

## Building Material Weights AISC Manual of Load and Resistance Factor Design, 3<sup>rd</sup> ed.

**Table 17-12 (cont.).  
Weights and Specific Gravities**

Substance	Weight lb per cu ft	Specific Gravity	Substance	Weight lb per cu ft	Specific Gravity
<b>ASHLAR, MASONRY</b>			<b>METALS, ALLOYS, ORES</b>		
Granite, gneiss, gneiss	165	2.3-3.0	Aluminum, cast, hammered	165	2.55-2.75
Limestone, marble	160	2.3-2.8	Brass, cast, rolled	534	8.4-8.7
Sandstone, bluestone	140	2.1-2.4	Bronze, 7.9 to 14% Sn	509	7.4-8.9
			Bronze, aluminum	481	7.7
<b>MORTAR RUBBLE</b>			Copper, cast, rolled	556	8.8-9.0
Granite, gneiss, gneiss	155	2.2-2.8	Copper ore, pyrites	282	4.1-4.3
Limestone, marble	150	2.2-2.6	Gold, cast, hammered	1205	19.25-19.3
Sandstone, bluestone	130	2.0-2.2	Iron, cast, pig	480	7.6-7.9
			Iron, wrought	485	7.5
<b>DRY RUBBLE MASONRY</b>			Iron, speigel-eisen	468	7.5
Granite, gneiss, gneiss	130	1.9-2.3	Iron, ferro-silicon	437	6.7-7.3
Limestone, marble	125	1.9-2.1	Iron ore, hematite	325	5.2
Sandstone, bluestone	110	1.8-1.9	Iron ore, hematite in bank	160-180	-
			Iron ore, hematite loose	130-160	-
<b>BRICK MASONRY</b>			Iron ore, limonite	237	3.6-4.0
Pressed brick	140	2.2-2.3	Iron ore, magnetite	315	4.9-5.2
Common brick	120	1.8-2.0	Iron ore, hematite	172	2.5-3.0
Soft brick	100	1.5-1.7	Iron slag	710	11.37
			Lead	465	7.3-7.6
<b>CONCRETE MASONRY</b>			Lead ore, galena	112	1.74-1.83
Cement, stone, sand	144	2.2-2.4	Magnesium, alloys	475	3.7-4.6
Cement, slag, etc.	130	1.9-2.3	Manganese	259	13.6
Cement, cinder, etc.	100	1.5-1.7	Manganese ore, pyrolusite	849	8.6-9.0
			Mercury	556	8.9-9.2
<b>VARIOUS BUILDING MATERIALS</b>			Nickel	1330	21.1-21.5
Ashes, cinders	40-45	-	Platinum, cast, hammered	656	10.4-10.6
Cement, portland, loose	90	2.7-3.2	Silver, cast, hammered	480	7.85
Cement, portland, set	163	-	Tin, cast, hammered	459	6.4-7.0
Lime, gypsum, loose	53-64	1.4-1.9	Tin ore, cassiterite	418	6.9-7.2
Mortar, set	103	-	Zinc, cast, rolled	440	3.9-4.2
Slags, bank slag	67-72	-	Zinc ore, blende	253	-
Slags, machine slag	98-117	-			
Slags, slag sand	49-55	-			
			<b>VARIOUS LIQUIDS</b>		
<b>EARTH, ETC., EXCAVATED</b>			Alcohol, 100%	49	0.79
Clay, dry	63	-	Acids, muriatic 40%	75	1.20
Clay, damp, plastic	110	-	Acids, nitric 91%	94	1.50
Clay and gravel, dry	100	-	Acids, sulphuric 87%	112	1.80
Earth, dry, loose	76	-	Lye, soda 66%	106	1.70
Earth, dry, packed	95	-	Oil, vegetable	58	0.91-0.94
Earth, moist, loose	78	-	Oil, mineral, lubricants	57	0.90-0.93
Earth, moist, packed	96	-	Water, 4° C max. density	62.428	1.0
Earth, mud, flowing	108	-	Water, 100° C	59.830	0.9584
Earth, mud, packed	115	-	Water, snow, fresh fallen	56	0.88-0.92
Riprap, limestone	80-85	-	Water, ice	8	1.25
Riprap, sandstone	90	-	Water, sea water	64	1.02-1.03
Riprap, shale	105	-			
Sand, gravel, dry, loose	90-105	-	<b>GASES</b>		
Sand, gravel, dry, packed	100-120	-	Air, 0° C 760 mm	0.0071	1.0
Sand, gravel, wet	118-120	-	Ammonia	0.0478	0.5920
			Carbon dioxide	1.2891	1.5291
<b>EXCAVATIONS IN WATER</b>			Carbon monoxide	0.781	0.9673
Sand or gravel	60	-	Gas, illuminating	.028-0.36	0.35-0.45
Sand or gravel and clay	65	-	Gas, natural	.038-0.39	0.47-0.48
Clay	80	-	Hydrogen	0.00559	0.0693
River mud	90	-	Nitrogen	0.784	0.9714
Soil	70	-	Oxygen	0.0082	1.1056
Stone riprap	65	-			

The specific gravities of solids and liquids refer to water at 4° C, those of gases to air at 0° C and 760 mm pressure. The weights per cubic foot are derived from average specific gravities, except where stated that weights are for bulk, heaped, or loose material, etc.

