

Errata to
Principles of Heating, Ventilating, and Air Conditioning, 6th Edition
June 22, 2010

Page 165: In Table 5-15, some of the data have been corrected. Please replace the original table with the one below. Updated values are in bold.

Table 5-1 Typical Thermal Properties of Common Building and Insulating Materials: Design Values^a

(Table 4, Chapter 26, 2009 ASHRAE Handbook—Fundamentals)

Description	Density, lb/ft ³	Conductivity ^b <i>k</i> , Btu·in/h·ft ² ·°F	Resistance <i>R</i> , h·ft ² ·°F/Btu	Specific Heat, Btu/lb·°F	Reference ⁿ
Building Board and Siding					
<i>Board</i>					
Asbestos/cement board	120	4	—	0.24	Nottage (1947)
Cement board	71	1.7	—	0.2	Kumaran (2002)
Fiber/cement board	88	1.7	—	0.2	Kumaran (2002)
.....	61	1.3	—	0.2	Kumaran (1996)
.....	26	0.5	—	0.45	Kumaran (1996)
.....	20	0.4	—	0.45	Kumaran (1996)
Gypsum or plaster board	40	1.1	—	0.27	Kumaran (2002)
Oriented strand board (OSB)	41	—	0.62	0.45	Kumaran (2002)
..... 7/16 in.	41	—	0.68	0.45	Kumaran (2002)
..... 1/2 in.	41	—	0.68	0.45	Kumaran (2002)
Plywood (douglas fir).....	29	—	0.79	0.45	Kumaran (2002)
..... 1/2 in.	29	—	0.79	0.45	Kumaran (2002)
..... 5/8 in.	34	—	0.85	0.45	Kumaran (2002)
Plywood/wood panels	28	—	1.08	0.45	Kumaran (2002)
Plywood/wood panels	28	—	1.08	0.45	Kumaran (2002)
Vegetable fiber board				—	
Sheathing, regular density ^c	18	—	1.32	0.31	Lewis (1967)
intermediate density ^c	22	—	1.09	0.31	Lewis (1967)
Nail-base sheathing ^c	25	—	1.06	0.31	
Shingle backer.....	18	—	0.94	0.3	
Shingle backer.....	18	—	0.94	0.3	
Sound-deadening board.....	15	—	1.35	0.3	
Tile and lay-in panels, plain or acoustic.....	18	0.4	—	0.14	
Laminated paperboard.....	30	0.5	—	0.33	Lewis (1967)
Homogeneous board from repulped paper.....	30	0.5	—	0.28	
Hardboard ^e					
medium density	50	0.73	—	0.31	Lewis (1967)
high density, service-tempered grade and service grade.....	55	0.82	—	0.32	Lewis (1967)
high density, standard-tempered grade.....	63	1	—	0.32	Lewis (1967)
Particleboard ^e					
low density	37	0.71	—	0.31	Lewis (1967)
medium density	50	0.94	—	0.31	Lewis (1967)
high density	62	1.18	0.85	—	Lewis (1967)
underlayment.....	40	—	0.82	0.29	Lewis (1967)
Waferboard.....	44	0.73	—	0.45	Kumaran (1996)
<i>Shingles</i>					
Asbestos/cement.....	120	—	0.21	—	
Wood, 16 in., 7 1/2 in. exposure	—	—	0.87	0.31	
Wood, double, 16 in., 12 in. exposure.....	—	—	1.19	0.28	
Wood, plus ins. backer board	—	—	1.4	0.31	
Siding				—	
Asbestos/cement, lapped.....	—	—	0.21	0.24	
Asphalt roll siding.....	—	—	0.15	0.35	
<i>Siding</i>					
Asphalt insulating siding (1/2 in. bed).....	—	—	1.46	0.35	
Hardboard siding.....	—	—	0.67	0.28	
Wood, drop, 8 in.....	—	—	0.79	0.28	
Wood, bevel					
8 in., lapped.....	—	—	0.81	0.28	

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Table 5-1 Typical Thermal Properties of Common Building and Insulating Materials: Design Values^a (Continued)

