



PROTOCOL FOR ANAEROBIC POWER TESTING

300 Meter Run Test

Purpose

Measure of anaerobic power. This test is recommended as part of the public safety fitness assessment battery.

Equipment

400 meter running track, or any measured 300 meter flat surface that provides good traction, running shoes. Irregular surfaces such as loose gravel are not acceptable.

Procedures

1. As with all physical tests, medical screening should precede testing.
2. As with all physical tests, warm up and stretching should precede testing.
3. If using a 400 meter track, participant runs 3/4 of 1 lap (inside lane) at maximal level of effort. Time used to complete distance is recorded in seconds. Consult norms to determine fitness category.
4. Participant should walk for 3-5 minutes immediately following test to cool down. This is an important safety consideration.

Percentile	Males				Females				
	Age				Age				
	20-29	30-39	40-49	50-59	20-29	30-39	40-49	50-59	
99th	42.6	42.0	47.0	52.0	54.0	55.0	65.0	NA	
95th	46.0	46.1	52.0	58.0	54.3	56.5	65.0		S
90th	48.0	49.0	55.0	61.0	56.0	60.0	66.0		
85th	49.0	50.0	56.0	63.0	58.0	63.5	68.2		
80th	50.3	51.0	57.0	66.4	58.3	66.0	72.0		E
75th	51.0	52.0	60.0	68.0	59.7	66.5	72.0		
70th	52.0	53.0	61.0	70.0	60.0	68.0	75.3		
65th	53.5	54.0	62.0	72.0	61.0	69.9	78.7		
60th	54.0	55.0	64.0	74.0	61.0	71.0	79.0		G
55th	55.0	56.0	66.0	77.4	62.7	72.0	80.5		
50th	56.0	57.0	67.6	80.0	64.0	74.0	86.0		
45th	57.5	58.0	70.0	82.6	68.5	75.5	91.7		
40th	59.0	58.9	72.0	83.2	71.0	79.0	94.0		F
35th	60.0	61.0	74.8	85.0	74.5	80.5	101.8		
30th	62.1	63.0	77.0	87.0	75.0	82.0	106.7		
25th	64.0	65.0	81.0	89.0	76.0	85.5	109.3		
20th	66.0	68.0	83.0	95.0	78.0	86.0	110.0		P
15th	69.0	70.0	86.0	99.0	88.0	93.5	116.0		
10th	73.4	74.9	90.0	101.6	97.0	100.0	121.5		
5th	81.3	80.9	104.0	112.0	106.7	114.0	125.0		
1st	95.1	113.9	143.0	184.0	120.0	210.0	125.0		VP

Vertical Jump Test

This is a measure of jumping or explosive power. It is an important area for pursuit tasks that require jumping and vaulting.

Equipment

yardstick taped to a smooth wall, chalk dust or chalk for marking extension when jumping

Procedures

1. Subject stands with one side toward the wall and reaches up as high as possible to mark his/her standard reach on the yardstick.
2. Subject jumps as high as possible and marks the spot on the wall above his/her standard reach mark. Prior to jump, one foot must remain stationary on the floor.
3. Score is the difference between the standard reach and top of the jump mark, to the nearest 1/2 inch.
4. The best of three trials is the score.

Percentile	Males				Females				
	Age				Age				
	20-29	30-39	40-49	50-59	20-29	30-39	40-49	50-59	
99th	30.3	28.4	25.1	22.0	19.0	18.0	13.5	NA	
95th	26.5	25.0	22.0	21.0	18.8	16.9	13.5		S
90th	25.0	24.0	20.3	19.5	18.1	16.0	13.3		
85th	25.0	23.0	19.5	18.0	18.0	15.5	13.0		
80th	24.0	22.0	19.0	17.0	17.7	15.0	13.0		E
75th	23.0	21.0	18.0	16.5	17.0	15.0	12.7		
70th	22.5	21.0	18.0	16.0	16.3	14.9	12.3		
65th	22.0	20.0	17.0	15.5	16.0	14.3	11.6		
60th	21.5	20.0	17.0	15.0	15.9	13.2	11.5		G
55th	21.0	20.0	16.5	14.5	15.5	13.0	11.1		
50th	20.5	19.5	16.0	14.0	15.2	12.5	10.0		
45th	20.0	19.0	16.0	14.0	14.3	12.4	10.0		
40th	20.0	18.6	15.5	13.5	14.0	12.0	9.6		F
35th	19.0	18.5	15.0	13.5	13.9	12.0	9.0		
30th	18.0	18.0	14.5	13.0	13.5	11.1	9.0		
25th	18.0	17.0	14.0	12.2	13.0	11.0	8.5		
20th	17.5	16.5	14.0	11.9	12.6	11.0	7.8		P
15th	17.0	16.0	13.0	11.0	12.0	10.9	7.1		
10th	16.0	15.5	12.1	10.0	12.0	10.2	7.0		
5th	13.6	14.5	11.0	9.3	11.4	9.1	7.0		
1st	10.3	12.1	6.9	6.5	11.0	6.0	7.0		VP

