

Table 1: Minimum Design Dead Loads

Component	Load (kN/m <sup>2</sup> )	Component	Load (kN/m <sup>2</sup> )
<b>CEILING</b>		Decking, 51 mm wood ( Douglas fir )	0.24
Acoustical Fiber Board	0.05	Decking, 76 mm wood ( Douglas fir )	0.35
Gypsum board ( per min thickness)	0.008	Fiberboard, 13 mm	0.04
Mechanical duct allowance	0.19	Gypsum sheathing, 13 mm	0.1
Plaster on tile or concrete	0.24	<b>Insulation, roof boards (per mm thickness)</b>	
Plaster on wood lath	0.38	Cellular glass	0.0013
Suspended steel channel system	0.1	Fibrous glass	0.0021
Suspended metal lath and cement plaster	0.72	Fiberboard	0.0028
Suspended metal lath and gypsum plaster	0.48	Perlite	0.0015
Wood furring suspension system	0.12	Polystyrene foam	0.0004
<b>COVERINGS, ROOF, AND WALL</b>		Urethane foam with skin	0.0009
Asbestos-cement shingles	0.19	Plywood (per mm thickness)	0.006
Asphalt shingles	0.1	Rigid insulation, 13 mm	0.04
Cement tile	0.77	Skylight, metal frame, 10 mm wire glass	0.38
<b>Clay tile (for mortar add 0.48 kN/m<sup>2</sup>)</b>		Slate, 5 mm	0.34
Book tile, 51 mm	0.57	Slate, 6 mm	0.48
Book tile, 76 mm	0.96	<b>Waterproofing membranes:</b>	
Ludowici	0.48	Bituminous, gravel-covered	0.26
Roman	0.57	Bituminous, smooth surface	0.07
Spanish	0.91	Liquid applied	0.05
<b>Composition:</b>		Single-ply, sheet	0.03
Three-ply ready roofing	0.05	Wood sheathing (per mm thickness)	0.0057
Four-ply felt and gravel	0.26	Wood shingles	0.14
Five-ply felt and gravel	0.29	<b>FLOOR FILL</b>	
Copper or tin	0.05	Cinder concrete, per mm	0.017
Corrugated asbestos-cement roofing	0.19	Lightweight concrete, per mm	0.015
Deck, metal, 20 gage	0.12	Sand, per mm	0.015
Deck, metal, 18 gage	0.14	Stone concrete, per mm	0.023

Note: Weights of masonry include mortar but not plaster. For plaster, add 0.24 kN/m<sup>2</sup> for each face of plastered. Values given represent averages. In some cases there is a considerable range of weights for the same construction.