(Table 4, Chapter 26, 2009 ASHRAE Handbook—Fundamentals)

Description	Density, lb/ft ³	Conductivity ^b <i>k</i> , Btu·in/h·ft ² ·°F	Resistance <i>R</i> , h·ft ² ·°F/Btu	Specific Heat, Btu/lb·°F	Reference ^a
10 in., lapped.....	3/4 in.	—	—	1.05	0.28
Wood, plywood, 3/8 in., lapped	—	—	—	0.59	0.29
Aluminum, steel, or vinyl, ^{j, k} over sheathing	—	—	—	—	—
hollow-backed.....	—	—	—	0.62	0.29 ^k
insulating-board-backed.....	—	—	—	—	—
.....	3/8 in.	—	—	1.82	0.32
foil-backed.....	3/8 in.	—	—	2.96	—
Architectural (soda-lime float) glass.....	158	6.9	—	—	0.21
Building Membrane					
Vapor-permeable felt.....	—	—	—	0.06	—
Vapor: seal, 2 layers of mopped 15 lb felt.....	—	—	—	0.12	—
Vapor: seal, plastic film.....	—	—	—	Negligible	—
Finish Flooring Materials					
Carpet and rebounded urethane pad.....	3/4 in.	7	—	2.38	—
Carpet and rubber pad (one-piece).....	3/8 in.	20	—	0.68	—
Pile carpet with rubber pad.....	3/8 to 1/2 in.	18	—	1.59	—
Linoleum/cork tile.....	1/4 in.	29	—	0.51	—
PVC/Rubber floor covering.....	—	—	2.8	—	—
Rubber tile.....	1.0 in.	119	—	0.34	—
Terrazzo.....	1.0 in.	—	—	0.08	0.19
Insulating Materials					
<i>Blanket and batt^{c,d}</i>					
Glass-fiber batts.....	3 to 3 1/2 in.	0.6 to 0.9	0.30	—	0.2
.....	6 in.	0.5 to 0.8	0.31 to 0.33	—	0.2
Mineral fiber.....	5 1/2 in.	2	0.25	—	0.2
Mineral wool, felted.....	1 to 3	0.28	—	—	—
.....	4 to 8	0.24	—	—	—
Slag wool.....	3 to 12	0.26	—	—	—
.....	16	0.28	—	—	—
.....	19	0.30	—	—	—
.....	22	0.33	—	—	—
.....	25	0.35	—	—	—
<i>Board and slabs</i>					
Cellular glass.....	8	0.33	—	—	0.18
Cement fiber slabs, shredded wood with Portland cement binder.....	25 to 27	0.50 to 0.53	—	—	—
with magnesia oxysulfide binder.....	22	0.57	—	—	0.31
Glass fiber board.....	10	0.22 to 0.28	—	—	0.2
Expanded rubber (rigid).....	4	0.2	—	—	0.4
Expanded polystyrene extruded (smooth skin).....	1.6 to 2.4	0.15 to 0.21	—	—	0.35
Expanded polystyrene, molded beads.....	0.9 to 1.6	0.22 to 0.27	—	—	0.35
Mineral fiberboard, wet felted.....	10	0.26	—	—	0.2
core or roof insulation.....	16 to 17	0.34	—	—	—
acoustical tile ^g	18	—	—	—	0.19
.....	21	0.37	—	—	—
wet-molded, acoustical tile ^g	23	0.42	—	—	0.14
Perlite board.....	10	0.36	—	—	—
Polyisocyanurate, aged	—	—	—	—	—
unfaced.....	1.6 to 2.3	0.14 to 0.19	—	—	—
with facers.....	4	0.13	—	—	0.35
Phenolic foam board with facers, aged.....	4	0.13	—	—	—
<i>Loose fill</i>					
Cellulosic (milled paper or wood pulp).....	2 to 3.5	0.26 to 0.31	—	—	0.45
fiberized	1.2 to 2.0	—	—	—	—
Perlite, expanded.....	2 to 4	0.27 to 0.31	—	—	0.26
.....	4 to 7.5	0.31 to 0.36	—	—	—
.....	7.5 to 11	0.36 to 0.42	—	—	—
Mineral fiber (rock, slag, or glass) ^d	—	—	—	—	—
.....approx. 3 3/4 to 5 in.	0.6 to 2.0	—	—	11.0	0.17
.....approx. 6 1/2 to 8 3/4 in.	0.6 to 2.0	—	—	19.0	—
.....approx. 7 1/2 to 10 in.	0.6 to 2.0	—	—	22.0	—

