

Table C3-1 Minimum Design Dead Loads^a

Component	Load (psf)
CEILINGS	
Acoustical fiber board	1
Gypsum board (per 1/8-in. thickness)	0.55
Mechanical duct allowance	4
Plaster on tile or concrete	5
Plaster on wood lath	8
Suspended steel channel system	2
Suspended metal lath and cement plaster	15
Suspended metal lath and gypsum plaster	10
Wood furring suspension system	2.5
COVERINGS, ROOF, AND WALL	
Asbestos-cement shingles	4
Asphalt shingles	2
Cement tile	16
Clay tile (for mortar add 10 psf)	
Book tile, 2-in.	12
Book tile, 3-in.	20
Ludowici	10
Roman	12
Spanish	19
Composition:	
Three-ply ready roofing	1
Four-ply felt and gravel	5.5
Five-ply felt and gravel	6
Copper or tin	1
Corrugated asbestos-cement roofing	4
Deck, metal, 20 gage	2.5
Deck, metal, 18 gage	3
Decking, 2-in. wood (Douglas fir)	5
Decking, 3-in. wood (Douglas fir)	8
Fiberboard, 1/2-in.	0.75
Gypsum sheathing, 1/2-in.	2
Insulation, roof boards (per inch thickness)	
Cellular glass	0.7
Fibrous glass	1.1
Fiberboard	1.5
Perlite	0.8
Polystyrene foam	0.2
Urethane foam with skin	0.5
Plywood (per 1/8-in. thickness)	0.4
Rigid insulation, 1/2-in.	0.75
Skylight, metal frame, 3/8-in. wire glass	8
Slate, 3/16-in.	7
Slate, 1/4-in.	10
Waterproofing membranes:	
Bituminous, gravel-covered	5.5
Bituminous, smooth surface	1.5
Liquid applied	1
Single-ply, sheet	0.7
Wood sheathing (per inch thickness)	3
Wood shingles	3
FLOOR FILL	
Cinder concrete, per inch	9

Continued

Table C3-1 (Continued)

Component						Load (psf)
Lightweight concrete, per inch						8
Sand, per inch						8
Stone concrete, per inch						12
FLOORS AND FLOOR FINISHES						
Asphalt block (2-in.), 1/2-in. mortar						30
Cement finish (1-in.) on stone-concrete fill						32
Ceramic or quarry tile (3/4-in.) on 1/2-in. mortar bed						16
Ceramic or quarry tile (3/4-in.) on 1-in. mortar bed						23
Concrete fill finish (per inch thickness)						12
Hardwood flooring, 7/7-in.						4
Linoleum or asphalt tile, 1/4-in.						1
Marble and mortar on stone-concrete fill						33
Slate (per mm thickness)						15
Solid flat tile on 1-in. mortar base						23
Subflooring, 3/4-in.						3
Terrazzo (1-1/2-in.) directly on slab						19
Terrazzo (1-in.) on stone-concrete fill						32
Terrazzo (1-in.), 2-in. stone concrete						32
Wood block (3-in.) on mastic, no fill						10
Wood block (3-in.) on 1/2-in. mortar base						16
FLOORS, WOOD-JOIST (NO PLASTER)						
DOUBLE WOOD FLOOR						
Joist sizes (in.)	12-in. spacing (1b/ft ²)	16-in. spacing (1b/ft ²)	24-in. spacing (1b/ft ²)			
2 × 6	6	5	5			
2 × 8	6	6	5			
2 × 10	7	6	6			
2 × 12	8	7	6			
FRAME PARTITIONS						
Movable steel partitions						4
Wood or steel studs, 1/2-in. gypsum board each side						8
Wood studs, 2 × 4, unplastered						4
Wood studs, 2 × 4, plastered one side						12
Wood studs, 2 × 4, plastered two sides						20
FRAME WALLS						
Exterior stud walls:						
2 × 4 @ 16-in., 5/8-in. gypsum, insulated, 3/8-in. siding						11
2 × 6 @ 16-in., 5/8-in. gypsum, insulated, 3/8-in. siding						12
Exterior stud walls with brick veneer						48
Windows, glass, frame, and sash						8
Clay brick wythes:						
4 in.						39
8 in.						79
12 in.						115
16 in.						155
Hollow concrete masonry unit wythes:						
Wythe thickness (in inches)		4	6	8	10	12
Density of unit (105 pcf)						
No grout		22	24	31	37	43
48 in. o.c.			29	38	47	55
40 in. o.c.	grout		30	40	49	57
32 in. o.c.	spacing		32	42	52	61
24 in. o.c.			34	46	57	67
16 in. o.c.			40	53	66	79
Full grout			55	75	95	115