Table 2: Minimum Design Dead Loads – Continued

Component	Load (kN/m <sup>2</sup> )	Component	Load (kN/m <sup>2</sup> )
<b>FLOORS AND FLOOR FINISHES</b>		Windows, glass, frame, and sash	0.38
Asphalt block (51 mm), 13 mm mortar	1.44	<b>Clay brick wythes:</b>	
Cement finish (25 mm) on stone-concrete fill	1.53	102 mm	1.87
Ceramic or quarry tile (19 mm) on 13 mm. mortar bed	0.77	203 mm	3.78
Ceramic or quarry tile (19 mm) on 25 mm mortar bed	1.10	305 mm	5.51
Concrete fill finish (per mm thickness)	0.023	406 mm	7.42
Hardwood flooring, 22 mm	0.19	<b>Hollow concrete masonry unit wythes:</b>	
Linoleum or asphalt tile, 6 mm	0.05	Wythe thickness (in mm)	102
Marble and mortar on stone-concrete fill	1.58	<b>Density of unit (16.49 kN/m<sup>2</sup>)</b>	
Slate (per mm thickness)	0.028	No grout	1.29
Solid flat tile on 25 mm mortar base	1.10	1219 mm	1.65
Subflooring, 19 mm	0.14	1016 mm	2.01
Terrazzo (38 mm) directly on slab	0.91	813 mm	2.35
Terrazzo (25 mm) on stone-concrete fill	1.53	610 mm	2.78
Terrazzo (25 mm), 51 mm stone concrete	1.53	406 mm	3.02
Wood block (76 mm) on mastic, no fill	0.48	Full grout	3.16
Wood block (76 mm) on 13 mm mortar base	0.77	<b>Density of unit (19.64 kN/m<sup>2</sup>)</b>	
<b>FLOORS. WOOD-JOIST (NO PLASTER)</b>		No grout	1.34
<b>DOUBLE WOOD FLOOR</b>		1219 mm	1.72
305 mm spacing	610 mm	1016 mm	2.11
406 mm spacing	spacing	813 mm	2.59
(kN/m <sup>2</sup> ) (kN/m <sup>2</sup> )	(kN/m <sup>2</sup> )	610 mm	2.97
51 x 152	0.24	406 mm	3.11
52 x 203	0.29	Full grout	3.26
53 x 254	0.29	<b>Density of unit (21.21 kN/m<sup>2</sup>)</b>	
54 x 305	0.34	No grout	1.87
	0.38	1219 mm	2.11
<b>FRAME PARTITIONS</b>		1016 mm	2.82
Movable steel partitions		813 mm	3.88
Wood or steel studs, 1/2-in. gypsum board each side		610 mm	4.88
Wood studs, 51 x 102, unplastered		406 mm	5.89
Wood studs, 51 x 102, plastered one side		Full grout	1.68
Wood studs, 51 x 102, plastered two sides		<b>Density of unit (21.21 kN/m<sup>2</sup>)</b>	
<b>FRAME WALLS</b>		No grout	1.55
Exterior stud walls:		1219 mm	2.15
51 x 102 @ 406 mm, 16 mm gypsum, insulated, 10 mm, siding		1016 mm	2.39
52 x 152 @ 406 mm, 16 mm gypsum, insulated, 10 mm, siding		813 mm	2.54
Exterior stud walls with brick veneer		610 mm	3.11
		406 mm	3.69
		Full grout	3.83
		<b>Solid concrete masonry unit wythes thickness (in mm):</b>	
		Wythe thickness (in mm)	102
		Density of unit (16.49 kN/m <sup>3</sup> )	152
		Density of unit (19.64 kN/m <sup>3</sup> )	203
		Density of unit (21.21 kN/m <sup>3</sup> )	254
			305
			3.02
			3.45
			3.69
			3.83
			4.12
			4.69
			5.27
			6.37
			2.54
			2.92
			3.45
			4.88
			5.79
			6.27