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Table 5-1 Typical Thermal Properties of Common Building and Insulating Materials: Design Values^a (Continued)

(Table 4, Chapter 26, 2009 ASHRAE Handbook—Fundamentals)

Description	Density, lb/ft ³	Conductivity ^b <i>k</i> , Btu·in/h·ft ² ·°F	Resistance <i>R</i> , h·ft ² ·°F/Btu	Specific Heat, Btu/lb·°F	Reference ⁿ
.....approx. 10 1/4 to 13 3/4 in.	0.6 to 2.0	—	30.0	—	
..... approx. 3 1/2 in. (closed sidewall application)	2.0 to 3.5	—	12.0 to 14.0	—	
Vermiculite, exfoliated	7.0 to 8.2	0.47	—	0.32	Sabine et al. (1975)
.....	4.0 to 6.0	0.44	—	—	(Manufacturer)
<i>Spray-applied</i>					
Cellulosic fiber	3.5 to 6.0	0.29 to 0.34	—	—	Yarbrough et al. (1987)
Glass fiber	3.5 to 4.5	0.26 to 0.27	—	—	Yarbrough et al. (1987)
Polyurethane foam (low density)	0.4 to 0.5	0.29	—	0.35	Kumaran (2002)
.....	2.4	0.18	—	0.35	Kumaran (2002)
aged and dry	1 1/2 in. 2.0	—	9.09	0.35	Kumaran (1996)
.....	2 in. 3.5	—	10.9	0.35	Kumaran (1996)
.....	4 1/2 in. 2.0	—	20.95	—	Kumaran (1996)
Ureaformaldehyde foam, dry	0.5 to 1.2	0.21 to 0.22	—	—	CIBSE (2006)
Metals					
(See Chapter 33, Table 3)					
Roofing					
Asbestos/cement shingles	120	—	0.21	0.24	
Asphalt (bitumen with inert fill)	100	2.98	—	—	CIBSE (2006)
.....	119	4.0	—	—	CIBSE (2006)
.....	144	7.97	—	—	CIBSE (2006)
Asphalt roll roofing.....	70	—	0.15	0.36	
Asphalt shingles	70	—	0.44	0.3	
Built-up roofing..... 3/8 in.	70	—	0.33	0.35	
Mastic asphalt (heavy, 20% grit).....	59	1.32	—	—	CIBSE (2006)
Reed thatch.....	17	0.62	—	—	CIBSE (2006)
Roofing felt	141	8.32	—	—	CIBSE (2006)
Slate..... 1/2 in.	—	—	0.05	0.3	
Straw thatch.....	15	0.49	—	—	CIBSE (2006)
Wood shingles, plain and plastic-film-faced.....	—	—	0.94	0.31	
Plastering Materials					
Cement plaster, sand aggregate.....	116	5.0	—	0.2	
Sand aggregate					
..... 3/8 in.	—	—	0.08	0.2	
..... 3/4 in.	—	—	0.15	0.2	
Gypsum plaster	70	2.63	—	—	CIBSE (2006)
.....	80	3.19	—	—	CIBSE (2006)
Lightweight aggregate					
..... 1/2 in.	45	—	0.32	—	
..... 5/8 in.	45	—	0.39	—	
on metal lath..... 3/4 in.	—	—	0.47	—	
Perlite aggregate.....	45	1.5	—	0.32	
Sand aggregate	105	5.6	—	0.2	
on metal lath..... 3/4 in.	—	—	0.13	—	
Vermiculite aggregate.....	30	1	—	—	CIBSE (2006)
.....	40	1.39	—	—	CIBSE (2006)
.....	45	1.7	—	—	CIBSE (2006)
.....	50	1.8	—	—	CIBSE (2006)
.....	60	2.08	—	—	CIBSE (2006)
Perlite plaster.....	25	0.55	—	—	CIBSE (2006)
.....	38	1.32	—	—	CIBSE (2006)
Pulpboard or paper plaster	38	0.48	—	—	CIBSE (2006)
Sand/cement plaster, conditioned.....	98	4.4	—	—	CIBSE (2006)
Sand/cement/lime plaster, conditioned	90	3.33	—	—	CIBSE (2006)
Sand/gypsum (3:1) plaster, conditioned.....	97	4.5	—	—	CIBSE (2006)
Masonry Materials					
<i>Masonry units</i>					
Brick, fired clay.....	150	8.4 to 10.2	—	—	Valore (1988)
.....	140	7.4 to 9.0	—	—	Valore (1988)
.....	130	6.4 to 7.8	—	—	Valore (1988)
.....	120	5.6 to 6.8	—	0.19	Valore (1988)
.....	110	4.9 to 5.9	—	—	Valore (1988)