Table C3-1 (Continued)

Component	Load (psf)				
Density of unit (125 pcf)					
No grout	26	28	36	44	50
48 in. o.c.		33	44	54	62
40 in. o.c. grout		34	45	56	65
32 in. o.c. spacing		36	47	58	68
24 in. o.c.		39	51	63	75
16 in. o.c.		44	59	73	87
Full grout		59	81	102	123
Density of unit (135 pcf)					
No grout	29	30	39	47	54
48 in. o.c.		36	47	57	66
40 in. o.c. grout		37	48	59	69
32 in. o.c. spacing		38	50	62	72
24 in. o.c.		41	54	67	78
16 in. o.c.		46	61	76	90
Full grout		62	83	105	127
Solid concrete masonry unit wythes (incl. concrete brick):					
Wythe thickness (in mm)	4	6	8	10	12
Density of unit (105 pcf)	32	51	69	87	105
Density of unit (125 pcf)	38	60	81	102	124
Density of unit (135 pcf)	41	64	87	110	133

Component	Load (kN/m ²)
CEILING	
Acoustical fiber board	0.05
Gypsum board (per mm thickness)	0.008
Mechanical duct allowance	0.19
Plaster on tile or concrete	0.24
Plaster on wood lath	0.38
Suspended steel channel system	0.10
Suspended metal lath and cement plaster	0.72
Suspended metal lath and gypsum plaster	0.48
Wood furring suspension system	0.12
COVERINGS, ROOF, AND WALL	
Asbestos-cement shingles	0.19
Asphalt shingles	0.10
Cement tile	0.77
Clay tile (for mortar add 0.48 kN/m ²)	
Book tile, 51 mm	0.57
Book tile, 76 mm	0.96
Ludowici	0.48
Roman	0.57
Spanish	0.91
Composition:	
Three-ply ready roofing	0.05
Four-ply felt and gravel	0.26
Five-ply felt and gravel	0.29
Copper or tin	0.05
Corrugated asbestos-cement roofing	0.19
Deck, metal, 20 gage	0.12
Deck, metal, 18 gage	0.14
Decking, 51-mm wood (Douglas fir)	0.24
Decking, 76-mm wood (Douglas fir)	0.38
Fiberboard, 13 mm	0.04

Continued

Table C3-1 (Continued)

Component	Load (kN/m ²)		
Gypsum sheathing, 13 mm	0.10		
Insulation, roof boards (per mm thickness)			
Cellular glass	0.0013		
Fibrous glass	0.0021		
Fiberboard	0.0028		
Perlite	0.0015		
Polystyrene foam	0.0004		
Urethane foam with skin	0.0009		
Plywood (per mm thickness)	0.006		
Rigid insulation, 13 mm	0.04		
Skylight, metal frame, 10-mm wire glass	0.38		
Slate, 5 mm	0.34		
Slate, 6 mm	0.48		
Waterproofing membranes:			
Bituminous, gravel-covered	0.26		
Bituminous, smooth surface	0.07		
Liquid applied	0.05		
Single-ply, sheet	0.03		
Wood sheathing (per mm thickness)			
Plywood	0.0057		
Oriented strand board	0.0062		
Wood shingles	0.14		
FLOOR FILL			
Cinder concrete, per mm	0.017		
Lightweight concrete, per mm	0.015		
Sand, per mm	0.015		
Stone concrete, per mm	0.023		
FLOORS AND FLOOR FINISHES			
Asphalt block (51 mm), 13-mm mortar	1.44		
Cement finish (25 mm) on stone-concrete fill	1.53		
Ceramic or quarry tile (19 mm) on 13-mm mortar bed	0.77		
Ceramic or quarry tile (19 mm) on 25-mm mortar bed	1.10		
Concrete fill finish (per mm thickness)	0.023		
Hardwood flooring, 22 mm	0.19		
Linoleum or asphalt tile, 6 mm	0.05		
Marble and mortar on stone-concrete fill	1.58		
Slate (per mm thickness)	0.028		
Solid flat tile on 25-mm mortar base	1.10		
Subflooring, 19 mm	0.14		
Terrazzo (38 mm) directly on slab	0.91		
Terrazzo (25 mm) on stone-concrete fill	1.53		
Terrazzo (25 mm), 51-mm stone concrete	1.53		
Wood block (76 mm) on mastic, no fill	0.48		
Wood block (76 mm) on 13-mm mortar base	0.77		
FLOORS, WOOD-JOIST (NO PLASTER)			
DOUBLE WOOD FLOOR			
Joist sizes (mm):	305-mm spacing (kN/m ²)	406-mm spacing (kN/m ²)	610-mm spacing (kN/m ²)
51 × 152	0.29	0.24	0.24
51 × 203	0.29	0.29	0.24
51 × 254	0.34	0.29	0.29
51 × 305	0.38	0.34	0.29
FRAME PARTITIONS			
Movable steel partitions			0.19
Wood or steel studs, 13-mm gypsum board each side			0.38

