

Component	Load (psf)	Component	Load (psf)	Component	Load (psf)
<b>CEILINGS</b>		<b>FLOOR FILL</b>		<b>Clay brick wythes:</b>	
Acoustical Fiber Board	1	Cinder concrete, per inch	9	4 in.	39
Gypsum board (per 1/8-in. thickness)	0.55	Lightweight concrete, per inch	8	8 in.	79
Mechanical duct allowance	4	Sand, per inch	8	12 in.	115
Plaster on tile or concrete	5	Stone concrete, per inch	12	16 in.	155
Plaster on wood lath	8	<b>FLOORS AND FLOOR FINISHES</b>		<b>Hollow concrete masonry unit wythes:</b>	
Suspended steel channel system	2	Asphalt block (2-in.), 1/2-in. mortar	30	<b>Wythe thickness (in inches)</b>	4 6 8 10 12
Suspended metal lath and cement plaster	15	Cement finish (1-in.) on stone-concrete fill	32	<b>Density of unit (105 pcf):</b>	
Suspended metal lath and gypsum plaster	10	Ceramic or quarry tile (3/4-in.) on 1/2-in. mortar bed	16	No grout	22 24 31 37 43
Wood furring suspension system	2.5	Ceramic or quarry tile (3/4-in.) on 1-in. mortar bed	23	48" o.c.	29 38 47 55
<b>COVERINGS, ROOF AND WALL</b>		Concrete fill finish (per inch thickness)	12	40" o.c. grout	30 40 49 57
Asbestos-cement shingles	4	Hardwood flooring, 7/8-in.	4	32" o.c. spacing	32 42 52 61
Asphalt shingles	2	Linoleum or asphalt tile, 1/4-in.	1	24" o.c.	34 46 57 67
Cement tile	16	Marble and mortar on stone-concrete fill	33	16" o.c.	40 53 66 79
Clay tile (for mortar add 10 lb.):		Slate (per inch thickness)	15	Full Grout	55 75 95 115
Book tile, 2-in.	12	Solid flat tile on 1-in. mortar base	23		
Book tile, 3-in.	20	Subflooring, 3/4-in.	3		
Ludowici	10	Terrazzo (1-1/2-in.) directly on slab	19	<b>Density of unit (125 pcf):</b>	
Roman	12	Terrazzo (1-in.) on stone-concrete fill	32	No grout	26 28 36 44 50
Spanish	19	Terrazzo (1-in.), 2-in. stone concrete	32	48" o.c.	33 44 54 62
<b>Composition:</b>		Wood block (3-in.) on mastic, no fill	10	40" o.c. grout	34 45 56 65
Three-ply ready roofing	1	Wood block (3-in.) on 1/2-in. mortar base	16	32" o.c. spacing	36 47 58 68
Four-ply felt and gravel	5.5	<b>FLOORS, WOOD-JOIST (NO PLASTER)</b>		24" o.c.	39 51 63 75
Five-ply felt and gravel	6	<b>DOUBLE WOOD FLOOR</b>		16" o.c.	44 59 73 87
Copper or tin	1	12-in.	16-in.	24-in.	Full Grout
Corrugated asbestos-cement roofing	4	Joist sizes	spacing	spacing	
Deck, metal, 20 gage	2.5	(inches):	(lb/ft <sup>2</sup> )	(lb/ft <sup>2</sup> )	<b>Density of unit (135 pcf):</b>
Deck, metal, 18 gage	3	2 × 6	6	5	No grout
Decking, 2-in. wood (Douglas fir)	5	2 × 8	6	5	48" o.c.
Decking, 3-in. wood (Douglas fir)	8	2 × 10	7	6	40" o.c. grout
Fiberboard, 1/2-in.	0.75	2 × 12	8	7	32" o.c. spacing
Gypsum sheathing, 1/2-in.	2				24" o.c.
<b>Insulation, roof boards (per inch thickness)</b>		<b>FRAME PARTITIONS</b>			46 61 76 90
Cellular glass	0.7	Movable steel partitions	4	Full Grout	62 83 105 127
Fibrous glass	1.1	Wood or steel studs, 1/2-in. gypsum board each side	8		
Fiberboard	1.5	Wood studs, 2 × 4, unplastered	4	<b>Solid concrete masonry unit wythes</b>	
Perlite	0.8	Wood studs, 2 × 4, plastered one side	12	<b>Wythe thickness (in inches)</b>	4 6 8 10 12
Polystyrene foam	0.2	Wood studs, 2 × 4, plastered two sides	20	<b>Density of unit (105 pcf):</b>	32 51 69 87 105
Urethane foam with skin	0.5	<b>FRAME WALLS</b>		<b>Density of unit (125 pcf):</b>	38 60 81 102 124
Plywood (per 1/8-in. thickness)	0.4	Exterior stud walls:		<b>Density of unit (135 pcf):</b>	41 64 87 110 133
Rigid insulation, 1/2-in.	0.75	2 × 4 @ 16-in., 5/8-in. gypsum, insulated, 3/8-in. siding	11		
Skylight, metal frame, 3/8-in. wire glass	8	2 × 6 @ 16-in., 5/8-in. gypsum, insulated, 3/8-in. siding	12		
Slate, 3/16-in.	7	Exterior stud walls with brick veneer	48		
Slate, 1/4-in.	10	Slate, 3/16-in.	8		
<b>Waterproofing membranes:</b>		Windows, glass, frame and sash	8		
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				

