

# CHARACTERISTICS OF BUILDING MATERIALS



The City  
of Owatonna

BUILDING DEPARTMENT

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[www.ci.owatonna.mn.us](http://www.ci.owatonna.mn.us)



## Weights of Common Building Materials

(All weights are approximate)

Acoustic fiberboard (1")	1.5 lbs/sq. ft.	Lightweight concrete block 4-inch	20 lbs./sq. ft.
Acoustical tile	1 lb/sq. ft.	Lightweight concrete block 6-inch	28 lbs./sq. ft.
Asphalt shingles	2.2-2.5 lbs/sq. ft.	Lightweight concrete block 8-inch	38 lbs./sq. ft.
Brick, 4" thick	40 lbs/sq. ft.	Lightweight concrete block 12-inch	55 lbs./sq. ft.
Concrete	150 lbs/sq. ft.	Mineral Wool or fiberglass (1" thick)	0.05 lbs./sq. ft.
Earth	80-125 lbs. per cu. ft.	OSB (4X8 sheet) 3/8"	45 lbs.
Hardwood Flr (1" nom)	4.0 lbs/sq. ft.	OSB (4X8 sheet) 7/16"	48 lbs.
Carpet and pad	2.0 lbs/sq. ft.	OSB (4X8 sheet) 1/2"	55 lbs.
Linoleum	1.5 lbs/sq. ft.	OSB (4X8 sheet) 19/32"	64 lbs.
3/4" Ceramic or Quarry tile/mortar bd	16 lbs/sq. ft.	OSB (4X8 sheet) 23/32"	74 lbs.
2x4 @ 16" o.c., 1/2" gyp bd/side, 8 ft hi	8 lbs/sq. ft.	Plywood (4X8 sheet) 3/8"	38 lbs.
2x4 @ 16" o.c., 5/8" gyp bd, insulated, 3/8" siding 8 ft hi	11 lbs/sq. ft.	Plywood (4X8 sheet) 1/2"	50 lbs.
2x6 @ 16" o.c., 5/8" gyp bd, insulated, 3/8" siding 8 ft hi	12 lbs/sq. ft.	Plywood (4X8 sheet) 3/4"	75 lbs.
Gyp board 1/2" 4 x 8	70 lbs.	Sand, dry	101 lbs./ cu. ft
Gyp board 1/2" 4 x 12	105 lbs.	Sand, wet	120 lbs./ cu. ft
Gyp board 5/8" 4 x 8	85 lbs.	Snow, freshly fallen	10 lbs./ cu. ft
Gyp board 5/8" 4 x 12	130 lbs.	Snow, packed	30-50 lbs./ cu. ft
Lumber 2 x 4 x 8	9 lbs. ea.	Water	62.5 lbs./ cu. ft
Lumber 2 x 6 x 8	14 lbs. ea.	Wood shingles	3 lbs./ sq. ft
Lumber 2 x 8 x 8	18 lbs. ea.	Wood shakes	4-6 lbs./ sq. ft
Lumber 2 x 10 x 8	24 lbs. ea.		
Lumber 2 x 12 x 8	29 lbs. ea.		

<b>Lumber Dimensions</b>			
<b>Nominal</b>	<b>Actual</b>	<b>Nominal</b>	<b>Actual</b>
1x2	3/4" x 1 1/2 "	1x12	3/4 " x 11 1/4 "
1x3	3/4 " x 2 1/2 "	2x4	1 1/2 " x 3 1/2 "
1x4	3/4 " x 3 1/2 "	2x6	1 1/2 " x 5 1/2 "
1x6	3/4 " x 5 1/2 "	2x8	1 1/2 " x 7 1/4 "
1x8	3/4 " x 7 1/4 "	2x10	1 1/2 " x 9 1/4 "
1x10	3/4 " x 9 1/4 "	2x12	1 1/2 " x 11 1/4 "

## R-Values of Various Materials

### R-value: the key to insulation:

R-value is the measurement of a material's ability to resist winter heat loss and summer heat gain. The higher the R-value, the greater the insulation value or resistance to heat flow.

<b>Insulation Values of common building materials</b>		
<b>Material</b>	<b>Kind</b>	<b>R-Value</b>
<b>Masonry</b>	Brick, 4 inch face	0.44
	Common 4 inch	0.80
	Stone, Lime/Sand 1 inch	0.08
	Stucco 1 inch	0.20
	Concrete Block, 8 inch	1.04
	Concrete Block, 8 inch, cores filled	1.93
<b>Concrete</b>	Poured concrete 1 inch	0.08
<b>Wood</b>	Fir, Pine, Other soft woods 1 inch	1.25
	Maple Oak, other hard woods 1 inch	0.91
	Wood shavings or sawdust 1inch	2.20
	Plywood, 1/2 inch	0.63
<b>Manufactured Wood Products</b>	Gypsum Board 1/2 inch	0.45
	Plywood, softwood, 1/4 inch	0.31
	Hardboard, underlayment 1/4 inch	0.31
<b>Siding and Roofing</b>	Asphalt roofing shingles	0.44
	Wood bevel siding 1/2 inch	0.81
	Building paper, felt 15#	0.06
<b>Insulation</b>	Glass fiber, batt 1 inch	3.13
	Blown cellulose 1 inch	3.4
	Expanded polystyrene 1 inch	3.85
	Expanded polyurethane 1 inch	6.64
	Extruded Polystyrene 1 inch (Styrofoam blue board)	4.92

R-Values for Windows			
Single glass	R.89	Double-pane ½" insulating glass	R1.73
Single glass with storm window	R1.79	Modern energy efficient windows	R3+

Various Types of Fiberglass Insulation			
R-Value	Application(s)	Width	Thickness
R-11	Interior Walls/Noise Control/Basement Walls	15", 23"	3.5"
R-13	Exterior Walls/Basement Walls	15", 23"	3.5"
R-15	Exterior Walls	15"	3.5"
R-19	Attics/Exterior Walls/Crawl Spaces	15", 23"	6.25"
R-21	Attics/Exterior Walls	15", 23"	5.5"
R-30	Attics	16", 24"	9.5"
R-38	Attics	16", 24"	12"

Note: Insulation comes both faced and unfaced, in rolls and batts

Weights and Measures	
144 square inches	= 1 sq. ft.
9 square feet	= 1 sq. yd.
231 cubic inches	= 1 gallon
1728 cubic inches	= 1 cu. Ft.
27 cubic feet	= 1 cu. Yd.
2 pints	= 1 quart
4 quarts	= 1 gallon
12 inches	= 1 foot
3 feet	= 1 yard
16 ounces	= 1 pound
2000 pounds	= 1 ton

Decimal equivalents of inches in feet			
Inches	Decimal	Inches	Decimal
1	0.08333	7	0.58331
2	0.16667	8	0.66667
3	0.25000	9	0.75000
4	0.33333	10	0.83333
5	0.41667	11	0.91666
6	0.50000	12	1.00000

Doubling the diameter of a pipe increases its area four times.

Doubling the diameter of a pipe increases its volume four times per unit of length.

The side of a square equal in area to a given circle equals diameter x 0.8862.

A gallon of water (U.S. standard) weighs  $8\frac{1}{3}$  lbs.

A cubic foot of water contains  $7\frac{1}{2}$  gallons and weighs  $62\frac{1}{2}$  lb