**Table 17-12.  
Weights and Specific Gravities**

Substance	Weight lb per cu ft	Specific Gravity	Substance	Weight lb per cu ft	Specific Gravity
<b>MINERALS</b>			<b>STONE, QUARRIED, PILED</b>		
Asbestos	153	2.1-2.8	Basalt, granite, gneiss	96	1.1-1.5
Barytes	281	4.50	Limestone, marble, quartz	95	1.4-1.7
Basalt	184	2.7-3.2	Sandstone	82	1.2-1.5
Bauxite	159	2.55	Shale	92	1.1-1.4
Borax	109	1.7-1.8	Greenstone, hornblende	107	0.65-0.85
Chalk	137	1.8-2.6	Coal, charcoal, pine	23	0.28-0.44
Clay, marl	181	2.9	Coal, coke	33	0.47-0.57
Dolomite	181	2.9	Coal, coke	75	1.0-1.4
Feldspar, orthoclase	159	2.5-2.6	Graphite	131	1.9-2.3
Granite, syenite	175	2.4-2.7	Paraffin	56	0.87-0.91
Greenstone, trap	187	2.5-3.1	Petroleum	54	0.87
Gypsum, alabaster	159	2.8-3.2	Petroleum, refined	50	0.79-0.82
Hornblende	187	3.0	Petroleum, benzine	46	0.73-0.75
Limestone, marble	165	2.5-2.8	Petroleum, gasoline	42	0.66-0.69
Magnetite	187	3.0	Pitch	69	1.07-1.15
Phosphate rock, apatite	200	3.2	Tar, bituminous	75	1.20
Porphyry	172	2.6-2.9			
Pumice, natural	140	0.37-0.90	<b>BITUMINOUS SUBSTANCES</b>		
Quartz, flint	165	2.5-2.8	Asphaltum	81	1.1-1.5
Sandstone, bluestone	147	2.2-2.5	Coal, anthracite	97	1.4-1.7
Shale, slate	175	2.7-2.9	Coal, bituminous	84	1.2-1.5
Soapstone, talc	169	2.6-2.8	Coal, lignite	78	1.1-1.4
			Coal, peat, turf, dry	47	0.65-0.85
			Coal, peat, turf, wet	23	0.28-0.44
			Coal, charcoal, oak	33	0.47-0.57
			Coal, coke	75	1.0-1.4
			Graphite	131	1.9-2.3
			Paraffin	56	0.87-0.91
			Petroleum	54	0.87
			Petroleum, refined	50	0.79-0.82
			Petroleum, benzine	46	0.73-0.75
			Petroleum, gasoline	42	0.66-0.69
			Pitch	69	1.07-1.15
			Tar, bituminous	75	1.20
			<b>COAL AND COKE, PILED</b>		
			Coal, anthracite	47-58	-
			Coal, bituminous, lignite	40-54	-
			Coal, peat, turf	20-26	-
			Coal charcoal	10-14	-
			Coal coke	23-32	-

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**Table 17-13.  
Weights of Building Materials**