CARDIORESPIRATORY FITNESS TESTS

Males

%	Age 20-29				Age 30-39				
	Balke Treadmill (time)	Max $\dot{V}O_2$ (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	32:00	61.2	2.02	8:22	30:00	58.3	1.94	8:49	
95	28:31	56.2	1.88	9:10	27:11	54.3	1.82	9:31	S
90	27:00	54.0	1.81	9:34	26:00	52.5	1.77	9:52	
85	26:00	52.5	1.77	9:52	24:45	50.7	1.72	10:14	
80	25:00	51.1	1.73	10:08	23:30	48.9	1.67	10:38	E
75	23:40	49.2	1.68	10:34	22:30	47.5	1.63	10:59	
70	23:00	48.2	1.65	10:49	22:00	46.8	1.61	11:09	
65	22:00	46.8	1.61	11:09	21:00	45.3	1.57	11:34	
60	21:15	45.7	1.58	11:27	20:20	44.4	1.55	11:49	G
55	21:00	45.3	1.57	11:34	20:00	43.9	1.53	11:58	
50	20:00	43.9	1.53	11:58	19:00	42.4	1.49	12:25	
45	19:26	43.1	1.51	12:11	18:15	41.4	1.46	12:44	
40	18:50	42.2	1.49	12:29	18:00	41.0	1.45	12:53	F
35	18:00	41.0	1.45	12:53	17:00	39.5	1.41	13:25	
30	17:30	40.3	1.43	13:08	16:15	38.5	1.38	13:48	
25	17:00	39.5	1.41	13:25	15:40	37.6	1.36	14:10	
20	16:00	38.1	1.37	13:58	15:00	36.7	1.33	14:33	P
15	15:00	36.7	1.33	14:33	14:00	35.2	1.29	15:14	
10	14:00	35.2	1.29	15:14	13:00	33.8	1.25	15:56	
5	12:00	32.3	1.21	16:46	11:10	31.1	1.18	17:30	
1	8:00	26.6	1.05	20:55	8:00	26.6	1.05	20:55	VP

n = 2,606

n = 13,158

Total n = 15,764



CARDIORESPIRATORY FITNESS TESTS

Males

%	Age 40-49				Age 50-59				
	Balke Treadmill (time)	Max $\dot{V}O_2$ (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	29:06	57.0	1.90	9:02	27:15	54.3	1.82	9:31	
95	26:16	52.9	1.79	9:47	24:00	49.7	1.69	10:27	S
90	25:00	51.1	1.73	10:09	22:00	46.8	1.61	11:09	
85	23:14	48.5	1.66	10:44	20:31	44.6	1.55	11:45	
80	22:00	46.8	1.61	11:09	19:35	43.3	1.52	12:08	E
75	21:02	45.4	1.58	11:32	18:32	41.8	1.47	12:37	
70	20:15	44.2	1.54	11:52	18:00	41.0	1.45	12:53	
65	20:00	43.9	1.53	11:58	17:00	39.5	1.41	13:25	
60	19:00	42.4	1.49	12:25	16:10	38.3	1.38	13:53	G
55	18:02	41.0	1.45	12:53	16:00	38.1	1.37	13:58	
50	17:34	40.4	1.44	13:05	15:02	36.7	1.33	14:33	
45	17:00	39.5	1.41	13:25	14:56	36.6	1.33	14:35	
40	16:12	38.4	1.38	13:50	14:00	35.2	1.29	15:14	F
35	15:38	37.6	1.36	14:10	13:05	33.9	1.26	15:53	
30	15:00	36.7	1.33	14:33	12:38	33.2	1.24	16:16	
25	14:20	35.7	1.31	15:00	12:00	32.3	1.21	16:46	
20	13:35	34.6	1.28	15:32	11:10	31.1	1.18	17:30	P
15	12:45	33.4	1.24	16:09	10:15	29.8	1.14	18:22	
10	11:40	31.8	1.20	17:04	9:15	28.4	1.10	19:24	
5	10:00	29.4	1.13	18:39	7:30	25.8	1.03	21:40	
1	7:00	25.1	1.01	22:22	4:20	21.3	0.90	27:08	VP

