77	18.11	18.78	19.20*
GERMAN AF FLYING PERSONNEL	1967-68	15.32	15.55	17.09	18.55	18.92
GREECE AF PILOTS	1960-61	14.49	14.61	15.87	17.28	17.64
ITALY AF PILOTS	1960-61	14.17	14.37	15.87	17.40	17.80
IRAN AF TOTAL	1970	14.56	14.72	15.90	17.12	17.44
ISRAEL AF PILOTS + NAVIG.	1977	16.02	16.22	17.48	18.78	19.02
JAPAN AF PILOTS	1972	14.22*	14.45	15.75	17.09	17.41*
KOREA - ROKAF PILOTS	1961	14.72*	14.84	16.10	17.20	17.53*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS	-	15.57*	15.98	17.09	18.66	18.87*
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	14.65	14.84	16.18	17.68	18.07
U.S. ARMY WOMEN	1977	14.75	14.95	16.37	18.01	18.39

Dimension Name: KNEE HEIGHT, SEATED

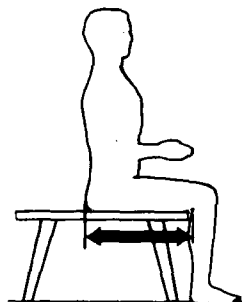
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the vertical distance from the footrest surface to the level of the musculature just above the right knee.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	20.07	20.27	21.82	23.50	23.91
USAF FLYING PERSONNEL	1967	20.15	20.37	21.94	23.60	24.05
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS	1970	19.03	19.26	20.84	22.60	23.13
U.S. NAVY ENLISTED	1966	19.18*	19.49	21.10	22.87	23.26*
U.S. MARINE CORPS ENLISTED	1966	19.40*	19.69	21.34	23.07	23.47*
U.S. ARMY SOLDIERS	1966	19.26*	19.57	21.26	23.11	23.49*
U.S. ADULTS - MEN	1960-62	19.47*	19.72	21.57	23.50	23.81
U.S. ADULTS - WOMEN	1960-62	17.66*	17.91	19.72	21.50	21.87*
FRENCH PILOTS	1973	20.43*	20.67	21.81	22.87	23.33*
GERMAN AF FLYING PERSONNEL	1967-68	19.16	19.46	21.27	23.03	23.47
GREECE AF PILOTS	1960-61	19.09	19.25	20.51	22.44	22.83
ITALY AF PILOTS	1960-61	19.13	19.33	21.02	22.76	23.19
IRAN AF TOTAL	1970	18.88	19.05	20.47	21.88	22.28
ISRAEL AF PILOTS + NAVIG.	1977	19.45	19.96	21.26	23.07	23.31
JAPAN AF PILOTS	1972	18.07*	18.35	19.53	20.87	21.17*
KOREA - ROKAF PILOTS	1961	18.13*	18.39	19.65	20.98	21.35*
RAF AIRCREW	1970-71	20.23	20.41	21.95	23.70	24.24
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		19.96*	20.28	21.70	23.66	23.92*
RNZAF FLYING PERSONNEL	1974	19.58*	19.80*	21.46*	23.15*	23.57*
SWEDEN AF FLYING PERSONNEL	1971	20.08*	20.31*	21.81*	23.31*	23.69*
TURKEY AF PILOTS	1960-61	19.02	19.17	20.51	22.20	22.56
U.S. ARMY WOMEN	1977	18.27	18.46	20.04	21.83	22.28

Dimension Name: UPPER LEG LENGTH (BUTTOCK-
POPLITEAL), SEATED

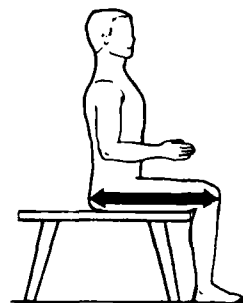
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles; the back of the calves should be in contact with the edge of the table. With the wooden block touching the rearmost surface of the buttocks, use the scale on the table surface to measure the horizontal distance from the most posterior protrusion of the right buttock to the back of the calf.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	17.97	18.19	19.76	21.45	21.87
USAF FLYING PERSONNEL	1967	17.94	18.15	19.83	21.50	21.96
U.S. AIR FORCE WOMEN	1968	16.90	17.11	18.71	20.70	21.25
U.S. ARMY AVIATORS	1970	17.48	17.66	19.32	21.03	21.42
U.S. NAVY ENLISTED	1966	17.54*	17.80	19.25	20.83	21.16*
U.S. MARINE CORPS ENLISTED	1966	17.85*	18.15	19.69	21.46	21.78*
U.S. ARMY SOLDIERS	1966	17.76*	18.03	19.61	21.26	21.63*
U.S. ADULTS - MEN	1960-62	17.27*	17.52	19.61	21.77	22.08*
U.S. ADULTS - WOMEN	1960-62	16.65*	16.93	18.98	21.10	21.42
FRENCH PILOTS	1973	17.77*	18.23	19.25	20.47	20.92*
GERMAN AF FLYING PERSONNEL	1967-68	17.19	17.46	19.20	20.87	21.22
GREECE AF PILOTS	1960-61	16.93	17.17	18.62	20.16	20.71
ITALY AF PILOTS	1960-61	17.09	17.32	18.90	20.47	20.83
IRAN AF TOTAL	1970	16.42	16.64	17.99	19.47	19.84
ISRAEL AF PILOTS + NAVIG.	1977	18.07	18.19	19.41	21.22	21.61
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	-	-	-	-	-
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	16.81	17.05	18.66	20.35	20.87
U.S. ARMY WOMEN	1977	-	-	-	-	-

Dimension Name: BUTTOCK TO KNEE LENGTH, SEATED

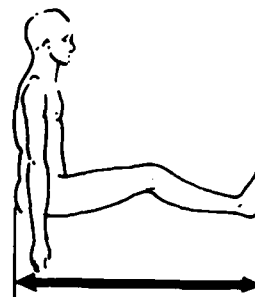
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the horizontal distance from the rearmost surface of the right buttock to the front surface of the kneecap.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	22.26	22.50	24.06	25.80	26.24
USAF FLYING PERSONNEL	1967	21.83	22.07	23.76	25.57	26.10
U.S. AIR FORCE WOMEN	1968	20.75	20.96	22.58	24.37	24.80
U.S. ARMY AVIATORS	1970	21.79	22.01	23.68	25.42	25.88
U.S. NAVY ENLISTED	1966	21.28*	21.57	23.31	25.12	25.52*
U.S. MARINE CORPS ENLISTED	1966	21.42*	21.73	23.39	25.28	25.62*
U.S. ARMY SOLDIERS	1966	21.30*	21.61	23.39	25.31	25.71*
U.S. ADULTS - MEN	1960-62	21.36*	21.54	23.54	25.51	25.80*
U.S. ADULTS - WOMEN	1960-62	20.17*	20.47	22.48	24.72	24.97*
FRENCH PILOTS	1973	21.81*	22.17	23.27	24.84	25.18*
GERMAN AF FLYING PERSONNEL	1967-68	21.77	22.00	23.66	25.36	25.75
GREECE AF PILOTS	1960-61	20.83	21.02	22.60	24.21	24.76
ITALY AF PILOTS	1960-61	21.06	21.30	22.91	24.65	25.04
IRAN AF TOTAL	1970	20.36	20.59	22.09	23.79	24.23
ISRAEL AF PILOTS + NAVIG.	1977	21.65	22.01	23.39	25.20	26.06
JAPAN AF PILOTS	1972	20.08*	20.43	21.81	23.39	23.75*
KOREA - ROKAF PILOTS	1961	19.59*	19.72	21.18	22.60	22.94*
RAF AIR CREW	1970-71	22.02	22.23	23.87	25.59	26.01
RAAF AIR CREW RATED	1973	21.54*	21.89	23.90	25.87	26.80*
RCAF PILOTS		21.95*	22.17	23.98	25.98	26.22*
RNZAF FLYING PERSONNEL	1974	22.13*	22.40*	24.20*	26.02*	26.46*
SWEDEN AF FLYING PERSONNEL	1971	22.15*	22.36*	23.95*	25.55*	25.92*
TURKEY AF PILOTS	1960-61	20.83	20.98	22.40	24.06	24.49
U.S. ARMY WOMEN	1977	20.64	20.90	22.71	24.89	25.41

Dimension Name: BUTTOCK-LEG LENGTH, SEATED

Sitting on rig floor, back to end wall. With both legs straight, buttocks pushed back to wall as far as possible. Measurement from end wall to heel block in light contact with left heel, using scale along rig floor.