Materials	Weight lb per sq ft	Materials	Weight lb per sq ft
<b>CEILING</b>		<b>PARTITIONS</b>	
Channel suspended system	1	Clay tile	17
Lathing and plastering	See Partitions	3 in.	18
Acoustical fiber tile	1	4 in.	28
		6 in.	34
		8 in.	40
		10 in.	
<b>FLOORS</b>		Gypsum block	
Steel deck	See Manufacturer	2 in.	9 1/2
		3 in.	10 1/2
Concrete-Reinforced 1 in.	12 1/2	4 in.	12 1/2
Stone	11 1/2	5 in.	14
Slag	6 to 10	6 in.	18 1/2
Lightweight		Wood studs 2 x 4	
		12-16 in. o.c.	2
Concrete-Plain 1 in.	12	Steel partitions	4
Stone	11	Plaster 1 in.	10
Slag	3 to 9	Cement	5
Lightweight		Gypsum	
		Lathing	1/2
Fills 1 inch	6	Metal	2
Gypsum	8	Gypsum board 1/2 in.	
Sand	4		
Cinders			
<b>Finishes</b>		<b>WALLS</b>	
Terrazzo 1 in.	13	Brick	40
Ceramic or Quarry Tile 3/4-in.	10	4 in.	80
Linoleum 1/4-in.	1	8 in.	120
Mastic 3/4-in.	9	12 1/2 in.	
Hardwood 7/8 in.	4	Hollow concrete block	
Softwood 3/4-in.	2 1/2	(Light aggregate)	
		4 in.	30
		6 in.	43
		8 in.	55
		12 1/2 in.	80
<b>ROOFS</b>		Hollow concrete block	
Copper or tin	1	(Heavy aggregate)	
Corrugated steel	See Manufacturer	4 in.	30
3-ply ready roofing	1	6 in.	43
3-ply felt and gravel	5 1/2	8 in.	55
5-ply felt and gravel	6	12 1/2 in.	80
Shingles		Hollow concrete block	
Wood	2	(Light aggregate)	
Asphalt	3	4 in.	21
Clay tile	9 to 14	6 in.	30
Slate 1/4 in.	10	8 in.	38
		12 in.	55
Sheathing		Clay tile (Load bearing)	
Wood 3/4 in.	3	4 in.	25
Gypsum 1 in.	4	6 in.	30
		8 in.	33
		12 in.	45
Insulation 1 in.	1/2	Stone 4 in.	55
Loose	2	Glass block 4 in.	18
Poured	1 1/2	Window, Glass, Frame, & Sash	8
Rigid		Curtain walls	See Manufacturer
		Structural glass 1 in.	15
		Corrugated Cement Asbestos 1/4 in.	3

For weights of other materials used in building construction, see Table 17-12.

**Table 17-14.  
Weights and Measures  
United States System**

LINEAR MEASURE					
Inches	Feet	Yards	Rods	Furlongs	Miles
1.0 =	.08333 =	.02778 =	.0050505 =	.00012626 =	.00001578 =
12.0 =	1.0 =	.33333 =	.0606061 =	.00151515 =	.00018939 =
36.0 =	3.0 =	1.0 =	.1818182 =	.00454545 =	.00056818 =
198.0 =	16.5 =	5.5 =	1.0 =	.025 =	.003125 =
7,920.0 =	660.0 =	220.0 =	40.0 =	1.0 =	.125 =
63,360.0 =	5,280.0 =	1,760.0 =	320.0 =	8.0 =	1.0 =

  

SQUARE AND LAND MEASURE					
Sq. Inches	Square Feet	Square Yards	Square Rods	Acres	Sq. Miles
1.0 =	.006944 =	.000772 =			
144.0 =	1.0 =	.11111 =			
1,296.0 =	9.0 =	1.0 =	.03306 =	.000207 =	.0000098 =
39,204.0 =	272.25 =	30.25 =	1.0 =	.00625 =	.0000625 =
	43,560.0 =	4,840.0 =	160.0 =	1.0 =	.015625 =
		3,097,600.0 =	102,400.0 =	640.0 =	1.0 =

  

AVOIRDUPOIS WEIGHTS					
Grains	Drams	Ounces	Pounds	Tons	
1.0 =	.06857 =	.002286 =	.000143 =	.0000000714 =	
27.34375 =	1.0 =	.0625 =	.003906 =	.00000195 =	
437.5 =	16.0 =	1.0 =	.0625 =	.00003125 =	
7,000.0 =	256.0 =	16.0 =	1.0 =	.0005 =	
14,000,000.0 =	512,000.0 =	32,000.0 =	2,000.0 =	1.0 =	

  

DRY MEASURE					
Pecks	Quarts	Pecks	Cubic Feet	Bushels	
1.0 =	5 =	.0625 =	.01945 =	.01563 =	
2.0 =	1.0 =	.125 =	.03891 =	.03125 =	
16.0 =	8.0 =	1.0 =	.3112 =	.25 =	
51.42827 =	25.71314 =	3.21414 =	1.0 =	.80354 =	
64.0 =	32.0 =	4.0 =	1.2445 =	1.0 =	

  

LIQUID MEASURE					
Gills	Pints	Quarts	U.S. Gallons	Cubic Feet	
1.0 =	.25 =	.125 =	.03125 =	.00418 =	
4.0 =	1.0 =	.5 =	.125 =	.01671 =	
8.0 =	2.0 =	1.0 =	.250 =	.03342 =	
32.0 =	8.0 =	4.0 =	1.0 =	.1337 =	
			7.48052 =	1.0 =	