n = 16,534

n = 9,102

Total n = 25,636



DYNAMIC STRENGTH

1 Minute Sit Up

Males

AGE

%	<20	20-29	30-39	40-49	50-59	60+	
99	>62.0	>55.0	>51.0	>47.0	>43.0	>39.0	
95	62.0	55.0	51.0	47.0	43.0	39.0	S
90	55.0	52.0	48.0	43.0	39.0	35.0	
85	53.0	49.0	45.0	40.0	36.0	31.0	
80	51.0	47.0	43.0	39.0	35.0	30.0	E
75	50.0	46.0	42.0	37.0	33.0	28.0	
70	48.0	45.0	41.0	36.0	31.0	26.0	
65	48.0	44.0	40.0	35.0	30.0	24.0	
60	47.0	42.0	39.0	34.0	28.0	22.0	G
55	46.0	41.0	37.0	32.0	27.0	21.0	
50	45.0	40.0	36.0	31.0	26.0	20.0	
45	42.0	39.0	36.0	30.0	25.0	19.0	
40	41.0	38.0	35.0	29.0	24.0	19.0	F
35	39.0	37.0	33.0	28.0	22.0	18.0	
30	38.0	35.0	32.0	27.0	21.0	17.0	
25	37.0	35.0	31.0	26.0	20.0	16.0	
20	36.0	33.0	30.0	24.0	19.0	15.0	P
15	34.0	32.0	28.0	22.0	17.0	13.0	
10	33.0	30.0	26.0	22.0	15.0	10.0	
5	27.0	27.0	23.0	17.0	12.0	7.0	
1	<27.0	<27.0	<23.0	<17.0	<12.0	<7.0	VP
n	46	312	1,431	1,558	919	205	

Total n = 4,471



DYNAMIC STRENGTH

Push Up

Males

AGE

%	20-29	30-39	40-49	50-59	60+	
99	100	86	64	51	39	
95	62	52	40	39	28	S
90	57	46	36	30	26	
85	51	41	34	28	24	
80	47	39	30	25	23	E
75	44	36	29	24	22	
70	41	34	26	21	21	
65	39	31	25	20	20	
60	37	30	24	19	18	G
55	35	29	22	17	16	
50	33	27	21	15	15	
45	31	25	19	14	12	
40	29	24	18	13	10	F
35	27	21	16	11	9	
30	26	20	15	10	8	
25	24	19	13	9.5	7	
20	22	17	11	9	6	P
15	19	15	10	7	5	
10	18	13	9	6	4	
5	13	9	5	3	2	VP
n	1,045	790	364	172	26	

Total n = 2,397



Cardiorespiratory Fitness Tests

Females

%	Age 20-29				Age 30-39				
	Balke Treadmill (time)	Max $\dot{V}O_2$ (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	27:43	55.0	1.84	9:23	26:00	52.5	1.77	9:52	
95	24:24	50.2	1.71	10:20	22:06	46.9	1.62	11:08	S
90	22:30	47.5	1.63	10:59	20:34	44.7	1.56	11:43	
85	21:00	45.3	1.57	11:34	19:03	42.5	1.50	12:23	
80	20:04	44.0	1.54	11:56	18:00	41.0	1.45	12:53	E
75	19:42	43.4	1.52	12:07	17:30	40.3	1.43	13:08	
70	18:06	41.1	1.46	12:51	16:30	38.8	1.39	13:41	
65	17:45	40.6	1.44	13:01	16:00	38.1	1.37	13:58	
60	17:00	39.5	1.41	13:25	15:02	36.7	1.33	14:33	G
55	16:00	38.1	1.37	13:58	15:00	36.7	1.33	14:33	
50	15:30	37.4	1.35	14:15	14:00	35.2	1.29	15:14	
45	15:00	36.7	1.33	14:33	13:30	34.5	1.27	15:35	
40	14:11	35.5	1.30	15:05	13:00	33.8	1.25	15:56	F
35	13:36	34.6	1.27	15:32	12:03	32.4	1.21	16:43	
30	13:00	33.8	1.25	15:56	12:00	32.3	1.21	16:46	
25	12:04	32.4	1.22	16:43	11:00	30.9	1.17	17:38	
20	11:30	31.6	1.19	17:11	10:20	29.9	1.15	18:18	P
15	10:42	30.5	1.16	17:53	9:39	28.9	1.12	19:01	
10	10:00	29.4	1.13	18:39	8:36	27.4	1.08	20:13	
5	7:54	26.4	1.05	21:05	7:16	25.5	1.02	21:57	
1	5:14	22.6	0.94	25:17	5:20	22.7	0.94	25:10	VP