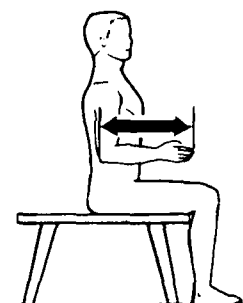


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	-	-	-	-	-
USAF FLYING PERSONNEL	1967	-	-	-	-	-
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS †	1970	41.83	42.21	44.92	47.63	48.28
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	-	-	-	-	-
GREECE AF PILOTS	1960-61	-	-	-	-	-
ITALY AF PILOTS	1960-61	-	-	-	-	-
IRAN AF TOTAL	1970	-	-	-	-	-
ISRAEL AF PILOTS + NAVIG.	1977	37.17	37.80	40.47	43.70	44.84
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	-	-	-	-	-
RAF AIRCREW	1970-71	40.06	40.53	43.95	47.37	48.19
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		40.21*	40.66	43.84	47.02	47.80*
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	-	-	-	-	-
U.S. ARMY WOMEN †	1977	38.59*	39.21	42.83	46.71	47.55*

† Subject is seated, leg extended & touching floor. Distance from back of waist to heel.

Dimension Name: ELBOW-FINGERTIP LENGTH

Subject sits erect, upper arms hanging relaxed, forearms and hands extended forward horizontally. With a beam caliper, measure the horizontal distance along the long axis of the forearm and hand from the posterior tip of the olecranon process to dactyion.

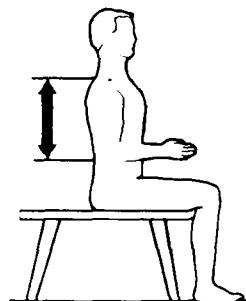


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	17.75	17.90	19.05	20.35	20.64
USAF FLYING PERSONNEL [†]	1967	17.71	17.91	19.31	20.81	21.19
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS	1970	17.40	17.59	18.95	20.32	20.75
U.S. NAVY ENLISTED	1966	17.18*	17.40	18.74	20.20	20.49*
U.S. MARINE CORPS ENLISTED	1966	17.18*	17.48	18.78	20.35	20.62*
U.S. ARMY SOLDIERS	1966	17.17*	17.44	18.86	20.43	20.75*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL [†]	1967-68	16.66	16.91	18.62	20.21	20.63
GREECE AF PILOTS [†]	1960-61	16.86	17.05	18.29	19.70	20.05
ITALY AF PILOTS [†]	1960-61	16.84	17.04	18.40	19.89	20.26
IRAN AF TOTAL	1970	16.76	16.93	18.10	19.37	19.69
ISRAEL AF PILOTS + NAVIG. [†]	1977	16.85	17.56	18.82	20.16	20.47
JAPAN AF PILOTS	1972	16.35*	16.54	17.52	18.58	18.83*
KOREA - ROKAF PILOTS	1961	16.02*	16.34	17.40	18.66	18.94*
RAF AIRCREW	1970-71	17.39	17.59	18.85	20.23	20.62
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS	-	-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	17.39*	17.56*	18.91*	20.24*	20.56*
SWEDEN AF FLYING PERSONNEL	1971	17.49*	17.68*	18.92*	20.20*	20.49*
TURKEY AF PILOTS [†]	1960-61	16.79	16.97	18.22	19.63	19.96
U.S. ARMY WOMEN	1977	15.57	15.74	17.08	18.71	19.11

[†]Measurement obtained by adding elbow-wrist length and hand length.

Dimension Name: SHOULDER TO ELBOW LENGTH

Subject sits erect, his right upper arm hanging at his side and his lower arm extended forward horizontally. Using the anthropometer, measure the vertical distance from the right acromion landmark to the bottom of the elbow.



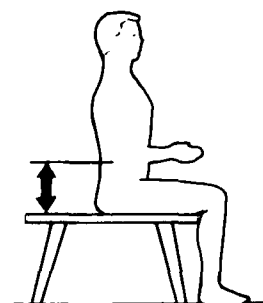
GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	13.26	13.41	14.49	15.61	15.91
USAF FLYING PERSONNEL	1967	12.91	13.06	14.14	15.28	15.55
U.S. AIR FORCE WOMEN	1968	11.01	11.15	12.22	13.25	13.50
U.S. ARMY AVIATORS	1970	13.15	13.31	14.44	15.62	15.95
U.S. NAVY ENLISTED	1966	13.16*	13.35	14.53	15.71	15.99*
U.S. MARINE CORPS ENLISTED	1966	13.25*	13.43	14.61	15.83	16.10*
U.S. ARMY SOLDIERS	1966	13.14*	13.31	14.53	15.75	16.02*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	11.44	11.81	12.68	13.66	14.04
GERMAN AF FLYING PERSONNEL	1967-68	12.95	13.13	14.52	15.85	16.15
GREECE AF PILOTS	1960-61	12.76	12.91	13.90	14.92	15.20
ITALY AF PILOTS	1960-61	12.80	12.91	14.02	15.12	15.43
IRAN AF TOTAL	1970	12.86	12.98	13.93	15.04	15.32
ISRAEL AF PILOTS + NAVIG.	1977	13.70	13.90	14.96	16.18	16.46
JAPAN AF PILOTS	1972	11.67	12.09	13.11	14.49	14.84
KOREA - ROKAF PILOTS	1961	12.60*	12.91	13.82	14.96	15.29*
RAF AIRCREW	1970-71	14.08	14.09	14.34	14.58	14.66
RAAF AIRCREW RATED	1973	14.20*	14.17	14.57	14.92	14.97*
RCAF PILOTS †		13.93*	14.02	14.41	14.61	14.98*
RNZAF FLYING PERSONNEL †	1974	14.88*	14.88*	15.07*	15.24*	15.28*
SWEDEN AF FLYING PERSONNEL	1971	13.55*	13.70*	14.82*	15.94*	16.21*
TURKEY AF PILOTS	1960-61	12.64	12.80	13.82	14.92	15.16
U.S. ARMY WOMEN	1977	12.00	12.14	13.18	14.39	14.67

† Measurement obtained by subtracting the Elbow Rest Height from the Acromial Height.

Dimension Name: ELBOW REST HEIGHT

Subject sits erect, his feet resting on a surface adjusted so that his knees are bent at about right angles, his right upper arm hanging at his side and his lower arm extended forward horizontally.

Using the anthropometer, measure the vertical distance from the sitting surface to the bottom of the tip of the right elbow.



