

Conversion Factors and Units of Measurement
Simplified Engineering for Architects and Builders, 10th ed., Ambrose & Tripeny, 2006

TABLE 3 Factors for Conversion of Units

To Convert from U.S. Units to SI Units, Multiply by:	U.S. Unit	SI Unit	To Convert from SI Units to U.S. Units, Multiply by:
25.4	in.	mm	0.03937
0.3048	ft	m	3.281
645.2	in. ²	mm ²	1.550×10^{-3}
16.39×10^3	in. ³	mm ³	61.02×10^{-6}
416.2×10^3	in. ⁴	mm ⁴	2.403×10^{-6}
0.09290	ft ²	m ²	10.76
0.02832	ft ³	m ³	35.31
0.4536	lb (mass)	kg	2.205
4.448	lb (force)	N	0.2248
4.448	kip (force)	kN	0.2248
1.356	ft-lb (moment)	N-m	0.7376
1.356	kip-ft (moment)	kN-m	0.7376
16.0185	lb/ft ³ (density)	kg/m ³	0.06243
14.59	lb/ft (load)	N/m	0.06853
14.59	kip/ft (load)	kN/m	0.06853
6.895	psi (stress)	kPa	0.1450
6.895	ksi (stress)	MPa	0.1450
0.04788	psf (load or pressure)	kPa	20.93
47.88	ksf (load or pressure)	kPa	0.02093
$0.566 \times (^{\circ}\text{F} - 32)$	$^{\circ}\text{F}$	$^{\circ}\text{C}$	$(1.8 \times ^{\circ}\text{C}) + 32$

TABLE 2 Units of Measurement: SI System

Name of Unit	Abbreviation	Use in Building Design
<i>Length</i>		
Meter	m	Large dimensions, building plans, beam spans
Millimeter	mm	Small dimensions, size of member cross sections
<i>Area</i>		
Square meters	m ²	Large areas
Square millimeters	mm ²	Small areas, properties of member cross sections
<i>Volume</i>		
Cubic meters	m ³	Large volumes
Cubic millimeters	mm ³	Small volumes
<i>Mass</i>		
Kilogram	kg	Mass of material (equivalent to weight in U.S. units)
Kilograms per cubic meter	kg/m ³	Density (unit weight)
<i>Force, Load</i>		
Newton	N	Force or load on structure
Kilonewton	kN	1000 Newtons
<i>Stress</i>		
Pascal	Pa	Stress or pressure (1 pascal = 1 N/m ²)
Kilopascal	kPa	1000 pascals
Megapascal	MPa	1,000,000 pascals
Gigapascal	GPa	1,000,000,000 pascals
<i>Temperature</i>		
Degree Celsius	$^{\circ}\text{C}$	Temperature

TABLE 1 Units of Measurement: U.S. System

Name of Unit	Abbreviation	Use in Building Design
<i>Length</i>		
Foot	ft	Large dimensions, building plans, beam spans
Inch	in.	Small dimensions, size of member cross sections
<i>Area</i>		
Square feet	ft ²	Large areas
Square inches	in. ²	Small areas, properties of cross sections
<i>Volume</i>		
Cubic yards	yd ³	Large volumes, of soil or concrete (commonly called simply "yards")
Cubic feet	ft ³	Quantities of materials
Cubic inches	in. ³	Small volumes
<i>Force, Mass</i>		
Pound	lb	Specific weight, force, load
Kip	kip, k	1000 pounds
Ton	ton	2000 pounds
Pounds per foot	lb/ft, plf	Linear load (as on a beam)
Kips per foot	kips/ft, klf	Linear load (as on a beam)
Pounds per square foot	lb/ft ² , psf	Distributed load on a surface, pressure
Kips per square foot	k/ft ² , ksf	Distributed load on a surface, pressure
Pounds per cubic foot	lb/ft ³	Relative density, unit weight
<i>Moment</i>		
Foot-pounds	ft-lb	Rotational or bending moment
Inch-pounds	in.-lb	Rotational or bending moment
Kip-feet	kip-ft	Rotational or bending moment
Kip-inches	kip-in.	Rotational or bending moment
<i>Stress</i>		
Pounds per square foot	lb/ft ² , psf	Soil pressure
Pounds per square inch	lb/in. ² , psi	Stresses in structures
Kips per square foot	kips/ft ² , ksf	Soil pressure
Kips per square inch	kips/in. ² , ksi	Stresses in structures
<i>Temperature</i>		
Degree Fahrenheit	°F	Temperature