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.....	100	4.2 to 5.1	—	—	Valore (1988)
.....	90	3.6 to 4.3	—	—	Valore (1988)
.....	80	3.0 to 3.7	—	—	Valore (1988)
.....	70	2.5 to 3.1	—	—	Valore (1988)
Clay tile, hollow					
1 cell deep	3 in.	—	0.80	0.21	Rowley (1937)
.....	4 in.	—	1.11	—	Rowley (1937)
2 cells deep	6 in.	—	1.52	—	Rowley (1937)
.....	8 in.	—	1.85	—	Rowley (1937)
.....	10 in.	—	2.22	—	Rowley (1937)
3 cells deep	12 in.	—	2.50	—	Rowley (1937)
Lightweight brick	50	1.39	—	—	Kumaran (1996)
.....	48	1.51	—	—	Kumaran (1996)
Concrete blocks ^{b, i}					
Limestone aggregate					
8 in., 36 lb, 138 lb/ft ³ concrete, 2 cores	—	—	—	—	
with perlite-filled cores	—	—	2.1	—	Valore (1988)
12 in., 55 lb, 138 lb/ft ³ concrete, 2 cores	—	—	—	—	
with perlite-filled cores	—	—	3.7	—	Valore (1988)
Normal-weight aggregate (sand and gravel)					
8 in., 33 to 36 lb, 126 to 136 lb/ft ³	—	—	1.11 to 0.97	0.22	Van Geem (1985)
concrete, 2 or 3 cores	—	—	—	—	
with perlite-filled cores	—	—	2.0	—	Van Geem (1985)
with vermiculite-filled cores	—	—	1.92 to 1.37	—	Valore (1988)
12 in., 50 lb, 125 lb/ft ³ concrete, 2 cores	—	—	1.23	0.22	Valore (1988)
Medium-weight aggregate (combinations of normal and lightweight aggregate)					
8 in., 26 to 29 lb, 97 to 112 lb/ft ³	—	—	1.71 to 1.28	—	Van Geem (1985)
concrete, 2 or 3 cores	—	—	—	—	
with perlite-filled cores	—	—	3.7 to 2.3	—	Van Geem (1985)
with vermiculite-filled cores	—	—	3.3	—	Van Geem (1985)
with molded-EPS-filled (beads) cores	—	—	3.2	—	Van Geem (1985)
with molded EPS inserts in cores	—	—	2.7	—	Van Geem (1985)
Lightweight aggregate (expanded shale, clay, slate or slag, pumice)					
6 in., 16 to 17 lb, 85 to 87 lb/ft ³	—	—	1.93 to 1.65	—	Van Geem (1985)
concrete, 2 or 3 cores	—	—	—	—	
with perlite-filled cores	—	—	4.2	—	Van Geem (1985)
with vermiculite-filled cores	—	—	3.0	—	Van Geem (1985)
8 in., 19 to 22 lb, 72 to 86 lb/ft ³ concrete	—	—	3.2 to 1.90	0.21	Van Geem (1985)
with perlite-filled cores	—	—	6.8 to 4.4	—	Van Geem (1985)
with vermiculite-filled cores	—	—	5.3 to 3.9	—	Shu et al. (1979)
with molded-EPS-filled (beads) cores	—	—	4.8	—	Shu et al. (1979)
with UF foam-filled cores	—	—	4.5	—	Shu et al. (1979)
with molded EPS inserts in cores	—	—	3.5	—	Shu et al. (1979)
12 in., 32 to 36 lb, 80 to 90 lb/ft ³ ,	—	—	2.6 to 2.3	—	Van Geem (1985)
concrete, 2 or 3 cores	—	—	—	—	
with perlite-filled cores	—	—	9.2 to 6.3	—	Van Geem (1985)
with vermiculite-filled cores	—	—	5.8	—	Valore (1988)
Stone, lime, or sand	180	72	—	—	Valore (1988)
Quartzitic and sandstone	160	43	—	—	Valore (1988)
.....	140	24	—	—	Valore (1988)
.....	120	13	—	0.19	Valore (1988)
Calcitic, dolomitic, limestone, marble, and granite	180	30	—	—	Valore (1988)
.....	160	22	—	—	Valore (1988)
.....	140	16	—	—	Valore (1988)
.....	120	11	—	0.21	Valore (1988)
.....	100	8	—	—	Valore (1988)
Gypsum partition tile					
3 by 12 by 30 in., solid	—	—	1.26	0.19	Rowley (1937)
4 cells	—	—	1.35	—	Rowley (1937)
4 by 12 by 30 in., 3 cells	—	—	1.67	—	Rowley (1937)
Limestone	150	3.95	—	0.2	Kumaran (2002)
.....	163	6.45	—	0.2	Kumaran (2002)