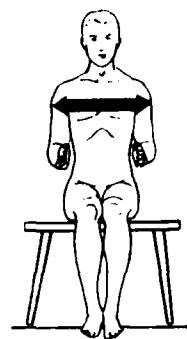
GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	7.42	7.64	9.25	10.90	11.37
USAF FLYING PERSONNEL	1967	8.00	8.24	9.89	11.63	12.09
U.S. AIR FORCE WOMEN	1968	7.17	7.37	8.92	10.59	11.02
U.S. ARMY AVIATORS	1970	7.08	7.37	9.10	10.81	11.27
U.S. NAVY ENLISTED	1966	6.74*	7.05	9.33	11.61	12.12*
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	7.65*	7.91	9.72	11.77	11.98*
U.S. ADULTS - WOMEN	1960-62	7.24*	7.44	9.33	11.18	11.50*
FRENCH PILOTS	1973	8.48*	8.66	10.24	11.34	11.81
GERMAN AF FLYING PERSONNEL	1967-68	7.02	7.30	9.32	11.30	11.76
GREECE AF PILOTS	1960-61	7.32	7.56	9.09	10.63	10.98
ITALY AF PILOTS	1960-61	7.20	7.40	8.82	10.31	10.71
IRAN AF TOTAL [†]	1970	8.43	8.54	9.31	9.97	10.14
ISRAEL AF PILOTS + NAVIG.	1977	7.44	7.72	9.61	11.18	11.81
JAPAN AF PILOTS	1972	8.67*	8.98	10.28	11.73	12.09*
KOREA - ROKAF PILOTS	1961	7.90*	8.03	9.69	11.34	11.69*
RAF AIRCREW	1970-71	7.88	8.13	9.77	11.32	11.71
RAAF AIRCREW RATED	1973	6.48*	6.30	8.70	11.10	12.36*
RCAF PILOTS		7.93*	8.07	9.69	11.06	11.58*
RNZAF FLYING PERSONNEL	1974	7.10*	7.36*	9.11*	10.87*	11.29*
SWEDEN AF FLYING PERSONNEL	1971	8.00*	8.23*	9.72*	11.22*	11.59*
TURKEY AF PILOTS	1960-61	6.93	7.17	8.82	10.39	10.79
U.S. ARMY WOMEN	1977	6.13*	6.35	8.20	9.86	10.37*

[†] Measurement obtained by subtracting the shoulder-elbow length from the acromion height, seated.

Dimension Name: SHOULDER BREADTH (BIDELTOID DIAMETER)

Subject sits erect, his upper arms hanging at his sides,
and his lower arms extended forward horizontally.

Using the anthropometer, measure the horizontal
distance across the maximum lateral protrusions of
the right and left deltoid muscles.

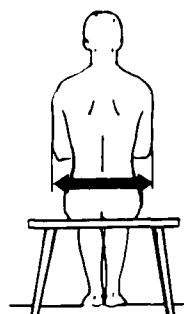


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	17.05	17.28	18.78	20.26	20.64
USAF FLYING PERSONNEL	1967	17.14	17.37	18.96	20.71	21.15
U.S. AIR FORCE WOMEN	1968	14.84	15.05	16.44	18.05	18.53
U.S. ARMY AVIATORS	1970	16.80	17.01	18.66	20.32	20.75
U.S. NAVY ENLISTED	1966	15.79*	16.10	17.64	19.45	19.76*
U.S. MARINE CORPS ENLISTED	1966	16.19*	16.46	17.87	19.49	19.78*
U.S. ARMY SOLDIERS	1966	15.98*	16.34	17.80	19.61	19.91
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	17.20*	17.09	18.78	19.92	20.40*
GERMAN AF FLYING PERSONNEL	1967-68	16.11	16.38	18.00	19.66	20.07
GREECE AF PILOTS	1960-61	16.02	16.18	17.56	19.81	19.49
ITALY AF PILOTS	1960-61	16.65	16.81	18.15	19.65	20.08
IRAN AF TOTAL	1970	15.43	15.62	17.11	19.15	19.65
ISRAEL AF PILOTS + NAVIG.	1977	16.57	16.77	18.27	19.92	20.35
JAPAN AF PILOTS	1972	16.21*	16.46	17.56	18.82	19.10*
KOREA - ROKAF PILOTS	1961	16.26*	16.50	17.56	19.06	19.11*
RAF AIR CREW	1970-71	16.93	17.15	18.47	19.82	20.24
RAAF AIR CREW RATED	1973	16.96*	16.97	18.58	20.16	20.52*
RCAF PILOTS		16.29*	16.50	18.07	19.76	19.97*
RNZAF FLYING PERSONNEL	1974	16.80*	17.01*	18.43*	19.84*	20.21*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	16.14	16.34	17.72	19.37	19.80
U.S. ARMY WOMEN	1977	14.95	15.12	16.54	17.98	18.39

Dimension Name: ELBOW TO ELBOW BREADTH

Subject sits erect, his upper arms hanging at his side, his lower arms extended forward horizontally, and his elbows resting lightly against his body.

Using the anthropometer, measure the maximum horizontal distance across the lateral surfaces of the elbows.

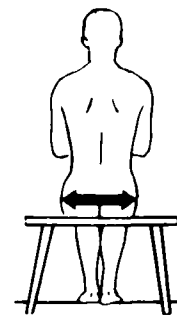


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	-	-	-	-	-
USAF FLYING PERSONNEL	1967	-	-	-	-	-
U.S. AIR FORCE WOMEN [†]	1968	12.58	12.77	14.24	16.05	16.57
U.S. ARMY AVIATORS	1970	-	-	-	-	-
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	13.11*	13.82	16.38	19.80	20.14*
U.S. ADULTS - WOMEN	1960-62	11.09*	12.24	14.57	18.78	18.98*
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	15.32	15.60	17.73	20.28	20.83
GREECE AF PILOTS	1960-61	15.71	15.98	17.60	19.45	19.92
ITALY AF PILOTS	1960-61	16.26	16.46	18.35	20.28	20.98
IRAN AF TOTAL	1970	14.84	15.10	17.29	20.85	21.73
ISRAEL AF PILOTS + NAVIG.	1977	15.04	15.35	17.32	20.79	21.30
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	14.27*	14.80	16.26	18.39	18.61*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS	-	-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	15.63	15.83	17.56	19.76	20.51
U.S. ARMY WOMEN	1977	-	-	-	-	-

[†] Measurement obtained by adding the waist breadth to 2 (humeral breadth).

Dimension Name: HIP BREADTH, SEATED

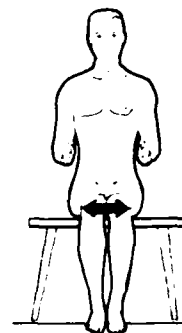
Subject sits erect. Using the anthropometer, measure horizontally across the widest protrusions of the hips.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	12.94	13.10	14.48	15.91	16.31
USAF FLYING PERSONNEL	1967	12.54	12.71	13.86	15.15	15.55
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS	1970	12.99	13.19	14.84	16.71	17.20
U.S. NAVY ENLISTED	1966	11.58*	12.01	13.23	15.04	15.23*
U.S. MARINE CORPS ENLISTED	1966	11.95*	12.24	13.39	14.84	15.08*
U.S. ARMY SOLDIERS	1966	11.69*	12.09	13.35	15.12	15.37*
U.S. ADULTS - MEN	1960-62	11.92*	12.20	14.02	16.06	16.26*
U.S. ADULTS - WOMEN	1960-62	11.60*	12.24	14.17	17.05	17.26*
FRENCH PILOTS	1973	13.09*	13.35	14.45	15.55	16.00*
GERMAN AF FLYING PERSONNEL	1967-68	12.39	12.59	13.87	15.15	15.48
GREECE AF PILOTS	1960-61	12.48	12.60	13.66	14.84	15.20
ITALY AF PILOTS	1960-61	12.76	12.87	14.02	15.28	15.59
IRAN AF TOTAL	1970	11.87	12.01	13.06	14.71	15.18
ISRAEL AF PILOTS + NAVIG.	1977	12.44	12.72	13.98	16.10	16.73
JAPAN AF PILOTS	1972	12.33*	12.64	13.46	14.61	14.80*
KOREA - ROKAF PILOTS	1961	11.65*	11.77	12.95	14.21	14.36*
RAF AIRCREW	1970-71	13.08	13.27	14.45	15.76	16.12
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	12.94*	13.11*	14.36*	15.59*	15.90*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	12.09	12.24	13.39	14.61	14.96
U.S. ARMY WOMEN	1977	-	-	-	-	-