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

Component	Load (kN/m <sup>2</sup> )	Component	Load (kN/m <sup>2</sup> )	Component	Load (kN/m <sup>2</sup> )
<b>CEILINGS</b>		<b>FLOOR FILL</b>		<b>Clay brick wythes:</b>	
Acoustical Fiber Board	0.05	Cinder concrete, per mm	0.017	102 mm	1.87
Gypsum board (per mm thickness)	0.008	Lightweight concrete, per mm	0.015	203 mm	3.78
Mechanical duct allowance	0.19	Sand, per mm	0.015	305 mm	5.51
Plaster on tile or concrete	0.24	Stone concrete, per mm	0.023	406 mm	7.42
Plaster on wood lath	0.38	<b>FLOORS AND FLOOR FINISHES</b>			
Suspended steel channel system	0.10	Asphalt block (51 mm), 13 mm mortar	1.44	<b>Hollow concrete masonry unit wythes:</b>	
Suspended metal lath and cement plaster	0.72	Cement finish (25 mm) on stone-concrete fill	1.53	<b>Wythe thickness (in mm)</b>	
Suspended metal lath and gypsum plaster	0.48	Ceramic or quarry tile (19 mm) on 13 mm mortar bed	0.77	102	152
Wood furring suspension system	0.12	Ceramic or quarry tile (19 mm) on 25 mm mortar bed	1.10	203	254
<b>COVERINGS, ROOF, AND WALL</b>		Concrete fill finish (per mm thickness)	0.023	305	305
Asbestos-cement shingles	0.19	Hardwood flooring, 22 mm	0.19	<b>Density of unit (16.49 kN/m<sup>3</sup>)</b>	
Asphalt shingles	0.10	Linoleum or asphalt tile, 6 mm	0.05	No grout	1.05
Cement tile	0.77	Marble and mortar on stone-concrete fill	1.58	1219 mm	1.15
Clay tile (for mortar add 0.48 kN/m <sup>2</sup> )		Slate (per mm thickness)	0.028	1016 mm	1.48
Book tile, 51 mm	0.57	Solid flat tile on 25 mm mortar base	1.10	813 mm	1.77
Book tile, 76 mm	0.96	Subflooring, 19 mm	0.14	610 mm	2.06
Ludowici	0.48	Terrazzo (38 mm) directly on slab	0.91	610 mm	2.25
Roman	0.57	Terrazzo (25 mm) on stone-concrete fill	1.53	1016 mm	2.63
Spanish	0.91	Terrazzo (25 mm), 51 mm stone concrete	1.53	813 mm	2.73
<b>Composition:</b>		Wood block (76 mm) on mastic; no fill	0.48	610 mm	2.92
Three-ply ready roofing	0.05	Wood block (76 mm) on 13 mm mortar base	0.77	406 mm	2.92
Four-ply felt and gravel	0.26	<b>FLOORS, WOOD-JOIST (NO PLASTER)</b>			
Five-ply felt and gravel	0.29	<b>DOUBLE WOOD FLOOR</b>			
Copper or tin	0.05	305 mm	406 mm	610 mm	
Corrugated asbestos-cement roofing	0.19	Joist sizes	spacing	spacing	spacing
Deck, metal, 20 gage	0.12	(mm):	(kN/m <sup>2</sup> )	(kN/m <sup>2</sup> )	(kN/m <sup>2</sup> )
Deck, metal, 18 gage	0.14	51 × 152	0.29	0.24	0.24
Decking, 51 mm wood (Douglas fir)	0.24	51 × 203	0.29	0.29	0.24
Decking, 76 mm wood (Douglas fir)	0.38	51 × 254	0.34	0.29	0.29
Fiberboard, 13 mm	0.04	51 × 305	0.38	0.34	0.29
Gypsum sheathing, 13 mm	0.10	<b>FRAME PARTITIONS</b>			
Insulation, roof boards (per mm thickness)		Movable steel partitions	0.19	406 mm	
Cellular glass	0.0013	Wood or steel studs, 13 mm gypsum board each side	0.38	Full Grout	
Fibrous glass	0.0021	Wood studs, 51 × 102, unplastered	0.19	<b>Solid concrete masonry unit wythes (incl. concrete brick):</b>	
Fiberboard	0.0028	Wood studs, 51 × 102, plastered one side	0.57	<b>Wythe thickness (in mm)</b>	
Perlite	0.0015	Wood studs, 51 × 102, plastered two sides	0.96	102	152
Polystyrene foam	0.0004	<b>FRAME WALLS</b>			
Urethane foam with skin	0.0009	<b>Exterior stud walls:</b>			
Plywood (per mm thickness)	0.006	51mm × 102mm @ 406mm, 16mm gypsum, insulated, 10mm siding	0.53	203	254
Rigid insulation, 13 mm	0.04	51mm × 152mm @ 406mm, 16mm gypsum, insulated, 10mm siding	0.57	305	305
Skylight, metal frame, 10 mm wire glass	0.38	Exterior stud walls with brick veneer	2.30	<b>Density of unit (16.49 kN/m<sup>3</sup>):</b>	
Slate, 5 mm	0.34	Windows, glass, frame and sash	0.38	1.53	2.44
Slate, 6 mm	0.48			1.82	2.87
<b>Waterproofing membranes:</b>				3.88	4.88
Bituminous, gravel-covered	0.26			4.88	5.94
Bituminous, smooth surface	0.07			1.96	3.06
Liquid applied	0.05			<b>Density of unit (21.21 kN/m<sup>3</sup>):</b>	
Single-ply, sheet	0.03			No grout	1.39
Wood sheathing (per mm thickness)	0.0057			1219 mm	1.44
Wood shingles	0.14			1016 mm	1.87
				813 mm	2.25
				610 mm	2.73
				406 mm	3.16
				Full Grout	3.78
				<b>Density of unit (19.64 kN/m<sup>3</sup>):</b>	
				No grout	1.24
				1,219 mm	1.34
				1,016 mm	1.72
				813 mm	2.11
				610 mm	2.59
				406 mm	2.97
				Full Grout	3.11
				<b>Density of unit (21.21 kN/m<sup>3</sup>):</b>	
				No grout	1.39
				1219 mm	1.44
				1016 mm	1.87
				813 mm	2.25
				610 mm	2.73
				406 mm	3.16
				Full Grout	3.78

