

Beaumont Environmental Systems

Conversion Factors

(* Indicates proper SI unit)

ACRES, U.S. Survey (area)

x $4.0469 \times 10^3 = \text{m}^{2*}$
x $4.3560 \times 10^4 = \text{ft}^2$
x $1.5625 \times 10^{-3} = \text{mj}^2$
x $0.4047 = \text{ha}$

ATMOSPHERES, Standard at Sea Level

Pressure -- atm (pressure)

x $1.0132 \times 10^5 = \text{Pa}^*$
x $14.696 = \text{psia}$
x $7.60 \times 10^2 = \text{mmHg at } 0^\circ\text{C}$
x $29.921 = \text{inHg at } 0^\circ\text{C}$
x $4.0716 \times 10^2 = \text{inH}_2\text{O at } 60^\circ\text{F}$
x $33.930 = \text{hH}_2\text{O at } 60^\circ\text{F}$
x $1.0132 = \text{bars absolute}$
x $1.0332 = \text{kgf/cm}^2 \text{ absolute}$

NOTE: Where a qualifying temperature is noted, the values for this unit vary with temperature.

BARRELS, Petroleum -- bbl (volume)

x $0.1590 = \text{m}^3*$
x $9.702 \times 10^3 = \text{in}^3$
x $5.6146 = \text{ft}^3$
x $42 = \text{gal, U.S.}$
x $34.972 = \text{gal, Imp.}$
x $1.5898 \times 10^2 = \text{L}$

BARS (pressure)

x $10^5 = \text{Pa}^*$
x $14.504 \text{ x } = \text{psi}$
 $7.5006 \times 10^2 = \text{mmHg at } 0^\circ\text{C}$
x $29.530 = \text{inHg at } 0^\circ\text{C}$
x $4.0184 \times 10^2 = \text{inH}_2\text{O at } 60^\circ\text{F}$
x $33.486 = \text{ftH}_2\text{O at } 60^\circ\text{F}$
x $0.9869 = \text{mbar}$
x $10^3 = \text{atm}$
x $1.0197 = \text{kgf/cm}^2$

NOTE: Where a qualifying temperature is noted, the values for this unit vary with temperature.

BRITISH THERMAL UNITS, International Table -- Btu (energy)

x $1.054 \times 10^3 = \text{J}^*$
x $2.929 \times 10^{-4} = \text{kW-h}$
x $3.928 \times 10^{-4} = \text{hp-h}$
x $0.252 = \text{kcal}$
x $7.780 \times 10^2 = \text{ft-lbf}$

NOTE: There are definitions of Btu other than the International Table, but they differ only past the third decimal place. If four or more decimal places are needed, refer to the appropriate handbook.

BTU PER HOUR, International Table -- Btu/h (power)

x $0.293 = \text{W}^*$
x $1.667 \times 10^{-2} = \text{Btu/min}$
x $3.93 \times 10^4 = \text{hp}$
x $4.20 \times 10^{-3} = \text{kcal/min}$
x $12.961 = \text{ft-lbf/min}$
NOTE: See note under Btu.

BTU PER MINUTE, International Table -- Btu/min (power) NOTE: Multiply by 60 and refer to Btu Per Hour.

CALORIES, International Table -- cal (energy) NOTE: Divide by 1000 and refer to Kilocalories.

CENTARES -- ca (area) NOTE: Refer to Square Metres.*

CENTIMETERS -- cm (length) NOTE: Divide by 100 and refer to Metres.*

CENTIMETERS OF MERCURY, at 0°C -- cmHg (pressure) NOTE: Multiply by 10 and refer to Millimetres of Mercury.

CENTIMETERS PER SECOND -- cm/s (velocity)

NOTE: Divide by 100 and refer to Metres Per Second.*

CENTIPOISES -- cP (absolute viscosity)

NOTE: Divide by 100 and refer to Poises.

CENTISTOKES -- cSt (kinematic viscosity)

NOTE: Divide by 100 and refer to Stokes.

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CUBIC CENTIMETERS -- cm³ (volume)

x 10⁻⁶ = m³*
x 6.1024 x 10⁻² = in³
x 3.5315 x 10⁻⁵ = ft³
x 3.3814 x 10⁻² = oz, U.S. fluid
x 3.5195 x 10⁻² = oz, Imp. Fluid
x 2.6417 x 10⁻⁴ = gal, U.S.
x 2.1997 x 10⁻⁴ = gal, Imp.
x 10⁻³ = pL
x 2.1134 x 10⁻³ = pt
1.0567 x 10⁻³ = pt

CUBIC CENTIMETERS PER SECOND -- cm³/s (volume per unit time)

x 10⁻⁶ = m³/s = m³/s*
x 3.6614 = in³/min
x 2.1189 x 10⁻³ = cfm
x 10⁻³ = L/s
x 1.5850 x 10⁻² = U.S. gpm
x 2.2824 x 10⁵ = million U.S. gpd

CUBIC FEET -- ft³(volume)

x 2.832 x 10⁻² = m³*
x 1.728 x 10³ = in³
x 9.5751 x = oz, U.S. fluid
x 9.9661 x = oz, Imp. fluid
x 7.4805 x = gal, U.S.
x 6.229 x = gal, Imp.
x 28.317 x = L
x 0.1781 x = bbl

CUBIC FEET PER HOUR -- cfh(volume per unit time)

NOTE: Divide by 60 and refer to Cubic Feet Per Minute.