Dimension Name: KNEE-TO-KNEE BREADTH

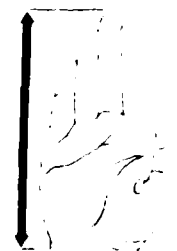
Subject sits erect, his feet resting on a surface adjusted so that his knees are bent at about right angles, with the knees touching lightly. Using the anthropometer, measure the maximum horizontal distance across the lateral surfaces of the knees.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	-	-	-	-	-
USAF FLYING PERSONNEL	1967	-	-	-	-	-
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS	1970	-	-	-	-	-
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	7.19	7.28	8.03	8.90	9.18
GREECE AF PILOTS	1960-61	7.36	7.44	8.15	9.02	9.29
ITALY AF PILOTS	1960-61	7.32	7.40	8.15	8.98	9.29
IRAN AF TOTAL	1970	-	-	-	-	-
ISRAEL AF PILOTS + NAVIG.	1977	7.28	7.40	8.07	9.37	9.72
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	6.63*	6.93	7.76	8.78	9.03*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	7.24	7.36	8.03	9.02	9.37
U.S. ARMY WOMEN	1977	-	-	-	-	-

Dimension Name: HAND LENGTH

Subject's right hand is extended stiffly in the axis of the lower arm, palm upward and fingers together. With the bar of the sliding caliper parallel to the long axis of the hand, measure the distance from the landmark at the base of the hand to the tip of the middle finger.

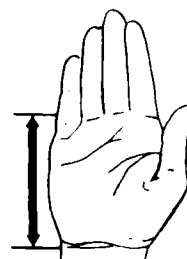


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	6.92	6.98	7.52	8.09	8.23
USAF FLYING PERSONNEL	1967	6.93	7.00	7.51	8.07	8.21
U.S. AIR FORCE WOMEN	1968	6.58	6.65	7.22	7.89	8.06
U.S. ARMY AVIATORS	1970	6.91	7.00	7.56	8.14	8.32
U.S. NAVY ENLISTED	1966	6.77*	6.85	7.44	8.03	8.17*
U.S. MARINE CORPS ENLISTED	1966	6.77*	6.89	7.44	8.11	8.21*
U.S. ARMY SOLDIERS	1966	6.78*	6.89	7.48	8.15	8.27*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	6.99*	6.97	7.60	8.03	8.18*
GERMAN AF FLYING PERSONNEL	1967-68	6.80	6.88	7.45	8.01	8.16
GREECE AF PILOTS	1960-61	6.82	6.89	7.38	7.96	8.12
ITALY AF PILOTS	1960-61	6.84	6.92	7.45	8.04	8.17
IRAN AF TOTAL	1970	6.78	6.84	7.34	7.91	8.06
ISRAEL AF PILOTS + NAVIG.	1977	6.97	7.05	7.52	8.03	8.11
JAPAN AF PILOTS [†]	1972	6.54*	6.61	7.24	7.80	7.98*
KOREA - ROKAF PILOTS	1961	6.69*	6.65	7.13	7.64	7.89*
RAF AIRCREW	1970-71	6.80	6.88	7.51	8.14	8.34
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		6.78*	6.89	7.52	7.99	8.24*
RNZAF FLYING PERSONNEL	1974	7.43*	7.52*	8.25*	8.98*	9.14*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	6.83	6.89	7.40	7.98	8.11
U.S. ARMY WOMEN	1977	6.25	6.32	6.84	7.50	7.65

[†] Palm length + length of middle finger. (from Anthropometry of JASDF Personnel and its Application for Human Engineering. Aeromedical Laboratory, 1972.)

Dimension Name: PALM LENGTH

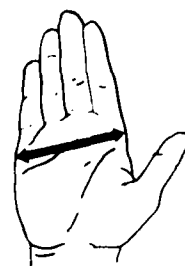
Subject's right hand is extended stiffly in the axis of the lower arm, palm upward and fingers together. With the bar of the sliding caliper parallel to the long axis of the hand, measure the distance from the landmark at the base of the hand to the skin furrow formed where the middle finger folds upon the palm.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	-	-	-	-	-
USAF FLYING PERSONNEL	1967	3.88	3.92	4.26	4.63	4.70
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS	1970	3.93	3.97	4.30	4.69	4.79
U.S. NAVY ENLISTED	1966	3.65*	3.70	4.09	4.45	4.54*
U.S. MARINE CORPS ENLISTED	1966	3.71*	3.78	4.13	4.57	4.76*
U.S. ARMY SOLDIERS	1966	3.70*	3.78	4.17	4.61	4.68*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	3.69	3.75	4.15	4.56	4.66
GREECE AF PILOTS	1960-61	3.78	3.83	4.13	4.52	4.60
ITALY AF PILOTS	1960-61	3.83	3.89	4.22	4.58	4.68
IRAN AF TOTAL	1970	3.77	3.81	4.11	4.47	4.58
ISRAEL AF PILOTS + NAVIG.	1977	3.90	3.94	4.29	4.61	4.72
JAPAN AF PILOTS	1972	3.79*	3.82	4.17	4.49	4.58*
KOREA - ROKAF PILOTS	1961	3.62*	3.70	4.06	4.41	4.49*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	3.85	3.89	4.21	4.56	4.64
U.S. ARMY WOMEN	1977	3.52	3.56	3.88	4.24	4.33

Dimension Name: PALM BREADTH AT KNUCKLE

Subject's right hand is held stiffly, palm upward, the fingers extended and together. The thumb is held away from the hand. Using the sliding caliper, measure the distance across the distal ends of the metacarpal bones.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	3.21	3.25	3.53	3.80	3.87
USAF FLYING PERSONNEL	1967	3.21	3.24	3.50	3.78	3.86
U.S. AIR FORCE WOMEN	1968	2.69	2.72	2.97	3.23	3.30
U.S. ARMY AVIATORS	1970	3.18	3.22	3.48	3.76	3.83
U.S. NAVY ENLISTED	1966	3.10*	3.19	3.50	3.94	4.00*
U.S. MARINE CORPS ENLISTED	1966	3.16*	3.23	3.50	3.78	3.84*
U.S. ARMY SOLDIERS	1966	3.14*	3.19	3.50	3.82	3.90*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	3.12*	3.19	3.43	3.70	3.76*
GERMAN AF FLYING PERSONNEL	1967-68	3.07	3.11	3.37	3.67	3.74
GREECE AF PILOTS	1960-61	3.17	3.20	3.45	3.73	3.80
ITALY AF PILOTS	1960-61	3.18	3.22	3.50	3.79	3.86
IRAN AF TOTAL	1970	3.13	3.17	3.42	3.70	3.77
ISRAEL AF PILOTS + NAVIG.	1977	3.19	3.23	3.46	3.70	3.74
JAPAN AF PILOTS	1972	3.05*	3.11	3.35	3.54	3.64*
KOREA - ROKAF PILOTS	1961	3.02*	3.07	3.31	3.54	3.59*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		3.01*	3.07	3.39	3.66	3.78*
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	3.09	3.14	3.40	3.69	3.76
U.S. ARMY WOMEN	1977	2.80	2.83	3.08	3.33	3.39