Table 3: Minimum Densities for Design Loads from Materials

Material	Density (kN/m <sup>3</sup> )	Material	Density (kN/m <sup>3</sup> )
Aluminum	26.71	<b>Lime</b>	
<b>Bituminous products</b>		Hydrated, loose	5.03
Asphaltum	12.73	Hydrated, compacted	7.07
Graphite	21.21	<b>Masonry, ashlar stone</b>	
Paraffin	8.80	Granite	25.92
Petroleum, crude	8.64	Limestone, crystalline	25.92
Petroleum, refined	7.86	Limestone, oolitic	21.21
Petroleum, benzine	7.23	Marble	27.18
Petroleum, gasoline	6.60	Sandstone	22.62
Pitch	10.84	<b>Masonry, brick</b>	
Tar	11.78	Hard (low absorbtion)	20.42
Brass	82.63	Medium (medium absorbtion)	18.07
Bronze	86.72	Soft (high absorbtion)	15.71
Cast-stone masonry ( cement, stone, sand)	22.62	Masonry, concrete*	
Cement, portland. loose	14.14	Lightweight units	16.50
Ceramic tile	23.57	Medium weight units	19.64
Charcoal	1.89	Normal weight units	21.21
Cinder fill	8.95	Masonry grout	21.99
Cinders, dry, in bulk	7.07	<b>Masonry, rubble stone</b>	
<b>Coal</b>		Granite	24.04
Anthracite, piled	8.17	Limestone, crystalline	23.09
Bituminous, piled	7.38	Limestone, oolitic	21.68
Lignite, piled	7.38	Marble	24.51
Peat, dry, piled	3.61	Sandstone	21.52
<b>Concrete, plain</b>		Mortar, cement or lime	20.42
Cinder	16.97	Particleboard	7.07
Expanded-slag aggregate	15.71	Plywood	5.66
Haydite (burned-clay aggregate)	14.14	<b>Riprap (not submerged)</b>	
Slag	20.74	Limestone	13.04
Stone (including gravel)	22.62	Sandstone	14.14
Vermiculite and perlite aggregate, nonload-bearing	3.93 – 7.86	Sand	
Other light aggregate, load-bearing	11.0 – 16.5	Clean and dry	14.14
<b>Concrete, reinforced</b>		River, dry	16.65
Cinder	17.44	<b>Slag</b>	
Slag	21.68	Bank	11.00
Stone ( including gravel )	23.57	Bank screenings	16.97
Copper	87.35	Machine	15.08
Cork, compressed	2.20	Sand	8.17
<b>Earth ( not submerged)</b>		Slate	27.02
Clay, dry	9.90	Steel, cold-drawn	77.29
Clay, damp	17.44	<b>Stone, quarried, piled</b>	
Clay and gravel, dry	15.71	Basalt, granite, gneiss	15.08
Silt, moist, loose	12.25	Limestone, marble, quartz	14.92
Silt, moist, packed	15.08	Sandstone	12.88
Silt, flowing	16.97	Shale	14.45
Sand and gravel, dry, loose	15.71	Greenstone, hornblende	16.81
Sand and gravel, dry, packed	17.28	<b>Terra Cotta, architectural</b>	
Sand and gravel, wet	18.85	Voids filled	18.85
<b>Earth (submerged)</b>		Voids unfilled	11.31
Clay	12.57	Tin	72.11
Soil	11.00	<b>Water</b>	
River mud	14.14	Fresh	9.74
Sand or gravel	9.43	Sea	10.05
Sand or gravel and clay	10.21	<b>Wood, seasoned</b>	
Glass	25.14	Ash, commercial white	6.44
Gravel, dry	16.34	Cypress, southern	5.34
Gypsum, loose	11.00	Fir, Douglas, coast region	5.34
Gypsum, wallboard	7.86	Hem fir	4.40
Ice	8.95	Oak, commercial reds and whites	7.38
<b>Iron</b>		Pine, southern yellow	5.81
Cast	70.70	Redwood	4.40
Wrought	75.41	Spruce, red, white, and Stika	4.56
Lead	111.54	Western hemlock	5.03
		Zinc, rolled sheet	70.54

Table 4: Minimum Design Dead Loads

Component	Load (psf)	Component	Load (psf)
<b>CEILING</b>		Decking, 2-in. wood ( Douglas fir)	5.00
Acoustical Fiber Board	1.00	Decking, 3-in. wood ( Douglas fir)	8.00
Gypsum board (per 1/8-in. thickness)	0.55	Fiberboard, 1/2-in.	0.75
Mechanical duct allowance	4.00	Gypsum sheathing, 1/2-in.	2.00
Plaster on tile or concrete	5.00	<b>Insulation, roof boards (per inch thickness)</b>	
Plaster on wood lath	8.00	Cellular glass	0.70
Suspended steel channel system	2.00	Fibrous glass	1.10
Suspended metal lath and cement plaster	15.00	Fiberboard	1.50
Suspended metal lath and gypsum plaster	10.00	Perlite	0.80
Wood furring suspension system	2.50	Polystyrene foam	0.20
<b>COVERINGS, ROOF, AND WALL</b>		Urethane foam with skin	0.50
Asbestos-cement shingles	4.00	Plywood (per 1/8-in. thickness)	0.40
Asphalt shingles	2.00	Rigid insulation, 1/2 in	0.75
Cement tile	16.00	Skylight, metal frame, 3/8-in. wire glass	8.00
<b>Clay tile (for mortar add 10 psf)</b>		Slate. 3/16-in.	7.00
Book tile, 2-in.	12.00	Slate. 1/4-in.	10.00
Book tile, 3-in.	20.00	<b>Waterproofing membranes:</b>	
Ludowici	10.00	Bituminous, gravel covered	5.50
Roman	12.00	Bituminous, smooth surface	1.50
Spanish	19.00	Liquid applied	1.00
<b>Composition:</b>		Single-ply, sheet	0.70
Three-ply ready roofing	1.00	Wood sheathing (per inch thickness)	3.00
Four-ply felt and gravel	5.50	Wood shingles	3.00
Five-ply felt and gravel	6.00	<b>FLOOR FILL</b>	
Copper or tin	1.00	Cinder concrete, per inch	9.00
Corrugated asbestos-cement roofing	4.00	Lightweight concrete, per inch	8.00
Deck, metal, 20 gage	2.50	Sand, per inch	8.00
Deck, metal, 18 gage	3.00	Stone concrete, per inch	12.00

