

2011 Compendium of Physical Activities Reference List
Category 17 – Walking

Code^c	2000 METs	Description	2011 METs^{a, b}	2011 References
17010	7.0	Backpacking (Taylor Code 050)	7.0	(Taylor, Jacobs et al. 1978)
17012		Backpacking, hiking with a daypack, or organized walking with daypack	7.8	Average of 3 measures below
		field march with heavy pack	8.66	(Passmore and Durnin 1955)
		marching (4 km/hr) with a 27 lb pack	6.87	(Passmore and Durnin 1955)
		field march with rifle and 27 lb pack at 3 mph	7.79	(Passmore and Durnin 1955)
17020	3.5	Carrying 15- 30 pound load (e.g. suitcase), level ground or downstairs	5.0	(Norgan, Ferro-Luzzi et al. 1974)
17021		Carrying ~10 lb child, slow walking	2.3 2.38	(Herrmann, Meckes et al. 2010) Same as Home Activities, code 05182
17025	9.0	Carrying load upstairs, general	8.3	Average of codes 17026 - 17030
17026	5.0	Carrying load, 1 to 15 lb load, upstairs	5.0	ESTIMATED
17027	6.0	Carrying load, 16 to 24 lb load, upstairs	6.0	ESTIMATED
17028	8.0	Carrying load, 25 to 49 lb load, upstairs	8.0	ESTIMATED
17029	10.0	Carrying load, 50 to 74 lb load, upstairs	10.0	ESTIMATED
17030	12.0	Carrying load, >74 lb load, upstairs	12.0	ESTIMATED
17031	3.0	Loading and/or unloading a car, implied walking	3.5	see Home Activities, code 05146
17033		Climbing hills, no load	6.3	Average of 6 measures below.
		walk uphill, no load	6.91	(McArdle, Katch et al. 1981)

Code	2000 METs	Description	2011 METs ^{a, b}	2011 References
		walking uphill	4.83	(Torun, McGuire et al. 1982)
		walk uphill, slowly	4.27	(Norgan, Ferro-Luzzi et al. 1974)
		walk uphill, average	6.05	(Norgan, Ferro-Luzzi et al. 1974)
		walk uphill, fast	7.12	(Norgan, Ferro-Luzzi et al. 1974)
		walking up a forest path	8.57	(Montgomery and Johnson 1977)
17035	7.0	Walking uphill with 0 to 9 lb load	6.5	(Norgan, Ferro-Luzzi et al. 1974)
17040	7.5	Climbing hills with 10 to 20 lb load	7.3 7.37	(McArdle, Katch et al. 1981)
17050	8.0	Climbing hills with 21 to 42 lb load	8.3	Average of 2 measures below.
		climbing hills 22 lbs (10-kg load)	8.0	(McArdle, Katch et al. 1981)
		climbing hills (20-kg load)	8.4	(McArdle, Katch et al. 1981)
17060	9.0	Climbing hills with 42+ pound load	9.0	ESTIMATED
17070	3.0	Descending stairs	3.5	Average of 4 measures below
		descending stairs	4.86 ± 1.09	(Teh and Aziz 2001)
		descending stairs	2.78 ± 0.82	(Jones, Chak et al. 2006)
		descending stairs	4.0 ± 0.85	(Kozey, Lyden et al. 2010)
		descending stairs	2.88 ± 0.31	(Bassett, Vachon et al. 1997)
17080	6.0	Hiking, cross country (Taylor Code 040)	6.0	(Taylor, Jacobs et al. 1978)