Dimension Name: FOOT LENGTH

Subject stands with his right foot in the foot box, the foot just touching the side and rear walls, its long axis parallel to the side wall, and his weight equally distributed on both feet. With the block touching the tip of the longest toe, measure foot length from the rear wall, using the scale on the floor of the box.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	9.64	9.73	10.46	11.29	11.49
USAF FLYING PERSONNEL	1967	9.79	9.89	10.63	11.43	11.64
U.S. AIR FORCE WOMEN	1968	8.64	8.74	9.47	10.23	10.43
U.S. ARMY AVIATORS	1970	9.50	9.62	10.42	11.25	11.45
U.S. NAVY ENLISTED	1966	9.48*	9.61	10.43	11.30	11.48*
U.S. MARINE CORPS ENLISTED	1966	9.56*	9.69	10.51	11.38	11.55*
U.S. ARMY SOLDIERS	1966	9.58*	9.72	10.51	11.42	11.59*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	9.63*	9.72	10.51	11.22	11.34*
GERMAN AF FLYING PERSONNEL	1967-68	9.49	9.60	10.37	11.19	11.38
GREECE AF PILOTS	1960-61	9.52	9.62	10.34	11.13	11.36
ITALY AF PILOTS	1960-61	9.59	9.69	10.41	11.17	11.40
IRAN AF TOTAL	1970	9.42	9.53	10.28	11.05	11.27
ISRAEL AF PILOTS + NAVIG.	1977	9.29	9.33	10.08	10.94	11.18
JAPAN AF PILOTS	1972	9.06*	9.17	9.72	10.31	10.47*
KOREA - ROKAF PILOTS	1961	9.03*	9.13	9.72	10.39	10.53*
RAF AIRCREW	1970-71	9.61	9.72	10.43	11.24	11.46
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		9.68*	9.76	10.47	11.38	11.52*
RNZAF FLYING PERSONNEL	1974	9.42*	9.53*	10.35*	11.18*	11.37*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	9.53	9.63	10.31	11.04	11.24
U.S. ARMY WOMEN	1977	8.69	8.80	9.55	10.42	10.65

Dimension Name: INSTEP LENGTH

Subject stands with his right foot in the foot box, the foot just touching the side and rear walls, its long axis parallel to the side wall, and his weight equally distributed on both feet. With the edge of the block touching the wider part of the foot, measure instep length from the rear wall, using the scale on the floor of the box.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	-	-	-	-	-
USAF FLYING PERSONNEL	1967	7.09	7.18	7.78	8.42	8.59
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS	1970	6.79	6.83	7.54	8.23	8.40
U.S. NAVY ENLISTED	1966	6.85*	6.97	7.64	8.31	8.46*
U.S. MARINE CORPS ENLISTED	1966	6.92*	7.05	7.72	8.43	8.56*
U.S. ARMY SOLDIERS	1966	6.96*	7.05	7.72	8.43	8.58*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	7.02*	7.17	7.56	8.11	8.18*
GERMAN AF FLYING PERSONNEL	1967-68	6.98	7.10	7.82	8.59	8.81
GREECE AF PILOTS	1960-61	6.88	6.97	7.54	8.09	8.28
ITALY AF PILOTS	1960-61	6.88	6.96	7.50	8.06	8.22
IRAN AF TOTAL	1970	6.53	6.65	7.27	7.84	8.00
ISRAEL AF PILOTS + NAVIG.	1977	6.46	6.54	7.17	7.83	7.95
JAPAN AF PILOTS	1972	6.66*	6.73	7.20	7.68	7.79*
KOREA - ROKAF PILOTS	1961	6.56*	6.69	7.17	7.64	7.90*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	6.88	6.94	7.48	8.05	8.21
U.S. ARMY WOMEN	1977	6.33	6.41	7.02	7.70	7.89

Dimension Name: FOOT BREADTH

Subject stands with his right foot in the foot box, the foot just touching the side and rear walls, its long axis parallel to the side wall, and his weight equally distributed on both feet. With the block touching the widest part of the foot, measure foot width from the side wall, using the scale on the floor of the box.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	3.53	3.58	4.00	4.58	4.74
USAF FLYING PERSONNEL	1967	3.50	3.54	3.84	4.18	4.27
U.S. AIR FORCE WOMEN	1968	3.11	3.16	3.48	3.84	3.95
U.S. ARMY AVIATORS	1970	3.51	3.56	3.92	4.33	4.44
U.S. NAVY ENLISTED	1966	3.45*	3.50	3.82	4.21	4.27*
U.S. MARINE CORPS ENLISTED	1966	3.47*	3.54	3.86	4.21	4.28*
U.S. ARMY SOLDIERS	1966	3.47*	3.54	3.56	4.25	4.32*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	3.69*	3.74	4.06	4.45	4.48
GERMAN AF FLYING PERSONNEL	1967-68	3.39	3.47	3.93	4.31	4.41
GREECE AF PILOTS	1960-61	3.61	3.66	3.98	4.33	4.40
ITALY AF PILOTS	1960-61	3.64	3.69	4.02	4.36	4.46
IRAN AF TOTAL	1970	3.68	3.74	4.05	4.48	4.55
ISRAEL AF PILOTS + NAVIG.	1977	3.50	3.54	3.86	4.25	4.37
JAPAN AF PILOTS	1972	3.75*	3.86	4.13	4.41	4.48*
KOREA - ROKAF PILOTS	1961	3.40*	3.54	3.82	4.09	4.11*
RAF AIRCREW	1970-71	3.43	3.46	3.73	4.03	4.11
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		3.71	3.66	4.09	4.49	4.53*
RNZAF FLYING PERSONNEL	1974	3.44*	3.50*	3.87*	4.25*	4.34*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	3.59	3.64	3.99	4.38	4.48
U.S. ARMY WOMEN	1977	3.12	3.17	3.49	3.83	3.93

Dimension Name: HEEL BREADTH

The Maximum breadth of the heel is measured behind the projections of the ankle bones.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	-	-	-	-	-
USAF FLYING PERSONNEL	1967	-	-	-	-	-
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS †	1970	1.51	1.55	1.79	2.05	2.13
U.S. NAVY ENLISTED	1966	2.33*	2.36*	2.64*	2.95*	2.99*
U.S. MARINE CORPS ENLISTED	1966	2.36*	2.44*	2.68*	2.99*	3.04*
U.S. ARMY SOLDIERS	1966	2.35*	2.44*	2.68*	3.03*	3.08*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	2.49*	2.52	2.76	2.99	3.04*
GERMAN AF FLYING PERSONNEL	1967-68	-	-	-	-	-
GREECE AF PILOTS	1960-61	-	-	-	-	-
ITALY AF PILOTS	1960-61	-	-	-	-	-
IRAN AF TOTAL	1970	2.38	2.41	2.66	2.88	2.96
ISRAEL AF PILOTS + NAVIG.	1977	-	-	-	-	-
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	2.20*	2.24	2.48	2.68	2.78*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	-	-	-	-	-
U.S. ARMY WOMEN	1977	2.12	2.15	2.38	2.69	2.77

† Maximum horizontal breadth of the right calcaneus.

Dimension Name: ANKLE BREADTH (Bi - MALLEOLUS)

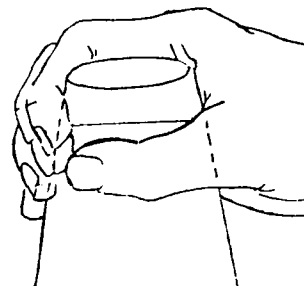
Subject stands, legs slightly apart, weight distributed equally on both feet. Holding the anthropometer shaft perpendicular to the long axis of the foot, measure horizontally across the maximum protrusions of the medial and lateral ankle bones of the right foot.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	-	-	-	-	-
USAF FLYING PERSONNEL	1967	2.62	2.65	2.88	3.14	3.21
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS	1970	-	-	-	-	-
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	2.62*	2.68	2.91	3.23	3.26*
GERMAN AF FLYING PERSONNEL	1967-68	2.70	2.73	3.03	3.32	3.42
GREECE AF PILOTS	1960-61	2.67	2.70	2.94	3.19	3.26
ITALY AF PILOTS	1960-61	2.65	2.69	2.94	3.21	3.28
IRAN AF TOTAL	1970	-	-	-	-	-
ISRAEL AF PILOTS + NAVIG.	1977	2.56	2.60	2.83	3.15	3.19
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	2.64*	2.68	2.95	3.15	3.27*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	2.67	2.70	2.97	3.26	3.34
U.S. ARMY WOMEN	1977	-	-	-	-	-

Dimension Name: GRIP DIAMETER, INSIDE [†]

The diameter of the widest level of a cone which the subject can grasp with his thumb and middle finger touching.