n = 1,350

n = 4,394

Total n = 5,744

Cardiorespiratory Fitness Tests

Females

%	Age 40-49				Age 50-59				
	Balke Treadmill (time)	Max $\dot{V}O_2$ (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (ml/kg/min.)	12 min. Run Distance (miles)	1.5 Mile Run (time)	
99	25:00	51.1	1.74	10:09	21:00	45.3	1.57	11:34	
95	20:56	45.2	1.57	11:35	17:16	39.9	1.42	13:16	S
90	19:00	42.4	1.49	12:25	16:00	38.1	1.37	13:58	
85	17:20	40.0	1.43	13:14	15:00	36.7	1.33	14:33	
80	16:34	38.9	1.40	13:38	14:00	35.2	1.29	15:14	E
75	16:00	38.1	1.37	13:58	13:15	34.1	1.26	15:47	
70	15:00	36.7	1.33	14:33	12:23	32.9	1.23	16:26	
65	14:14	35.6	1.30	15:03	12:00	32.3	1.21	16:46	
60	13:56	35.1	1.29	15:17	11:23	31.4	1.19	17:19	G
55	13:02	33.8	1.25	15:56	11:00	30.9	1.17	17:38	
50	12:39	33.3	1.24	16:13	10:30	30.2	1.15	18:05	
45	12:00	32.3	1.21	16:46	10:00	29.4	1.13	18:39	
40	11:30	31.6	1.19	17:11	9:30	28.7	1.11	19:10	F
35	11:00	30.9	1.17	17:38	9:00	28.0	1.09	19:43	
30	10:10	29.7	1.14	18:26	8:30	27.3	1.07	20:17	
25	10:00	29.4	1.13	18:39	8:00	26.6	1.05	20:55	
20	9:00	28.0	1.09	19:43	7:15	25.5	1.02	21:57	P
15	8:07	26.7	1.06	20:49	6:40	24.6	1.00	22:53	
10	7:21	25.6	1.03	21:52	6:00	23.7	0.97	23:55	
5	6:17	24.1	0.98	23:27	4:48	21.9	0.92	26:15	
1	4:00	20.8	0.89	27:55	3:00	19.3	0.85	30:34	VP

n = 4,834

n = 3,103

Total n = 7,937



DYNAMIC STRENGTH

1 Minute Sit Up

Females

AGE

%	<20	20-29	30-39	40-49	50-59	60+	
99	>55.0	>51.0	>42.0	>38.0	>30.0	>28.0	
95	55.0	51.0	42.0	38.0	30.0	28.0	S
90	54.0	49.0	40.0	34.0	29.0	26.0	
85	49.0	45.0	38.0	32.0	25.0	20.0	
80	46.0	44.0	35.0	29.0	24.0	17.0	E
75	40.0	42.0	33.0	28.0	22.0	15.0	
70	38.0	41.0	32.0	27.0	22.0	12.0	
65	37.0	39.0	30.0	25.0	21.0	12.0	
60	36.0	38.0	29.0	24.0	20.0	11.0	G
55	35.0	37.0	28.0	23.0	19.0	10.0	
50	34.0	35.0	27.0	22.0	17.0	8.0	
45	34.0	34.0	26.0	21.0	16.0	8.0	
40	32.0	32.0	25.0	20.0	14.0	6.0	F
35	30.0	31.0	24.0	19.0	12.0	5.0	
30	29.0	30.0	22.0	17.0	12.0	4.0	
25	29.0	28.0	21.0	16.0	11.0	4.0	
20	28.0	24.0	20.0	14.0	10.0	3.0	P
15	27.0	23.0	18.0	13.0	7.0	2.0	
10	25.0	21.0	15.0	10.0	6.0	1.0	
5	25.0	18.0	11.0	7.0	5.0	0.0	
1	<25.0	<18.0	<11.0	<7.0	<5.0	0.0	VP
n	15	144	289	249	137	26	

Total n = 860



DYNAMIC STRENGTH

Full Body Push Up*

Females

AGE

%	20-29	30-39	40-49	
99	53.0	48.0	23.0	
95	42.0	39.5	20.0	S
90	37.0	33.0	18.0	
85	33.0	26.0	17.0	
80	28.0	23.0	15.0	E
75	27.0	19.0	15.0	
70	24.0	18.0	14.0	
65	23.0	16.0	13.0	
60	21.0	15.0	13.0	G
55	19.0	14.0	11.0	
50	18.0	14.0	11.0	
45	17.0	13.0	10.0	
40	15.0	11.0	9.0	F
35	14.0	10.0	8.0	
30	13.0	9.0	7.0	
25	11.0	9.0	7.0	
20	10.0	8.0	6.0	P
15	9.0	6.5	5.0	
10	8.0	6.0	4.0	
5	6.0	4.0	1.0	
1	3.0	1.0	0.0	VP

* Full body push ups are generally used by law enforcement and public safety organizations. These norms are based on >1000 female U.S. Army soldiers who were tested in the 1990's by the U.S. Army.