Table 5-1 Typical Thermal Properties of Common Building and Insulating Materials: Design Values^a (Continued)

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Description	Density, lb/ft ³	Conductivity ^b <i>k</i> , Btu·in/h·ft ² ·°F	Resistance <i>R</i> , h·ft ² ·°F/Btu	Specific Heat, Btu/lb·°F	Reference ⁿ
<i>Concretesⁱ</i>					
Sand and gravel or stone aggregate concretes (concretes with >50% quartz or quartzite sand have conductivities in higher end of range).....	150	10.0 to 20.0	—	—	Valore (1988)
.....	140	9.0 to 18.0	—	0.19 to 0.24	Valore (1988)
.....	130	7.0 to 13.0	—	—	Valore (1988)
Lightweight aggregate or limestone concretes.....	120	6.4 to 9.1	—	—	Valore (1988)
Expanded shale, clay, or slate; expanded slags; cinders; pumice (with density up to 100 lb/ft ³); scoria (sanded concretes have conductivities in higher end of range).....	100	4.7 to 6.2	—	0.2	Valore (1988)
.....	80	3.3 to 4.1	—	0.2	Valore (1988)
.....	60	2.1 to 2.5	—	—	Valore (1988)
.....	40	1.3	—	—	Valore (1988)
Gypsum/fiber concrete (87.5% gypsum, 12.5% wood chips).....	51	1.66	—	0.2	Rowley (1937)
Cement/lime, mortar, and stucco.....	120	9.7	—	—	Valore (1988)
.....	100	6.7	—	—	Valore (1988)
.....	80	4.5	—	—	Valore (1988)
Perlite, vermiculite, and polystyrene beads.....	50	1.8 to 1.9	—	—	Valore (1988)
.....	40	1.4 to 1.5	—	0.15 to 0.23	Valore (1988)
.....	30	1.1	—	—	Valore (1988)
.....	20	0.8	—	—	Valore (1988)
Foam concretes.....	120	5.4	—	—	Valore (1988)
.....	100	4.1	—	—	Valore (1988)
.....	80	3.0	—	—	Valore (1988)
.....	70	2.5	—	—	Valore (1988)
Foam concretes and cellular concretes.....	60	2.1	—	—	Valore (1988)
.....	40	1.4	—	—	Valore (1988)
.....	20	0.8	—	—	Valore (1988)
Aerated concrete (oven-dried).....	27 to 50	1.4	—	0.2	Kumaran (1996)