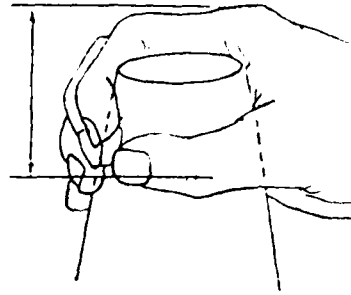


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	1.71	1.76	1.93	2.14	2.16
USAF FLYING PERSONNEL	1967	1.71	1.76	1.93	2.14	2.16
U.S. AIR FORCE WOMEN	1968	1.63	1.68	1.86	2.09	2.12
U.S. ARMY AVIATORS	1970	1.71	1.76	1.94	2.16	2.19
U.S. NAVY ENLISTED	1966	1.67	1.73	1.91	2.13	2.15
U.S. MARINE CORPS ENLISTED	1966	1.67	1.74	1.91	2.15	2.16
U.S. ARMY SOLDIERS	1966	1.67	1.74	1.92	2.16	2.18
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	1.73	1.76	1.95	2.13	2.15
GERMAN AF FLYING PERSONNEL	1967-68	1.68	1.76	1.91	2.12	2.15
GREECE AF PILOTS	1960-61	1.68	1.74	1.90	2.11	2.13
ITALY AF PILOTS	1960-61	1.69	1.74	1.91	2.13	2.15
IRAN AF TOTAL	1970	1.67	1.72	1.89	2.10	2.12
ISRAEL AF PILOTS + NAVIG.	1977	1.72	1.78	1.93	2.13	2.13
JAPAN AF PILOTS	1972	1.59	1.61	1.81	2.05	2.09
KOREA - ROKAF PILOTS	1961	1.68	1.73	1.89	2.05	2.08
RAF AIRCREW	1970-71	1.68	1.76	1.93	2.16	2.19
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		1.67	1.76	1.93	2.12	2.16
RNZAF FLYING PERSONNEL	1974	1.84	1.90	2.12	2.38	2.40
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	1.69	1.74	1.90	2.11	2.13
U.S. ARMY WOMEN	1977	-	-	-	-	-

[†] All values are estimated except KOREAN PILOTS & JAPANESE PILOTS. Refer to page 3-40.

Dimension Name: GRIP DIAMETER, OUTSIDE †

The distance between the first and second phalanges of the thumb and the knuckle of the middle finger measured with the hand held as for grip diameter, inside.

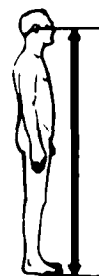


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	3.60	3.71	3.76	4.37	4.42
USAF FLYING PERSONNEL	1967	3.60	3.72	3.76	4.36	4.41
U.S. AIR FORCE WOMEN	1968	3.42	3.54	3.61	4.26	4.33
U.S. ARMY AVIATORS	1970	3.59	3.72	3.78	4.40	4.47
U.S. NAVY ENLISTED	1966	3.52	3.64	3.72	4.34	4.39
U.S. MARINE CORPS ENLISTED	1966	3.52	3.67	3.72	4.38	4.41
U.S. ARMY SOLDIERS	1966	3.53	3.67	3.74	4.40	4.44
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	3.63	3.71	3.73	4.34	4.39
GERMAN AF FLYING PERSONNEL	1967-68	3.54	3.66	3.73	4.33	4.38
GREECE AF PILOTS	1960-61	3.55	3.67	3.69	4.30	4.36
ITALY AF PILOTS	1960-61	3.55	3.68	3.73	4.34	4.38
IRAN AF TOTAL	1970	3.53	3.64	3.67	4.27	4.33
ISRAEL AF PILOTS + NAVIG.	1977	3.62	3.75	3.76	4.34	4.36
JAPAN AF PILOTS	1972	3.40	3.52	3.62	4.21	4.29
KOREA - ROKAF PILOTS	1961	3.48	3.54	3.56	4.13	4.24
RAF AIRCREW	1970-71	3.54	3.66	3.76	4.40	4.48
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		3.53	3.66	3.76	4.33	4.42
RNZAF FLYING PERSONNEL	1974	3.86	4.00	4.13	4.85	4.91
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	3.55	3.67	3.70	4.31	4.36
U.S. ARMY WOMEN	1977	-	-	-	-	-

† All values are estimated except KOREA - ROKAF pilots. Refer to page 3-40.

Dimension Name: EAR HEIGHT, STANDING (TRAGION HEIGHT)

The height of the tragion.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	60.82	61.25	64.84	68.75	69.62
USAF FLYING PERSONNEL †	1967	60.46	60.96	64.48	68.21	69.10
U.S. AIR FORCE WOMEN †	1968	55.06	55.44	58.78	62.23	63.11
U.S. ARMY AVIATORS †	1970	59.28	59.76	63.49	67.25	68.32
U.S. NAVY ENLISTED †	1966	59.49	60.20	63.59	67.56	68.18*
U.S. MARINE CORPS ENLISTED †	1966	59.29	63.38	67.28	68.00	68.00*
U.S. ARMY SOLDIERS †	1966	59.20*	59.80	63.46	67.36	68.19*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	60.56*	61.06	64.13	67.52	68.36*
GERMAN AF FLYING PERSONNEL †	1967-68	60.88	61.27	64.48	68.02	68.76
GREECE AF PILOTS †	1960-61	57.98	58.41	61.82	65.33	66.27
ITALY AF PILOTS †	1960-61	57.86	58.32	62.09	65.68	66.69
IRAN AF TOTAL	1970	57.74	58.05	61.00	64.42	65.25
ISRAEL AF PILOTS + NAVIG.	1977	60.27	60.82	63.74	67.09	68.03
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	57.77*	57.91	61.22	63.62	64.97*
RAF AIRCREW †	1970-71	60.52	60.97	64.58	68.26	69.28
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	61.57	64.56	68.19	68.84*
RNZAF FLYING PERSONNEL	1974	60.20*	60.75*	64.45*	68.16*	69.09*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS †	1960-61	58.05	58.41	61.37	64.99	65.73
U.S. ARMY WOMEN †	1977	54.78	55.29	58.88	62.92	63.88*

† Measurement is stature minus the tragion to top of head length.

Dimension Name: CERVICALE HEIGHT

Subject stands erect, his head in the Frankfort plane.

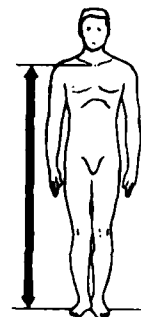
Using the anthropometer, measure the vertical distance from the standing surface to the cervicale landmark indicating the protrusion of the spinous process of the 7th cervical vertebra.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	55.64	56.05	59.42	63.26	64.11
USAF FLYING PERSONNEL	1967	55.53	56.10	59.84	63.70	64.70
U.S. AIR FORCE WOMEN	1968	50.89	51.30	54.75	58.43	59.37
U.S. ARMY AVIATORS	1970	54.53	55.03	58.93	62.80	63.89
U.S. NAVY ENLISTED	1966	54.23*	54.96	58.86	63.15	64.01*
U.S. MARINE CORPS ENLISTED	1966	54.38*	55.08	58.82	62.99	63.82*
U.S. ARMY SOLDIERS	1966	54.19*	54.84	58.86	63.07	64.00*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	55.23	55.72	59.38	63.27	64.18
GREECE AF PILOTS	1960-61	52.91	53.43	56.81	60.55	61.50
ITALY AF PILOTS	1960-61	52.83	53.39	57.40	61.22	62.28
IRAN AF TOTAL	1970	52.71	53.15	56.54	60.20	61.05
ISRAEL AF PILOTS + NAVIG.	1977	54.57	55.08	58.11	62.28	62.99
JAPAN AF PILOTS	1972	52.15*	52.87	55.59	59.02	59.61*
KOREA - ROKAF PILOTS	1961	52.65*	52.87	56.02	58.74	59.60*
RAF AIRCREW	1970-71	55.51	55.92	59.72	63.54	64.56
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		55.50*	56.18	59.49	63.39	64.13*
RNZAF FLYING PERSONNEL	1974	54.93*	55.47*	59.39*	63.31*	64.26*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	52.87	53.27	56.46	60.31	61.26
U.S. ARMY WOMEN	1977	50.67*	51.17	55.32	58.97	60.09*