Note: Weights of masonry include mortar but not plaster. For plaster, add 5 lb/ft<sup>2</sup> for each face of plastered. Values given represent averages. In some cases there is a considerable range of weights for the same construction.

Table 5: Minimum Design Dead Loads – Continued

Component	Load (psf)	Component	Load (psf)
<b>FLOORS AND FLOOR FINISHES</b>		Windows, glass, frame, and sash	8
Asphalt block (2-in.), 1/2-in. mortar	30	<b>Clay brick wythes:</b>	
Cement finish (1-in.) on stone-concrete fill	32	4 in.	39
Ceramic or quarry tile (3/4-in.) on 1/2-in. mortar bed	16	8 in.	79
Ceramic or quarry tile (3/4-in.) on 1-in. mortar bed	23	12 in.	115
Concrete fill finish (per inch thickness)	12	16 in.	155
Hardwood flooring, 7/7-in.	4	<b>Hollow concrete masonry unit wythes:</b>	
Linoleum or asphalt tile, 1/4-in.	1	Wythe thickness (in inches)	4 6 8 10 12
Marble and mortar on stone-concrete fill	33	<b>Density of unit (105 pcf)</b>	
Slate (per mm thickness)	15	No grout	22
Solid flat tile on 1-in. mortar base	23	48 in. o.c.	24 24 31 37 43
Subflooring, 3/4-in.	3	40 in. o.c.	29 38 47 55
Terrazzo (1 - 1/2-in.) directly on slab	19	32 in. o.c.	30 40 49 57
Terrazzo (1 -in.) on stone-concrete fill	32	24 in. o.c.	32 42 52 61
Terrazzo (1-in.), 2-in. stone concrete	32	16 in. o.c.	34 46 57 67
Wood block (3-in.) on mastic, no fill	10	Full grout	40 53 66 79
Wood block (3-in.) on 1/2-in. mortar base	16	<b>Density of unit (125 pcf)</b>	55 75 95 115
<b>FLOORS WOOD-JOIST (NO PLASTER)</b>		No grout	26
<b>DOUBLE WOOD FLOOR</b>		48 in. o.c.	28 36 44 50
12-in.	16-in.	40 in. o.c.	33 44 54 62
24-in.		32 in. o.c.	34 45 56 65
Joint sizes	spacing	spacing	36 47 58 68
( in.)	(lb/ft <sup>2</sup> )	spacing	39 51 63 75
2 x 6	5	16 in. o.c.	44 59 73 87
2 x 8	6	Full grout	59 81 102 123
2 x 10	7	<b>Density of unit (135 pcf)</b>	
2 x 12	8	No grout	29
<b>FRAME PARTITIONS</b>		48 in. o.c.	30 39 47 54
Movable steel partitions		40 in. o.c.	36 47 57 66
Wood or steel studs, 1/2-in. gypsum board each side		32 in. o.c.	37 48 59 69
Wood studs, 2 x 4, un-plastered		24 in. o.c.	38 50 62 72
Wood studs, 2 x 4, plastered one side		16 in. o.c.	41 54 67 75
Wood studs, 2 x 4, plastered two sides		Full grout	46 61 76 90
<b>FRAME WALLS</b>		<b>Solid concrete masonry unit wythes (incl. concrete brick):</b>	62 83 105 127
Exterior stud walls:		Wythe thickness (in mm)	4 6 8 10 12
2 x 4 @ 16-in., 5/8-in. gypsum, insulated, 3/8-in. siding,	11	Density of unit (105 pcf)	32 51 69 87 105
2 x 6 @ 16-in., 5/8-in. gypsum, insulated, 3/8-in. siding,	12	Density of unit (125 pcf)	38 60 81 102 124
Exterior stud walls with brick veneer	48	Density of unit (135 pcf)	41 64 87 110 13