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

**TABLE C3-2a**  
**Minimum Densities for Design Loads from Materials**

Material	Load (lb/cu ft)	Material	Load (lb/cu ft)
Aluminum	170	Lead	710
Bituminous products		Lime	
Asphaltum	81	Hydrated, loose	32
Graphite	135	Hydrated, compacted	45
Parafin	56	Masonry, Ashlar Stone	
Petroleum, crude	55	Granite	165
Petroleum, refined	50	Limestone, crystalline	165
Petroleum, benzine	46	Limestone, oolitic	135
Petroleum, gasoline	42	Marble	173
Pitch	69	Sandstone	144
Tar	75	Masonry, Brick	
Brass	526	Hard (low absorbtion)	130
Bronze	552	Medium (medium absorbtion)	115
Cast-stone masonry (cement, stone, sand)	144	Soft (high absorbtion)	100
Cement, portland, loose	90	Masonry, Concrete*	
Ceramic tile	150	Lightweight units	105
Charcoal	12	Medium weight units	125
Cinder fill	57	Normal weight units	135
Cinders, dry, in bulk	45	Masonry Grout	140
Coal		Masonry, Rubble Stone	
Anthracite, piled	52	Granite	153
Bituminous, piled	47	Limestone, crystalline	147
Lignite, piled	47	Limestone, oolitic	138
Peat, dry, piled	23	Marble	156
Concrete, plain		Sandstone	137
Cinder	108	Mortar, cement or lime	130
Expanded-slag aggregate	100	Particleboard	45
Haydite (burned-clay aggregate)	90	Plywood	36
Slag	132	Riprap (Not submerged)	
Stone (including gravel)	144	Limestone	83
Vermiculite and perlite aggregate, nonload-bearing	25-50	Sandstone	90
Other light aggregate, load-bearing	70-105	Sand	
Concrete, Reinforced		Clean and dry	90
Cinder	111	River, dry	106
Slag	138	Slag	
Stone (including gravel)	150	Bank	70
Copper	556	Bank screenings	108
Cork, compressed	14	Machine	96
Earth (not submerged)		Sand	52
Clay, dry	63	Slate	172
Clay, damp	110	Steel, cold-drawn	492
Clay and gravel, dry	100	Stone, Quarried, Piled	
Silt, moist, loose	78	Basalt, granite, gneiss	96
Silt, moist, packed	96	Limestone, marble, quartz	95
Silt, flowing	108	Sandstone	82
Sand and gravel, dry, loose	100	Shale	92
Sand and gravel, dry, packed	110	Greenstone, hornblende	107
Sand and gravel, wet	120	Terra Cotta, Architectural	
Earth (submerged)		Voids filled	120
Clay	80	Voids unfilled	72
Soil	70	Tin	459
River mud	90	Water	
Sand or gravel	60	Fresh	62
Sand or gravel and clay	65	Sea	64
Glass	160	Wood, Seasoned	
Gravel, dry	104	Ash, commercial white	41
Gypsum, loose	70	Cypress, southern	34
Gypsum, wallboard	50	Fir, Douglas, coast region	34
Ice	57	Hem fir	28
Iron		Oak, commercial reds and whites	47
Cast	450	Pine, southern yellow	37
Wrought	48	Redwood	28
		Spruce, red, white, and Stika	29
		Western hemlock	32
		Zinc, rolled sheet	449