Dimension Name: SUPRASTERNAL HEIGHT

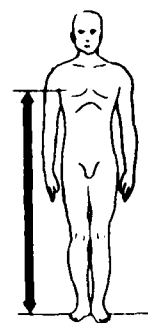
Subject stands erect. Using the anthropometer, measure the vertical distance from the standing surface to the suprasternal landmark.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	53.44	53.82	57.14	60.75	61.52
USAF FLYING PERSONNEL	1967	53.15	53.65	57.12	60.82	61.71
U.S. AIR FORCE WOMEN	1968	48.18	48.59	51.92	55.48	56.38
U.S. ARMY AVIATORS	1970	-	-	-	-	-
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	53.23*	53.78	56.42	59.96	60.40*
GERMAN AF FLYING PERSONNEL	1967-68	52.92	53.43	56.75	60.36	61.14
GREECE AF PILOTS	1960-61	50.43	51.02	54.37	57.91	58.94
ITALY AF PILOTS	1960-61	50.39	50.83	54.49	58.11	59.09
IRAN AF TOTAL	1970	-	-	-	-	-
ISRAEL AF PILOTS + NAVIG.	1977	52.44	53.03	55.59	59.57	60.00
JAPAN AF PILOTS	1972	49.95*	50.55	53.15	56.14	56.80*
KOREA - ROKAF PILOTS	1961	50.63*	51.06	53.98	56.57	57.50*
RAF AIRCREW	1966	52.64	52.91	56.65	59.92	60.94*
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	50.63	50.94	53.98	57.44	58.23
U.S. ARMY WOMEN	1977	48.04*	48.57	52.22	55.89	56.76*

Dimension Name: NIPPLE HEIGHT

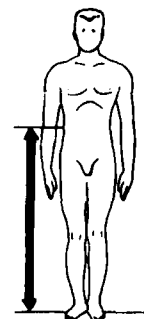
Subject stands erect. Using the anthropometer, measure the vertical distance from the standing surface to the center of the right nipple.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	47.48	47.84	51.03	54.52	55.28
USAF FLYING PERSONNEL	1967	47.06	47.54	50.83	54.37	55.21
U.S. AIR FORCE WOMEN	1968	42.88	43.32	46.50	50.11	51.03
U.S. ARMY AVIATORS	1970	-	-	-	-	-
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	47.25	47.73	50.97	54.43	55.18
GREECE AF PILOTS	1960-61	45.28	45.71	48.70	51.93	52.87
ITALY AF PILOTS	1960-61	44.72	45.16	48.74	52.17	53.11
IRAN AF TOTAL	1970	-	-	-	-	-
ISRAEL AF PILOTS + NAVIG.	1977	46.65	47.13	50.00	53.43	53.86
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	45.23*	45.55	48.35	50.79	51.60*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	45.08	45.47	48.39	51.65	52.36
U.S. ARMY WOMEN	1977	42.57	43.02	46.53	50.31	51.21

Dimension Name: WAIST HEIGHT (OMPHALION)

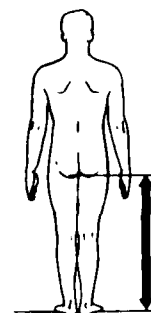
Subject stands erect. Using the anthropometer, measure the vertical distance from the standing surface to the center of the umbilicus.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	39.01	39.37	42.23	45.32	45.99
USAF FLYING PERSONNEL	1967	38.42	38.85	41.91	44.99	45.76
U.S. AIR FORCE WOMEN	1968	36.29	36.64	39.43	42.47	43.24
U.S. ARMY AVIATORS	1970	38.00	38.42	41.77	44.98	45.87
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	38.55	38.98	42.02	45.18	45.97
GREECE AF PILOTS	1960-61	36.30	36.65	39.53	42.52	43.39
ITALY AF PILOTS	1960-61	36.22	36.61	39.96	42.99	43.90
AF TOTAL	1970	-	-	-	-	-
ISRAEL AF PILOTS + NAVIG.	1977	37.91	38.54	40.91	44.06	44.88
JAPAN AF PILOTS	1972	35.04*	35.63	37.83	40.35	40.99*
KOREA - ROKAF PILOTS	1961	37.83*	38.23	40.94	43.43	44.35*
RAF AIRCREW	1970-71	38.56	39.00	42.22	45.56	46.85
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	39.56*	40.08*	43.85*	47.60*	48.53*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	36.54	36.81	39.33	42.32	42.91
U.S. ARMY WOMEN	1977	36.23	36.70	39.84	43.43	44.36

Dimension Name: GLUTEAL FURROW HEIGHT

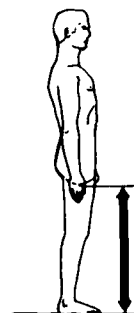
Subject stands erect. Using the anthropometer, measure the vertical distance from the standing surface to the furrow where the gluteal curve intersects the back of the thigh.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	29.16	29.48	31.96	34.69	35.30
USAF FLYING PERSONNEL	1967	28.98	29.37	31.90	34.61	35.30
U.S. AIR FORCE WOMEN	1968	25.84	26.16	28.57	31.26	31.92
U.S. ARMY AVIATORS	1970	-	-	-	-	-
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	29.07	29.42	32.04	34.70	35.31
GREECE AF PILOTS	1960-61	27.28	27.56	29.88	32.44	33.27
ITALY AF PILOTS	1960-61	26.97	27.40	30.31	32.95	33.66
IRAN AF TOTAL	1970	-	-	-	-	-
ISRAEL AF PILOTS + NAVIG.	1977	28.82	28.90	31.14	33.86	34.06
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	26.28*	26.61	28.86	30.94	31.43*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	27.36	27.64	29.92	32.36	32.99
U.S. ARMY WOMEN	1977	26.17*	26.74	29.10	31.90	32.46*

Dimension Name: CROTCH HEIGHT

Subject stands erect, legs slightly apart. Hold the anthropometer vertically in front of the subject and raise the instrument arm between the scrotum and right leg. Have the subject ring his heels together and raise the instrument arm until it presses firmly against the flesh of the midpoint of the crotch. Measure the indicated distance above the standing surface.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	30.32	30.65	33.15	35.99	36.62
USAF FLYING PERSONNEL	1967	30.47	30.84	33.46	36.23	36.92
U.S. AIR FORCE WOMEN	1968	26.50	26.82	29.28	32.04	32.73
U.S. ARMY AVIATORS	1970	29.09	29.43	32.24	35.20	35.98
U.S. NAVY ENLISTED	1966	39.35*	29.88	32.72	35.83	36.45*
U.S. MARINE CORPS ENLISTED	1966	29.63*	30.12	33.03	36.14	36.78*
U.S. ARMY SOLDIERS	1966	29.59*	30.04	33.03	36.10	36.82*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	29.75*	30.28	32.40	34.57	34.90*
GERMAN AF FLYING PERSONNEL	1967-68	29.96	30.34	33.18	35.93	36.56
GREECE AF FLYING PERSONNEL	1960-61	28.70	29.06	31.54	34.13	34.96
ITALY AF FLYING PERSONNEL	1960-61	28.50	28.90	31.77	35.67	35.16
IRAN AF TOTAL	1970	26.82	27.17	29.98	32.84	33.48
ISRAEL AF PILOTS + NAVIG.	1977	30.00	30.35	32.52	35.12	35.87
JAPAN AF PILOTS	1972	26.57*	27.09	29.02	31.42	31.85*
KOREA - ROKAF PILOTS	1961	27.03*	27.24	29.65	32.05	32.48*
RAF AIRCREW	1970-71	30.52	30.91	33.60	36.49	37.32
RAAF AIRCREW RATED	1973	30.04*	28.90	32.20	35.51	36.38*
RCAF PILOTS		30.58*	30.79	33.19	35.79	36.70*
RNZAF FLYING PERSONNEL	1974	29.44*	29.84*	32.69*	35.55*	36.24*
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF FLYING PERSONNEL	1960-61	28.19	28.54	30.98	33.54	34.09
U.S. ARMY WOMEN	1977	27.01	27.37	29.97	33.04	33.75