Table C3-1 (Continued)

Component	Load (kN/m ²)				
Wood studs, 51 × 102, unplastered	0.19				
Wood studs, 51 × 102, plastered one side	0.57				
Wood studs, 51 × 102, plastered two sides	0.96				
FRAME WALLS					
Exterior stud walls:					
51 mm × 102 mm @ 406 mm, 16-mm gypsum, insulated, 10-mm siding	0.53				
51 mm × 152 mm @ 406 mm, 16-mm gypsum, insulated, 10-mm siding	0.57				
Exterior stud walls with brick veneer	2.30				
Windows, glass, frame, and sash	0.38				
Clay brick wythes:					
102 mm	1.87				
203 mm	3.78				
305 mm	5.51				
406 mm	7.42				
Hollow concrete masonry unit wythes:					
Wythe thickness (in mm)	102	152	203	254	305
Density of unit (16.49 kN/m ³)					
No grout	1.05	1.29	1.68	2.01	2.35
1,219 mm		1.48	1.92	2.35	2.78
1,016 mm grout		1.58	2.06	2.54	3.02
813 mm spacing		1.63	2.15	2.68	3.16
610 mm		1.77	2.35	2.92	3.45
406 mm		2.01	2.68	3.35	4.02
Full grout		2.73	3.69	4.69	5.70
Density of unit (19.64 kN/m ³)					
No grout	1.25	1.34	1.72	2.11	2.39
1,219 mm		1.58	2.11	2.59	2.97
1,016 mm grout		1.63	2.15	2.68	3.11
813 mm spacing		1.72	2.25	2.78	3.26
610 mm		1.87	2.44	3.02	3.59
406 mm		2.11	2.78	3.50	4.17
Full grout		2.82	3.88	4.88	5.89
Density of unit (21.21 kN/m ³)					
No grout	1.39	1.68	2.15	2.59	3.02
1,219 mm		1.58	2.39	2.92	3.45
1,016 mm grout		1.72	2.54	3.11	3.69
813 mm spacing		1.82	2.63	3.26	3.83
610 mm		1.96	2.82	3.50	4.12
406 mm		2.25	3.16	3.93	4.69
Full grout		3.06	4.17	5.27	6.37
Solid concrete masonry unit					
Wythe thickness (in mm)	102	152	203	254	305
Density of unit (16.49 kN/m ³)	1.53	2.35	3.21	4.02	4.88
Density of unit (19.64 kN/m ³)	1.82	2.82	3.78	4.79	5.79
Density of unit (21.21 kN/m ³)	1.96	3.02	4.12	5.17	6.27

^aWeights of masonry include mortar but not plaster. For plaster, add 0.24 kN/m² for each face plastered. Values given represent averages. In some cases there is a considerable range of weight for the same construction.