Polystyrene concrete (oven-dried).....	16 to 50	2.54	—	0.2	Kumaran (1996)
Polymer concrete.....	122	11.4	—	—	Kumaran (1996)
.....	138	7.14	—	—	Kumaran (1996)
Polymer cement.....	117	5.39	—	—	Kumaran (1996)
Slag concrete.....	60	1.5	—	—	Touloukian et al. (1970)
.....	80	2.25	—	—	Touloukian et al. (1970)
.....	100	3	—	—	Touloukian et al. (1970)
.....	125	8.53	—	—	Touloukian et al. (1970)
Woods (12% moisture content)^l					
<i>Hardwoods</i>					
Oak.....	41 to 47	1.12 to 1.25	—	0.39 ^m	Wilkes (1979)
Birch.....	43 to 45	1.16 to 1.22	—	—	Cardenas and Bible (1987)
Maple.....	40 to 44	1.09 to 1.19	—	—	Cardenas and Bible (1987)
Ash.....	38 to 42	1.06 to 1.14	—	—	Cardenas and Bible (1987)
<i>Softwoods</i>					
Southern pine.....	36 to 41	1.00 to 1.12	—	0.39 ^m	Wilkes (1979)
Southern yellow pine.....	31	1.06 to 1.16	—	—	Cardenas
Eastern white pine.....	25	0.85 to 0.94	—	—	Kumaran (2002)
Douglas fir/larch.....	34 to 36	0.95 to 1.01	—	—	Kumaran (2002)
Southern cypress.....	31 to 32	0.90 to 0.92	—	—	Cardenas and Bible (1987)
Hem/fir, spruce/pine/fir.....	24 to 31	0.74 to 0.90	—	—	Cardenas and Bible (1987)
Spruce.....	25	0.74 to 0.85	—	—	Cardenas and Bible (1987)
Western red cedar.....	22	0.83 to 0.86	—	—	Kumaran (2002)
West coast woods, cedars.....	22 to 31	0.68 to 0.90	—	—	Kumaran (2002)
Eastern white cedar.....	22	0.82 to 0.89	—	—	Cardenas and Bible (1987)
California redwood.....	24 to 28	0.74 to 0.82	—	—	Kumaran (2002)
Pine (oven-dried).....	23	0.64	—	0.45	Cardenas and Bible (1987)
Spruce (oven-dried).....	25	0.69	—	0.45	Kumaran (1996)

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In Table 29, some of the data have been corrected. Please replace the original table with the one below. Updated values are in bold.

Table 29 Window Component of Heat Gain (No Blinds or Overhang)