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17082		Hiking or walking at a normal pace through fields and hillsides	5.3	Average of 3 measures below
		hiking, general	4.69	(McArdle, Katch et al. 1981)
		walk through open forest foot paths	5.1	(Montgomery and Johnson 1977)
		walking on level forest paths	5.78	(Montgomery and Johnson 1977)
17085	2.5	Bird watching, slow walk	2.5	ESTIMATED
17088		Marching, moderate speed, military, no pack	4.5	Average of 4 measures below
		marching 3-4 mph	4.94	(Edholm and Fletcher 1955)
		marching at a parade	4.26	(Edholm and Fletcher 1955)
		marching slowly	3.18	(Passmore and Durnin 1955)
		field marching, US military soldiers	5.35	(Passmore and Durnin 1955)
17090	6.5	Marching rapidly, military, no pack	8.0 8.11	(Passmore and Durnin 1955)
17100	2.5	Pushing or pulling stroller with child or walking with children, 2.5 to 3.1 mph	4.0	Average of 2 measures below
		walking with stroller (5.0 km/hr)	4.9 ± 1.13	(Brown, Ringnet et al. 2001)
		pushing stroller with child	3.08	(Herrmann, Meckes et al. 2010)
17105	4.0	Pushing a wheelchair, non-occupational	3.8	
		pushing wheelchair with 75 kg adult at 2.5 mph	3.68	(Herrmann, Meckes et al. 2010)
17110	6.5	Race walking	6.5	ESTIMATED

Code	2000 METs	Description	2011 METs ^{a, b}	2011 References
17120	8.0	Rock or mountain climbing (Taylor Code 060)		Moved to sports code 15533
17130	8.0	Stair climbing, using or climbing up ladder (Taylor Code 030)	8.0	(Taylor, Jacobs et al. 1978)
17133		Stair climbing, slow pace	4.0	Average of 2 measures below
		climb stairs, slow pace	3.1	(Yue, Woo et al. 2007)
		climb stairs	4.95	(Cole and Ogbe 1987)
17134		Stair climbing, fast pace	8.8	Average value from 7 measures below
		climbing stairs	9.6 ± 1.85	(Kozey, Lyden et al. 2010)
		stair climbing, up and down 46 steps, 7 inches high	8.8	(Edholm and Fletcher 1955)
		ascending stairs	6.83 ± 0.65	(Crouter, Clowers et al. 2006)
		climbing stairs	7.95 ± 0.9	(Campbell, Crocker et al. 2002)
		ascending stairs	9.57 ± 1.37	(Teh and Aziz 2001)
		ascending stairs	8.56 ± 0.39	(Bassett, Vachon et al. 1997)
		climbing stairs	10.2 ± 2	(Aziz and Teh 2005)
17140	5.0	Using crutches	5.0	Average of 16 measures below
		double crutch	4.2	(Sumio, Tomoyasu et al. 1985)
		single crutch	4.3	(Sumio, Tomoyasu et al. 1985)
		single Lofstland crutch	4.4	(Sumio, Tomoyasu et al. 1985)

Code	2000 METs	Description	2011 METs ^{a, b}	2011 References
		underarm crutch, level, 30.3 meters/min	3.09	(Fisher and Patterson 1981)
		underarm crutch, level, 50.5 meters/min	4.17	(Fisher and Patterson 1981)
		underarm crutch, level, 70.3 meters/min	5.6	(Fisher and Patterson 1981)
		underarm crutch, 5% grade, 40.1 meters/min	4.46	(Fisher and Patterson 1981)
		underarm crutch, 5% grade, 60.0 meters/min	6.23	(Fisher and Patterson 1981)
		underarm crutch, upstairs, 16 steps/minute	4.11	(Fisher and Patterson 1981)
		underarm crutch, upstairs, 24 steps/minute	5.51	(Fisher and Patterson 1981)
		underarm crutch, self-selected speed	4.75	(Lee 1987)
		underarm crutch, faster speed	6.96	(Lee 1987)
		underarm crutch, slower speed	4.50	(Lee 1987)
		elbow crutch, self-selected speed	5.28	(Lee 1987)
		elbow crutch, faster speed	8.10	(Lee 1987)
		elbow crutch, slower speed	4.54	(Lee 1987)
17150	2.0	Walking, household	2.0	Estimated from values in code 17151
17151	2.0	Walking, less than 2.0 mph, level, strolling, very slow	2.0	Average of 4 measures below
		walking slowly	1.45	(Minetti, Ardigo et al. 1994)
		strolling	2.03	(Edmundson and Edmundson 1989)
		walking slowly	2.6	(Brun, Bleiberg et al. 1981)
		walking 1.88 mph (3 kph)	2.56	(Dufour 1984)

