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## Engineering Conversions and Equivalents

Let Our On-Line Calculators do the work for you!

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Abbreviations may stand for singular or plural usage			
cm = centimeter	cu. = cubic	ft. = foot	gal. = gallon (US)
gr. = gram	Imp. = Imperial	in. = inch	kg. = kilogram
km. = kilometer	l. = liter	lb. = pound	m. = meter
mi. = mile	oz. = ounce	qt. = quart	std. = standard
US = United States	yd. = yard		

### LENGTH MEASURES

Common Usage	Reciprocal Value
1 ft. = 12 in..	1 in. = 0.0833 ft.
1 yd. = 3 ft.	1 ft. = 0.3333 yd.
1 rod = 5.5000 yd.	1 yd. = 0.1818 rods
1 furlong = 40 rods	1 rod = 0.0250 furlongs
1 mile = 8 furlongs	1 furlong = 0.1250 mi.
1 mi. = 5,280 ft.	1 ft. = 0.000189 mi.
1 mi. = 1,760 yd.	1 yd. = 0.000568 mi.
1 fathom = 6 ft.	1 ft. = 0.1667 fathom
120 fathoms = 1 cable	1 cable = 0.00833 fathoms
1 league = 3 mi.	1 mi. = 0.3333 leagues
1 nautical mi. = 6076.11 ft.	1 ft. = 0.000165 nautical mi.
1 hand = 4 in. (equestrian)	1 in. = 0.2500 hands

### METRIC

1 in. = 2.54 cm.	1 cm. = 0.3937 in.
1 ft. = 30.48 cm.	1 cm. = 0.0328 ft.
1 m. = 3.2808 ft.	1 ft. = 0.3048 m.
1 m. = 39.37 in.	1 in. = 0.0254 m.
1 m. = 1.0936 yd.	1 yd. = 0.9144 m.
1 rod = 5.029 m.	1 m. = 0.1988 rod
1 km = 1000 m.	1 m. = 0.001 km.
1 km = 0.621 mi.	1 mi. = 1.6103 km.

### SQUARE MEASURES

Common Usage	Reciprocal Value
1 sq. ft. = 144 sq. in.	1 sq. in. = .006944 sq. ft.
1 sq. yd. = 9 sq. ft.	1 sq. ft. = 0.1111 sq. yd.
1 sq. rod = 30.25 sq. yd.	1 sq. yd. = 0.0331 sq. rods
1 sq. mi. = 640 acres	1 acre = 0.0016 sq. mi.

### METRIC

1 sq. cm. = 0.1550 sq. in.	1 sq. in. = 6.452 sq. cm.
1 sq. ft. = 0.0929 sq. m.	1 sq. m. = 10.7643 sq. ft.
1 sq. m. = 1.196 sq. yd.	1 sq. yd. = 0.8361 sq. m.

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1 hectare = 2.47 acres      1 acre = 0.4049 hectares  
 1 sq. km. = 0.386 sq. mi.      1 sq. mi. = 2.59 sq. km.

**CUBIC & VOLUME MEASURES**

Common Usage	Reciprocal Value
1 cu. ft. = 1,728 cu. in.	1 cu. in. = 0.0005787 cu. ft.
1 cu. yd. = 27 cu. ft.	1 cu. ft. = 0.0370 cu. yd.
1 cord (wood) = 128 cu. ft.	1 cu. ft. = 0.0078 cord
1 US std. gal. = 231 cu. in.	1 cu. in. = 0.00433 US std. gal.

**METRIC**

1 cu. in. = 16.39 cu. cm.	1 cu. cm. = 0.0610 cu. in.
1 cu. m. = 35.3357 cu. ft.	1 cu. ft. = 0.0283 cu. m.
1 cu. m. = 1.308 cu. yd.	1 cu. yd. = 0.7646 cu. m.