Table 6: Minimum Densities for Design Loads from Materials

Material	Density (lb/ft <sup>3</sup> )	Material	Density (lb/ft <sup>3</sup> )
Aluminum	170	<b>Lime</b>	
<b>Bituminous products</b>		Hydrated, loose	32
Asphaltum	81	Hydrated, compacted	45
Graphite	135	<b>Masonry, ashlar stone</b>	
Paraffin	56	Granite	165
Petroleum, crude	55	Limestone, crystalline	165
Petroleum, refined	50	Limestone, oolitic	135
Petroleum, benzine	46	Marble	173
Petroleum, gasoline	42	Sandstone	144
Pitch	69	<b>Masonry, brick</b>	
Tar	75	Hard (low absorbtion)	130
Brass	526	Medium (medium absorbtion)	115
Bronze	552	Soft (high absorbtion)	100
Cast-stone masonry ( cement, stone, sand)	144	Masonry, concrete*	
Cement, portland. loose	90	Lightweight units	105
Ceramic tile	150	Medium weight units	125
Charcoal	12	Normal weight units	135
Cinder fill	57	Masonry grout	140
Cinders, dry, in bulk	45	<b>Masonry, rubble stone</b>	
<b>Coal</b>		Granite	153
Anthracite, piled	52	Limestone, crystalline	147
Bituminous, piled	47	Limestone, oolitic	138
Lignite, piled	47	Marble	156
Peat, dry, piled	23	Sandstone	137
<b>Concrete, plain</b>		Mortar, cement or lime	130
Cinder	108	Particleboard	45
Expanded-slag aggregate	100	Plywood	36
Haydite (burned-clay aggregate)	90	<b>Riprap (not submerged)</b>	
Slag	132	Limestone	83
Stone (including gravel)	144	Sandstone	90
Vermiculite and perlite aggregate, nonload-bearing	25 – 50	Sand	
Other light aggregate, load-bearing	70 – 105	Clean and dry	90
<b>Concrete, reinforced</b>		River, dry	106
Cinder	111	<b>Slag</b>	
Slag	138	Bank	70
Stone ( including gravel )	150	Bank screenings	108
Copper	556	Machine	96
Cork, compressed	14	Sand	52
<b>Earth ( not submerged)</b>		Slate	172
Clay, dry	63	Steel, cold-drawn	492
Clay, damp	111	<b>Stone, quarried, piled</b>	
Clay and gravel, dry	100	Basalt, granite, gneiss	96
Silt, moist, loose	78	Limestone, marble, quartz	95
Silt, moist, packed	96	Sandstone	82
Silt, flowing	108	Shale	92
Sand and gravel, dry, loose	100	Greenstone, hornblende	107
Sand and gravel, dry, packed	110	<b>Terra Cotta, architectural</b>	
Sand and gravel, wet	120	Voids filled	120
<b>Earth (submerged)</b>		Voids unfilled	72
Clay	80	Tin	459
Soil	70	<b>Water</b>	
River mud	90	Fresh	62
Sand or gravel	60	Sea	64
Sand or gravel and clay	65	<b>Wood, seasoned</b>	
Glass	160	Ash, commercial white	41
Gravel, dry	104	Cypress, southern	34
Gypsum, loose	70	Fir, Douglas, coast region	34
Gypsum, wallboard	50	Hem fir	28
Ice	57	Oak, commercial reds and whites	47
<b>Iron</b>		Pine, southern yellow	37
Cast	450	Redwood	28
Wrought	480	Spruce, red, white, and Stika	29
Lead	710	Western hemlock	32
		Zinc, rolled sheet	449