Code	2000 METs	Description	2011 METs^{a, b}	2011 References
17152	2.5	Walking, 2.0 mph, level, slow pace, firm surface	2.8	Average of 7 measures below
		walking, 2.0 mph, level, slow pace, firm surface	2.13	(Minetti, Ardigo et al. 1994)
		free walking on plane surface	2.68	Nag 1980
		walking	2.62	(Bandyopadhyay and Chattopadhyay 1980)
		walking, 2.0 mph	2.63	(Haymes and Byrnes 1993)
		walking 2.0 mph on flat surface	3.1 ± 0.48	(Rosenberger, Haskell et al. 2010)
		walking, 2.0 mph (54 m/min), men	2.91	(Abel, Hannon et al. 2008)
		walking, 2.0 mph (54 m/min), women	3.14	(Abel, Hannon et al. 2008)
17160	3.5	Walking for pleasure (Taylor Code 010)	3.5	(Taylor, Jacobs et al. 1978)
17161	2.5	Walking from house to car or bus, from car or bus to go places, from car or bus to and from the worksite	2.5	ESTIMATED
17162	2.5	Walking to neighbor's house or family's house for social reasons	2.5	ESTIMATED
17165	3.0	Walking the dog	3.0	ESTIMATED
17170	3.0	Walking, 2.5 mph, firm, level surface	3.0	Average of 9 measures below
		walking at 2.5 mph, flat surface	2.97 ± 0.3	(Barkely and Penko 2009)
		walking at 2.5 mph (4 kph)	3.22	(Dufour 1984)
		walking on flat terrain without load	3.1	(Torun, McGuire et al. 1982)
		walking, no speed given	3.11	(de Guzman, Recto et al. 1979)

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		walking, no speed given	3.23	(Brun, Bleiberg et al. 1981)
		walking, no speed given	2.8	(de Guzman, Cabrera et al. 1978)
		walking, no speed given	3.17	(de Guzman, Cabrera et al. 1984)
		walking at 2.5 mph	3.5 ± 0.5	(Anjos, Woehrlich et al. 2008)
		walking, 2.65 mph, treadmill	3.19	(Dal, Erdogan et al. 2010)
17180	2.8	Walking, 2.5 mph, downhill	3.3	Average of 4 measures below
		walking down a forest path	3.95	(Montgomery and Johnson 1977)
		walking downhill slowly	2.49	(Norgan, Ferro-Luzzi et al. 1974)
		walk downhill average	3.2	(Norgan, Ferro-Luzzi et al. 1974)
		walk downhill fast pace	3.68	(Norgan, Ferro-Luzzi et al. 1974)
17190	3.3	Walking, 2.8 to 3.2 mph, level, moderate pace, firm surface	3.5	Average of 17 measures below.
		walking, 2.8 mph	4.01	(Dufour 1984)
		walking at 3.0 mph, firm surface	2.92	(Minetti, Ardigo et al. 1994)
		walking at 5.0 km/hr	3.8 ± 0.41	(Brown and Weir 2001)
		walking at 3.0 mph, firm surface	3.99 ± 0.58	(Rosenberger, Haskell et al. 2010)
		walking, at 3.09 mph (83 m/min)	3.33 ± 0.32	(Crouter, Clowers et al. 2006)
		walking at 3.0 mph (1.34 m/s, 0% grade)	3.8 ± 0.46	(Kozey, Lyden et al. 2010)