**DRY MEASURES**

1 qt. = 2 pints	1 pint = 0.5000 qt.
1 peck = 8 qt.	1 qt. = 0.1250 peck
1 bushel = 4 pecks	1 peck = 0.2500 bushels

**METRIC**

1 qt. dry = 1.101 l.	1 l. = 0.908 qt. dry
1 peck = 8.810 l.	1 l. = 0.1135 peck
1 hectoliter = 2.8375 bushels	1 bushel = 0.3524 hectoliters

**LIQUID MEASURES**

1 pint = 2 cup	1 cup = 0.5000 pints
1 qt. = 2 pints	1 pints = 0.5000 qt.
1 gal.. = 4 qt.	1 qt. = 0.2500 gal.
1 gal.. = 8 pints	1 pint = 0.125000 gal..
1 barrel = 31.5 gal..	1 gal.. = 0.0317 barrel

**IMPERIAL & METRIC LIQUID MEASURE**

1 US gal.. = 0.833 Imp. gal..	1 Imp. gal.. = 1.201 US gal..
1 Imp. gal.. = 4.546 l.	1 l. = 0.2200 Imp. gal..
1 l. = 0.264 US gal..	1 US gal.. = 3.7879 l.
1 l. = 1.0567 qt. liquid	1 qt. liquid = 0.9463 l.
1 gal.. = 3.7854 l.	1 l. = 0.2642 gal..

**WEIGHT MEASURES**

Common Usage	Reciprocal Value
1 lb. = 16 oz.	1 oz. = 0.0625 lb.
1 ton = 2000 lb.	1 lb. = 0.0005 ton

**METRIC**

1 oz. = 28.35 gr.	1 gr. = 0.03527 oz.
1 kg = 1000 gm	1 gr. = 0.001 kg.
1 lb. = 0.4536 kg.	1 kg. = 2.2046 lb.
1 metric ton = 0.9842 English ton	1 English ton = 1.016 metric tons

**Temperature**

Celsius or Centigrade	Fahrenheit
1 degree Celsius (C)	= 5/9 x (F - 32)
(9/5 x C) + 32	= 1 degree Fahrenheit (F)

**Air Density Calculation**

Std Air Density = 1.22556 and is defined at 59.0F degrees, 0.0% humidity, and 29.92 inches on the barometer.

Temp C = (Temp-32.0) \* 5.0 / 9.0;  
 Temp K = Temp C + 273.0;  
 Baro mb = Barometer / (29.92 / 1013.0);  
 Baro pa = Baro\_mb \* 100.0;  
 Saturation Pressure mb = 6.11 \* pow(10,(7.5\*Temp C)/(237.7+Temp\_c));  
 Vapor Pressure mb = Humidity \* Saturation Pressure mb / 100.0;  
 Temp Virtual K = Temp K / (1.0 - (Vapor Pressure mb/Baro\_mb)\*(1.-0.622))// D = P/(T\*R)

Air Density = Baro\_pa / (Temp\_Virtual\_k\*GasConstant)% Std Density = Air Density/Std Air Density\*100

**Thermal Conductivity Conversions:**

$$1 \text{ cal/cm}^2/\text{cm/sec/}^{\circ}\text{C} = 10.63 \text{ watts/in} - ^{\circ}\text{C}$$

$$117 \text{ BTU}/(\text{hr-ft-}^{\circ}\text{F}) \times (.293 \text{ watt-hr/BTU}) \times (1.8^{\circ}\text{F/}^{\circ}\text{C}) \times (\text{ft}/12 \text{ in.}) = 5.14 \text{ watts/in} - ^{\circ}\text{C}$$

or

$$117 \text{ Btu} / (\text{hr-ft-}^{\circ}\text{F}) \times .04395 \text{ watt-hr-}^{\circ}\text{F-ft}/(\text{Btu=}^{\circ}\text{C} - \text{in}) = 5.14 \text{ watts/in-}^{\circ}\text{C}$$

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