Table C3-2 Minimum Densities for Design Loads from Materials

Material	Density (lb/ft ³)	Density (kN/m ³)	Material	Density (lb/ft ³)	Density (kN/m ³)
Aluminum	170	27	Soil	70	11.0
Bituminous products			River mud	90	14.1
Asphaltum	81	12.7	Sand or gravel	60	9.4
Graphite	135	21.2	Sand or gravel and clay	65	10.2
Paraffin	56	8.8	Glass	160	25.1
Petroleum, crude	55	8.6	Gravel, dry	104	16.3
Petroleum, refined	50	7.9	Gypsum, loose	70	11.0
Petroleum, benzine	46	7.2	Gypsum, wallboard	50	7.9
Petroleum, gasoline	42	6.6	Ice	57	9.0
Pitch	69	10.8	Iron		
Tar	75	11.8	Cast	450	70.7
Brass	526	82.6	Wrought	480	75.4
Bronze	552	86.7	Lead	710	111.5
Cast-stone masonry (cement, stone, sand)	144	22.6	Lime		
Cement, portland, loose	90	14.1	Hydrated, loose	32	5.0
Ceramic tile	150	23.6	Hydrated, compacted	45	7.1
Charcoal	12	1.9	Masonry, ashlar stone		
Cinder fill	57	9.0	Granite	165	25.9
Cinders, dry, in bulk	45	7.1	Limestone, crystalline	165	25.9
Coal			Limestone, oolitic	135	21.2
Anthracite, piled	52	8.2	Marble	173	27.2
Bituminous, piled	47	7.4	Sandstone	144	22.6
Lignite, piled	47	7.4	Masonry, brick		
Peat, dry, piled	23	3.6	Hard (low absorption)	130	20.4
Concrete, plain			Medium (medium absorption)	115	18.1
Cinder	108	17.0	Soft (high absorption)	100	15.7
Expanded-slag aggregate	100	15.7	Masonry, concrete ^a		
Haydite (burned-clay aggregate)	90	14.1	Lightweight units	105	16.5
Slag	132	20.7	Medium weight units	125	19.6
Stone (including gravel)	144	22.6	Normal weight units	135	21.2
Vermiculite and perlite aggregate, nonload-bearing	25–50	3.9–7.9	Masonry grout	140	22.0
Other light aggregate, load-bearing	70–105	11.0–16.5	Masonry, rubble stone		
Concrete, reinforced			Granite	153	24.0
Cinder	111	17.4	Limestone, crystalline	147	23.1
Slag	138	21.7	Limestone, oolitic	138	21.7
Stone (including gravel)	150	23.6	Marble	156	24.5
Copper	556	87.3	Sandstone	137	21.5
Cork, compressed	14	2.2	Mortar, cement or lime	130	20.4
Earth (not submerged)			Particleboard	45	7.1
Clay, dry	63	9.9	Plywood	36	5.7
Clay, damp	110	17.3	Riprap (not submerged)		
Clay and gravel, dry	100	15.7	Limestone	83	13.0
Silt, moist, loose	78	12.3	Sandstone	90	14.1
Silt, moist, packed	96	15.1	Sand		
Silt, flowing	108	17.0	Clean and dry	90	14.1
Sand and gravel, dry, loose	100	15.7	River, dry	106	16.7
Sand and gravel, dry, packed	110	17.3	Slag		
Sand and gravel, wet	120	18.9	Bank	70	11.0
Earth (submerged)			Bank screenings	108	17.0
Clay	80	12.6	Machine	96	15.1
			Sand	52	8.2
			Slate	172	27.0

Table C3-2 (Continued)

Material	Density (lb/ft ³)	Density (kN/m ³)	Material	Density (lb/ft ³)	Density (kN/m ³)
Steel, cold-drawn	492	77.3	Sea	64	10.1
Stone, quarried, piled			Wood, seasoned		
Basalt, granite, gneiss	96	15.1	Ash, commercial white	41	6.4
Limestone, marble, quartz	95	14.9	Cypress, southern	34	5.3
Sandstone	82	12.9	Fir, Douglas, coast region	34	5.3
Shale	92	14.5	Hem fir	28	4.4
Greenstone, hornblende	107	16.8	Oak, commercial reds and whites	47	7.4
Terra cotta, architectural			Pine, southern yellow	37	5.8
Voids filled	120	18.9	Redwood	28	4.4
Voids unfilled	72	11.3	Spruce, red, white, and Sitka	29	4.5
Tin	459	72.1	Western hemlock	32	5.0
Water			Zinc, rolled sheet	449	70.5
Fresh	62	9.7			

*Tabulated values apply to solid masonry and to the solid portion of hollow masonry.