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		walking at 3.0 mph	3.25	(Haymes and Byrnes 1993)
		walking, normal pace	3.1 ± 0.5	(Yngve, Nilsson et al. 2003)
		walking, 2.9 mph, 0% grade	3.29	(Kang, Chaloupka et al. 2002)
		walking, 3.2 mph, over ground	3.66	(Dal, Erdogan et al. 2010)
		walking 3.0 mph (80 m/min), men	3.72	(Abel, Hannon et al. 2008)
		walking 3.0 mph (80 m/min), women	3.96	(Abel, Hannon et al. 2008)
		walking 3.0 mph, trial 1	3.75	(Welk, Blair et al. 2000)
		walking 3.0 mph, trial 2	3.57	(Welk, Blair et al. 2000)
		walking, 3.2 mph	3.7	(Gunn, Brooks et al. 2002)
		walking, 3.2 mph, laboratory setting	3.8	(Gunn, Ploeg et al. 2004)
		walking, 3.2 mph, laboratory setting	3.9	(Gunn, Brooks et al. 2005)
17200	3.8	Walking, 3.5 mph, level, brisk, firm surface, walking for exercise	4.3	Average of 6 measures below
		walking, 3.65 mph (98 m/min)	4.41 ± 0.82	(Crouter, Clowers et al. 2006)
		walking 3.49 mph (1.56 m/s, 0% grade)	4.5 ± 0.55	(Kozey, Lyden et al. 2010)
		walking, normal pace, asphalt road, no speed given	4.57	(McArdle, Katch et al. 1981)
		walking, 3.5 mph	4.5 ± 0.7	(Anjos, Wohrlich et al. 2008)
		walking, fast pace	4.3 ± 0.7	(Yngve, Nilsson et al. 2003)

Code	2000 METs	Description	2011 METs ^{a, b}	2011 References
		forward walking, 3.5 mph, 0% grade	3.66	(Chaloupka, Kang et al. 1997)
17210	6.0	Walking, 2.9 to 3.5 mph, uphill, 1 to 5% grade	5.3	Average of 5 measures below
		walking 3.49 mph (1.56 m/s, 3% grade)	5.6 ± 0.58	(Kozey, Lyden et al. 2010)
		walking 3.0 mph (1.34 m/s, 3% grade)	4.7 ± 0.51	(Kozey, Lyden et al. 2010)
		walking, 3.5 mph, 2.5% grade	5.4 ± 0.7	(Anjos, Wöhrlich et al. 2008)
		walking, 2.9 mph, 5% grade	4.86	(Kang, Chaloupka et al. 2002)
		forward walking, 3.5 mph, 5% grade	5.26	(Chaloupka, Kang et al. 1997)
17211		Walking, 2.9 to 3.5 mph, uphill, 6% to 15% grade	8.0	Average of 3 measures below
		walking, 2.9 mph, 10% grade	7.14	(Kang, Chaloupka et al. 2002)
		walking, 2.9 mph, 15% grade	9.14	(Kang, Chaloupka et al. 2002)
17220	5.0	Walking, 4.0 mph, level, firm surface, very brisk pace	5.0	Average of 6 measures below
		walking, 4.0 mph, level	4.26	(Minetti, Ardigo et al. 1994)
		walking, 4.0 mph, treadmill	5.26	(Hurley, Seals et al. 1984)
		walking, 4.0 mph	4.54	(Haymes and Byrnes 1993)
		walking, 3.97 mph	5.42	(Sherrman, Morris et al. 1998)
		walking, 4.0 mph (107 m/min), men	5.09	(Abel, Hannon et al. 2008)
		walking, 4.0 mph (107 m/min), women	5.51	(Abel, Hannon et al. 2008)