Dimension Name: PATELLA HEIGHT, TOP

Subject stands. Using the anthropometer, measure the vertical distance from the standing surface to the landmark on the right knee indicating the top edge of the patella

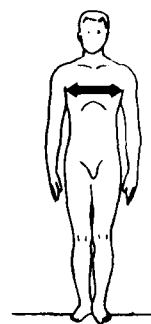


GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	19.06	19.27	20.96	22.75	23.20
USAF FLYING PERSONNEL	1967	18.86	19.10	20.69	22.42	22.88
U.S. AIR FORCE WOMEN	1968	-	-	-	-	-
U.S. ARMY AVIATORS	1970	18.22	18.44	20.14	21.94	22.40
U.S. NAVY ENLISTED	1966	18.54*	18.90	20.79	22.91	23.34*
U.S. MARINE CORPS ENLISTED	1966	18.29*	18.70	20.71	23.07	23.49*
U.S. ARMY SOLDIERS	1966	18.41*	18.74	20.79	22.99	23.43*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	-	-	-	-	-
GERMAN AF FLYING PERSONNEL	1967-68	18.47	18.74	20.64	22.51	22.91
GREECE AF PILOTS	1960-61	17.72	17.91	19.45	21.06	21.57
ITALY AF PILOTS	1960-61	17.68	17.91	19.57	21.38	21.89
IRAN AF TOTAL [†]	1970	17.65	17.85	19.39	21.07	21.42
ISRAEL AF PILOTS + NAVIG.	1977	18.35	18.78	20.39	22.20	22.52
JAPAN AF PILOTS	1972	-	-	-	-	-
KOREA - ROKAF PILOTS	1961	17.56*	17.95	19.25	20.83	21.20*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	17.72	17.87	19.33	21.02	21.57
U.S. ARMY WOMEN	1977	17.02	17.24	18.80	20.67	21.09

[†] Measurement was designated "knee height"

Dimension Name: CHEST BREADTH (SKIN)

Subject stands erect with his arms initially raised and then lowered when the instrument is in place. Holding the instrument at the level of the subject's nipples, measure the horizontal breadth of the chest with light skin contact during normal breathing.



GROUP	SURVEY YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	11.46	11.62	12.84	14.29	14.68
USAF FLYING PERSONNEL	1967	11.44	11.60	12.86	14.37	14.81
U.S. AIR FORCE WOMEN	1968	9.73	9.87	10.96	12.36	12.77
U.S. ARMY AVIATORS	1970	11.89	12.08	13.50	15.14	15.66
U.S. NAVY ENLISTED	1966	10.35*	10.63	11.81	13.31	13.54*
U.S. MARINE CORP ENLISTED	1966	10.71*	10.94	12.09	13.39	13.62*
U.S. ARMY SOLDIERS	1966	10.44*	10.75	11.97	13.54	13.77*
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	11.27*	11.42	12.60	14.06	14.15*
GERMAN AF FLYING PERSONNEL	1967-68	10.71	10.90	12.21	13.83	14.29
GREECE AF PILOTS	1960-61	10.87	11.02	12.13	13.58	13.94
ITALY AF PILOTS	1960-61	11.26	11.38	12.48	13.78	14.21
IRAN AF TOTAL	1970	10.28	10.42	11.52	13.14	13.63
ISRAEL AF PILOTS + NAVIG.†	1977	10.91	11.22	12.44	14.29	14.53
JAPAN AF PILOTS	1972	10.60*	10.87	11.97	13.23	13.51*
KOREA - ROKAF PILOTS	1961	10.57*	10.91	11.93	13.31	13.55*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		11.35*	11.50	12.99	14.37	14.75*
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	11.02	11.18	12.24	13.62	14.06
U.S. ARMY WOMEN	1977	9.86	9.99	11.08	12.37	12.77

† Measurement taken slightly above, rather than at, the nipple level.

Dimension Name: WAIST BREADTH (OMPHALION)

Subject stands erect. Holding the anthropometer horizontally, measure the breadth between the left and right omphalion waist landmarks.



GROUP	SURVEY, YEAR	PERCENTILES				
		3	5	50	95	98
U.S. NAVY AVIATORS	1964	10.39	10.60	11.97	13.34	13.73
USAF FLYING PERSONNEL	1967	10.50	10.70	12.15	13.79	14.29
U.S. AIR FORCE WOMEN	1968	8.22	8.35	9.44	10.85	11.27
U.S. ARMY AVIATORS	1970	-	-	-	-	-
U.S. NAVY ENLISTED	1966	-	-	-	-	-
U.S. MARINE CORPS ENLISTED	1966	-	-	-	-	-
U.S. ARMY SOLDIERS	1966	-	-	-	-	-
U.S. ADULTS - MEN	1960-62	-	-	-	-	-
U.S. ADULTS - WOMEN	1960-62	-	-	-	-	-
FRENCH PILOTS	1973	10.43*	10.67	11.73	13.19	13.52*
GERMAN AF FLYING PERSONNEL	1967-68	9.54	9.72	11.11	12.62	12.98
GREECE AF PILOTS	1960-61	10.31	10.43	11.46	12.80	13.27
ITALY AF PILOTS	1960-61	10.47	10.59	11.77	13.27	13.82
IRAN AF TOTAL	1970	-	-	-	-	-
ISRAEL AF PILOTS + NAVIG.	1977	10.08	10.28	11.38	13.82	14.37
JAPAN AF PILOTS	1972	9.39*	9.65	10.71	12.01	12.25*
KOREA - ROKAF PILOTS	1961	8.91*	9.21	10.16	11.61	11.68*
RAF AIRCREW	1970-71	-	-	-	-	-
RAAF AIRCREW RATED	1973	-	-	-	-	-
RCAF PILOTS		-	-	-	-	-
RNZAF FLYING PERSONNEL	1974	-	-	-	-	-
SWEDEN AF FLYING PERSONNEL	1971	-	-	-	-	-
TURKEY AF PILOTS	1960-61	10.00	10.16	11.26	12.80	13.35
U.S. ARMY WOMEN	1977	8.56	8.70	9.96	11.81	12.49

NOTE ON GRIP DIAMETER ESTIMATION

Due to the lack of grip diameter measurements, grip diameters were estimated based on the few available measurements. It was assumed that grip diameters were largely dependent on hand lengths. Then, the ratio between a known country's grip diameter and its hand length will be roughly proportional to the ratio between another country's unknown grip diameter and its hand length. That is:

$$\frac{\text{KGD}}{\text{KHL}} = \frac{\text{XGD}}{\text{XHL}}$$

where K stands for the country whose grip diameter is known and X stands for the country whose grip diameter is unknown.

For the inside grip diameter, measurements were available from two countries, Korea and Japan. Average ratios were calculated for each percentile from the Korean and Japanese ratios; these ratios were then used to estimate other grip diameters.

<u>Percentile</u>	<u>Korean Grip Diameter</u> <u>Korean Hand Length</u>	<u>Japan Grip Diameter</u> <u>Japan Hand Length</u>	<u>Average Grip Diameter</u> <u>Hand Length</u>
3	0.251	0.243	0.247
5	0.260	0.244	0.252
50	0.265	0.250	0.257
95	0.268	0.263	0.265
98	0.264	0.262	0.263

Multiplying the average ratios above by the hand lengths of each unknown country in each percentile gave estimations of the inside grip diameters.

The outside grip diameter values were calculated in a similar way, except that since only Korean values were available, no average ratio could be formed. The accuracy of this estimation is +0.1 inch at best.