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

**TABLE C3-2b**  
**Minimum Densities for Design Loads from Materials**

Material	Load (kN/m <sup>3</sup> )	Material	Load (kN/m <sup>3</sup> )
Aluminum	26.7	Lead	111.5
Bituminous products		Lime	
Asphaltum	12.7	Hydrated, loose	5.0
Graphite	21.2	Hydrated, compacted	7.1
Parafin	8.8	Masonry, Ashlar Stone	
Petroleum, crude	8.6	Granite	25.9
Petroleum, refined	7.9	Limestone, crystalline	25.9
Petroleum, benzine	7.2	Limestone, oolitic	21.2
Petroleum, gasoline	6.6	Marble	27.2
Pitch	10.8	Sandstone	22.6
Tar	11.8	Masonry, Brick	
Brass	82.6	Hard (low absorbtion)	20.4
Bronze	86.7	Medium (medium absorbtion)	18.1
Cast-stone masonry (cement, stone, sand)	22.6	Soft (high absorbtion)	15.7
Cement, portland, loose	14.1	Masonry, Concrete*	
Ceramic tile	23.6	Lightweight units	16.5
Charcoal	1.9	Medium weight units	19.6
Cinder fill	9.0	Normal weight units	21.2
Cinders, dry, in bulk	7.1	Masonry Grout	22.0
Coal		Masonry, Rubble Stone	
Anthracite, piled	8.2	Granite	24.0
Bituminous, piled	7.4	Limestone, crystalline	23.1
Lignite, piled	7.4	Limestone, oolitic	21.7
Peat, dry, piled	3.6	Marble	24.5
Concrete, plain		Sandstone	21.5
Cinder	17.0	Mortar, cement or lime	20.4
Expanded-slag aggregate	15.7	Particleboard	7.1
Haydite (burned-clay aggregate)	14.1	Plywood	5.7
Slag	20.7	Riprap (Not submerged)	
Stone (including gravel)	22.6	Limestone	13.0
Vermiculite and perlite aggregate, nonload-bearing	3.9-7.9	Sandstone	14.1
Other light aggregate, load-bearing	11.0-16.5	Sand	
Concrete, Reinforced		Clean and dry	14.1
Cinder	17.4	River, dry	16.7
Slag	21.7	Slag	
Stone (including gravel)	23.6	Bank	11.0
Copper	87.3	Bank screenings	17.0
Cork, compressed	2.2	Machine	15.1
Earth (not submerged)		Sand	8.2
Clay, dry	9.9	Slate	27.0
Clay, damp	17.3	Steel, cold-drawn	77.3
Clay and gravel, dry	15.7	Stone, Quarried, Piled	
Silt, moist, loose	12.3	Basalt, granite, gneiss	15.1
Silt, moist, packed	15.1	Limestone, marble, quartz	14.9
Silt, flowing	17.0	Sandstone	12.9
Sand and gravel, dry, loose	15.7	Shale	14.5
Sand and gravel, dry, packed	17.3	Greenstone, hornblende	16.8
Sand and gravel, wet	18.9	Terra Cotta, Architectural	
Earth (submerged)		Voids filled	18.9
Clay	12.6	Voids unfilled	11.3
Soil	11.0	Tin	72.1
River mud	14.1	Water	
Sand or gravel	9.4	Fresh	9.8
Sand or gravel and clay	10.2	Sea	10.1
Glass	25.1	Wood, Seasoned	
Gravel, dry	16.3	Ash, commercial white	6.4
Gypsum, loose	11.0	Cypress, southern	5.3
Gypsum, wallboard	7.9	Fir, Douglas, coast region	5.3
Ice	9.0	Hem fir	4.4
Iron		Oak, commercial reds and whites	7.4
Cast	70.7	Pine, southern yellow	5.8
Wrought	75.4	Redwood	4.4
		Spruce, red, white, and Stika	4.5
		Western hemlock	5.0
		Zinc, rolled sheet	70.5

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