Local Std. Hour	Beam Solar Heat Gain					Diffuse Solar Heat Gain							Conduction		Total Window Heat Gain, Btu/h	
	Beam Normal, Btu/h·ft ²	Surface Incident Angle	Surface Beam, Btu/h·ft ²	Beam SHGC	Adjusted Beam IAC	Beam Solar Heat Gain, Btu/h	Diffuse Horiz. E _d , Btu/h·ft ²	Ground Diffuse, Btu/h·ft ²	Y Ratio	Sky Diffuse, Btu/h·ft ²	Subtotal Diffuse, Btu/h·ft ²	Hemis. SHGC	Diff. Solar Heat Gain, Btu/h	Out-side Temp., °F		Con-duction Heat Gain, Btu/h
1	0.0	117.4	0.0	0.000	1.000	0	0.0	0.0	0.4500	0.0	0.0	0.410	0	73.8	-54	-54
2	0.0	130.9	0.0	0.000	1.000	0	0.0	0.0	0.4500	0.0	0.0	0.410	0	73.0	-90	-90
3	0.0	144.5	0.0	0.000	1.000	0	0.0	0.0	0.4500	0.0	0.0	0.410	0	72.3	-121	-121
4	0.0	158.1	0.0	0.000	1.000	0	0.0	0.0	0.4500	0.0	0.0	0.410	0	71.7	-148	-148
5	0.0	171.3	0.0	0.000	1.000	0	0.0	0.0	0.4500	0.0	0.0	0.410	0	71.3	-166	-166
6	5.6	172.5	0.0	0.000	0.000	0	5.8	0.6	0.4500	2.6	3.2	0.410	106	71.7	-148	-42
7	92.4	159.5	0.0	0.000	0.000	0	27.4	5.0	0.4500	12.3	17.3	0.410	569	73.2	-81	488
8	155.4	145.9	0.0	0.000	0.000	0	42.9	11.2	0.4500	19.3	30.5	0.410	1002	76.7	76	1078
9	193.1	132.3	0.0	0.000	0.000	0	53.9	17.5	0.4500	24.3	41.8	0.410	1371	80.6	251	1622
10	216.1	118.8	0.0	0.000	0.000	0	61.6	23.1	0.4500	27.7	50.8	0.410	1665	84.1	408	2073
11	229.8	105.6	0.0	0.000	0.000	0	66.6	27.2	0.4553	30.3	57.5	0.410	1887	87.2	547	2434
12	236.7	92.6	0.0	0.000	0.000	0	69.3	29.6	0.5306	36.8	66.4	0.410	2177	89.3	641	2818
13	238.0	80.2	40.4	0.166	1.000	537	69.8	30.1	0.6332	44.2	74.3	0.410	2436	91.0	717	3690
14	233.8	68.7	85.1	0.321	1.000	2183	68.1	28.6	0.7505	51.1	79.7	0.410	2614	92.0	762	5559
15	223.5	58.4	117.0	0.398	1.000	3722	64.2	25.2	0.8644	55.5	80.7	0.410	2648	92.0	762	7132
16	205.3	50.4	130.8	0.438	1.000	4583	57.9	20.3	0.9555	55.3	75.6	0.410	2479	90.8	708	7770
17	175.5	45.8	122.4	0.448	1.000	4392	48.5	14.3	1.0073	48.9	63.2	0.410	2072	89.1	632	7096
18	126.2	45.5	88.4	0.449	1.000	3177	35.4	7.9	1.0100	35.7	43.6	0.410	1429	87.0	538	5143
19	44.7	49.7	28.9	0.441	1.000	1017	16.6	2.3	0.9631	16.0	18.3	0.410	599	83.9	399	2015
20	0.0	57.5	0.0	0.403	0.000	0	0.0	0.0	0.8755	0.0	0.0	0.410	0	81.7	300	300
21	0.0	67.5	0.0	0.330	0.000	0	0.0	0.0	0.7630	0.0	0.0	0.410	0	79.8	215	215
22	0.0	79.0	0.0	0.185	0.000	0	0.0	0.0	0.6452	0.0	0.0	0.410	0	77.9	130	130
23	0.0	91.3	0.0	0.000	1.000	0	0.0	0.0	0.5403	0.0	0.0	0.410	0	76.3	58	58
24	0.0	104.2	0.0	0.000	1.000	0	0.0	0.0	0.4618	0.0	0.0	0.410	0	75.0	0	0

Page 261: In Table 31, some of the data have been corrected. Please replace the original table with the one below. Updated values are in bold.

Table 31 Window Component of Cooling Load (With Blinds, No Overhang)