Code	2000 METs	Description	2011 METs ^{a, b}	2011 References
		walking, 4.0 mph, trial 1	5.45	(Welk, Blair et al. 2000)
		walking, 4.0 mph, trial 2	5.29	(Welk, Blair et al. 2000)
17230	6.3	Walking, 4.5 mph, level, firm surface, very, very brisk	7.0 7.08	(Minetti, Ardigo et al. 1994)
17231	8.0	Walking, 5.0 mph, level, firm surface	8.3	Average of 5 measures below
		walking, 5.0 mph	8.31 ± 0.85	(Rosenberger, Haskell et al. 2010)
		walking, 4.99 mph (2.23 m/s, 0% grade)	8.5 ± 0.94	(Kozey, Lyden et al. 2010)
		walking, 5.0 mph	7.17	(Haymes and Byrnes 1993)
		walking, 5.0 mph (134 m/min), men	8.74	(Abel, Hannon et al. 2008)
		walking, 5.0 mph (134 m/min), women	8.80	(Abel, Hannon et al. 2008)
17235		Walking, 5.0 mph, uphill, 3% grade	9.8 9.8 ± 0.97	(Kozey, Lyden et al. 2010)
17250	3.5	Walking, for pleasure, work break	3.5	(Taylor, Jacobs et al. 1978)
17260	5.0	Walking, grass track	4.8 4.63	(McArdle, Katch et al. 1981)
17262		Walking, normal pace, plowed field or sand	4.5 4.4	(McArdle, Katch et al. 1981)
17270	4.0	Walking, to work or class (Taylor Code 015)	4.0	(Taylor, Jacobs et al. 1978)
17280	2.5	Walking, to and from an outhouse	2.5	ESTIMATED

Code	2000 METs	Description	2011 METs ^{a, b}	2011 References
17302	4.0	Walking, for exercise, 3.5 mph, with ski poles, Nordic walking, level, moderate pace	4.5	Average for 6 measures below
		Nordic walking men , 3.6 mph (5.6 km/h)	4.23	(Church, Earnest et al. 2002)
		Nordic walking women 3.7 mph (5.9 km/h)	5.11	(Church, Earnest et al. 2002)
		Nordic walking, combined men's and women's scores	4.77	(Church, Earnest et al. 2002).
		Nordic walking, 2.68 mph, artificial track, flat surface	3.43	(Schiffer, Knicker et al. 2006)
		Nordic walking, 3.4 mph, artificial track, flat surface	4.29	(Schiffer, Knicker et al. 2006)
		Nordic walking, 4.0 mph, artificial track, flat surface	5.14	(Schiffer, Knicker et al. 2006)
17305		Walking, for exercise, 5.0 mph, with ski poles, Nordic walking, level, fast pace	8.8	Average of 5 measures below
		Nordic walking, 4.9 mph , concrete, flat surface	9.1 ± 0.7	(Schiffer, Knicker et al. 2009)
		Nordic walking, 4.9 mph, artificial track, flat surface	9.6 ± 0.9	(Schiffer, Knicker et al. 2009)
		Nordic walking, 4.9 mph, grass, flat surface	10.2 ± 1.2	(Schiffer, Knicker et al. 2009)
		Nordic walking, 4.7 mph, artificial track, flat surface	6.86	(Schiffer, Knicker et al. 2006)
		Nordic walking, 5.4 mph, artificial track, flat surface	7.71	(Schiffer, Knicker et al. 2006)
17310		Walking, for exercise, with ski poles, Nordic walking, uphill	6.8	Estimated from codes 17302 and 17305
17320		Walking, backward, 3.5 mph, level	6.0	(Chaloupka, Kang et al. 1997)

Code	2000 METs	Description	2011 METs ^{a, b}	2011 References
			5.92	
17325		Walking, backward, 3.5 mph, uphill, 5% grade	8.0 8.06	(Chaloupka, Kang et al. 1997)

^a MET values used in the Compendium of Physical Activities are in bold font

^b Some MET levels from references show the mean \pm standard deviation or the mean and 95% confidence interval

^c Codes in bold were added in 2011

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