Local Standard Hour	Unshaded Direct Beam Solar (if AC = 1)						Shaded Direct Beam (AC < 1.0) + Diffuse + Conduction									
	Beam Heat Gain, Btu/h	Con- vective Btu/h	Radiant Btu/h	Solar RTS, Type 8, %	Radiant Btu/h	Cooling Load, Btu/h	Beam Heat Gain, Btu/h	Diffuse Heat Gain, Btu/h	Con- duction Heat Gain, Btu/h	Total Heat Gain, Btu/h	Con- vective Btu/h	Radiant Btu/h	Non- solar RTS, Type 8	Radiant Btu/h	Cooling Load, Btu/h	Window Cooling Load, Btu/h
1	0	0	0	1	0	0	0	0	-54	-54	-29	-25	49%	211	186	186
2	0	0	0	0	0	0	0	0	-90	-90	-48	-41	17%	184	143	143
3	0	0	0	0	0	0	0	0	-121	-121	-65	-56	9%	165	109	109
4	0	0	0	0	0	0	0	0	-148	-148	-80	-68	5%	146	78	78
5	0	0	0	0	0	0	0	0	-166	-166	-90	-76	3%	127	51	51
6	0	0	0	0	0	0	0	84	-148	-64	-35	-29	2%	140	110	110
7	0	0	0	0	0	0	0	449	-81	368	199	169	2%	249	419	419
8	0	0	0	0	0	0	0	791	76	868	469	399	1%	411	810	810
9	0	0	0	0	0	0	0	1083	251	1334	720	614	1%	587	1200	1200
10	0	0	0	0	0	0	0	1315	408	1723	930	793	1%	746	1539	1539
11	0	0	0	0	0	0	0	1491	547	2037	1100	937	1%	880	1817	1817
12	0	0	0	0	0	0	0	1720	641	2361	1275	1086	1%	1008	2094	2094
13	0	0	0	0	0	0	349	1925	717	2990	1615	1376	1%	1219	2594	2594
14	0	0	0	0	0	0	1419	2065	762	4246	2293	1953	1%	1630	3583	3583
15	0	0	0	0	0	0	2430	2092	762	5284	2853	2431	1%	2070	4500	4500
16	0	0	0	0	0	0	3062	1958	708	5728	3093	2635	1%	2379	5014	5014
17	0	0	0	0	0	0	3003	1637	632	5271	2847	2425	1%	2409	4834	4834
18	0	0	0	0	0	0	2227	1129	538	3893	2102	1791	1%	2093	3883	3883
19	0	0	0	0	0	0	734	473	399	1606	867	739	1%	1400	2139	2139
20	0	0	0	0	0	0	0	0	300	300	162	138	1%	814	952	952
21	0	0	0	0	0	0	0	0	215	215	116	99	0%	555	654	654
22	0	0	0	0	0	0	0	0	130	130	70	60	0%	406	466	466
23	0	0	0	0	0	0	0	0	58	58	31	27	0%	314	341	341
24	0	0	0	0	0	0	0	0	0	0	0	0	0%	254	254	254

Errata to
Principles of Heating, Ventilating, and Air Conditioning, 6th edition (2009)
August 9, 2012

- Page 67:** In the left-hand column, near the bottom, “chapter 6 of the *2005 ASHRAE Handbook—Fundamentals*” should read “**chapter 1 of the 2009 ASHRAE Handbook—Fundamentals**” and the h_{w_2} , h_{w_1} , and $h_{condensate}$ values should be updated from $h_{w_2} = 1083.03$ Btu/lb, $h_{w_1} = 1102.55$ Btu/lb, and $h_{condensate} = 18.06$ Btu/lb to $h_{w_2} = \mathbf{1083.07}$ Btu/lb, $h_{w_1} = \mathbf{1102.57}$ Btu/lb, and $h_{condensate} = \mathbf{18.07}$ Btu/lb.
- Page 69:** In the left-hand column, in the paragraph under Equation 3-25, change the first sentence from “In Equations (3-24) and (3-25), respectively, 2500 kJ/kg (1076 Btu/lb) is the approximate energy content of the superheated water vapor at 23.8°C (75°F), less the energy content of water at 10°C (50°F)” to “In Equations (3-24) and (3-25), respectively, 2500 kJ/kg (1076 Btu/lb) is the approximate energy content of the superheated water vapor at 23.8°C (75°F) (**1093.95 Btu/lb**), less the energy content of water at 10°C (50°F) (**18.07 Btu/lb**)” and add the following new explanatory text: “**This difference is rounded up to 1076 Btu/lb (2500 kJ/kg).**”
- Page 69:** In the right-hand column, under $m_w = q_l/1100 = 8800/1100 = 8$ lb/h, add the following new explanatory text: “**where 1100 Btu/lb approximates the enthalpy of the moisture added, causing the latent heat load. It is an approximation for 1076 Btu/lb in Equation 3-25.**”