CUBIC FEET PER MINUTE -- cfm (volume per unit time)

x 4.7195 x 10⁻⁴ = m³/s*
x 1.6990 = m³/h
x 1.728 x 10³ = in³/min
x 1.667 x 10⁻² = cfs
x 60 = cfh
x 0.4719 = L/s
x 7.4805 = U. S. gpm
x 1.0772 x 10⁻² = million U.S. gpd

CUBIC FEET PER SECOND -- cfs (volume per unit time)

NOTE: Multiply by 60 and refer to Cubic Feet Per Minute.

CUBIC INCHES -- in³ (volume)

x 1.6387 x 10⁻⁵ = m³*
x 5.787 x 10⁻⁴ = ft³
x 0.5541 = oz, U.S. fluid
x 0.5767 = oz, Imp. fluid
x 4.329 x 10⁻³ = gal, U.S.
x 3.605 x 10⁻³ = gal, Imp.

x 1.639 x 10⁻² = L

CUBIC INCHES PER MINUTE -- in³/min (volume per unit time)

x 2.7312 x 10⁻⁷ = m³/s*
x 5.787 x 10⁻⁴ = cfm
x 2.7312 x 10⁻⁴ = L/s
x 4.3290 x 10⁻³ = U.S. gpm

*** CUBIC METRES -- m³ (volume)**

x 6.1024 x 10⁴ = R³x
35.315 = ft³
x 3.3814 x 10⁴ = oz, U.S. fluid
x 3.5195 x 10⁴ = oz, Imp. fluid
x 2.6417 x 10² = gal, U.S.
x 2.1997 x 10² = gal, Imp.
x 10³ = L
x 6.2898 = bbl

CUBIC METRES PER HOURS -- m³/h (volume per unit time)

NOTE: Divide by 3600 and refer to Cubic Metres Per Second.*

CUBIC METRES PER MINUTE -- m³/min (volume per unit time)

NOTE: Divide by 60 and refer to Cubic Metres Per Second.*

* Indicates proper SI unit

*** CUBIC METRES PER SECOND -- m³/s (volume per unit time)**

x 60 = m³/min
x 3.600 x 10³ = m³/h
x 10⁶ = cm³/S
x 2.1189 x 10³ = dm
x 10³ = L/s
x 15.850 x 10³ = U.S. gpm
x 22.824 = million U.S. gpd

DEGREES CENTIGRADE--see Degrees Celsius (temperature)

DEGREES FAHRENHEIT -- °F (temperature)

(F - 32)/1.8 = °C*
(F + 459.67)/1.8 = K
F + 459.67 = °R

DEGREES KELVIN -- see Kelvin (temperature)

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DEGREES RANKINE -- °R (temperature)

$$(R/1.8) - 273.15 = °C^*$$

$$R - 459.69 = °F$$

$$R/1.8 = K$$

DEGREES PER SECOND, Angular -- °/s

(angular velocity)

$$x 1.7453 \times 10^{-2} = \text{rad/s}^*$$

$$x 0.1667 = \text{r/min (rpm)}$$

DYNES (force)

$$x 10^{-5} = \text{N}^*$$

$$x 1.0197 \times 10^{-6} = \text{kgf}$$

$$x 2.2481 \times 10^{-6} = \text{lbf}$$

FEET -- ft (length)

$$x 0.3048 = \text{m}^*$$

$$x 12 = \text{in}$$

$$x 0.3333 = \text{yd}$$

$$x 1.894 \times 10^{-4} = \text{mi, statute}$$

$$x 1.6458 \times 10^{-4} = \text{mi, nautical}$$

FEET OF WATER, at 68°F -- ftH₂O

(pressure)

$$x 2.9863 \times 10^3 = \text{Pa}^*$$

$$x 0.4331 = \text{Psi}$$

$$x 22.399 = \text{mmHg at } 0^\circ\text{C}$$

$$x 0.8818 = \text{inHg at } 0^\circ\text{C}$$

$$x 12 = \text{in H}_2\text{O at } 60^\circ\text{F}$$

$$x 2.9473 \times 10^{-2} = \text{atm}$$

$$x 2.9863 \times 10^{-2} = \text{bar}$$

$$x 3.0452 \times 10^{-2} = \text{kgf/cm}^2$$

NOTE: Where a qualifying temperature is noted, the values for this unit vary with temperature.

FEET PER MINUTE -- ft/min (velocity)

$$x 5.0800 \times 10^{-3} = \text{m/s}^*$$

$$x 1.8288 \times 10^{-2} = \text{km/h}$$

$$x 1.1364 \times 10^{-2} = \text{mph}$$

$$x 1.6667 \times 10^{-2} = \text{ft/s}$$

$$x 9.8750 \times 10^{-3} = \text{kn}$$

FEET PER SECOND -- ft/s (velocity)

NOTE: Multiply by 60 and refer to Feet Per Minute.

FEET PER SECOND SQUARED -- ft/s²

(acceleration)

$$x 0.3048 = \text{m/s}^2^*$$

FEET-POUNDS-FORCE -- ft-lbf (energy)

$$x 1.3558 = \text{J}^*$$

$$x 3.7662 \times 10^{-7} = \text{kW-h}$$

$$x 1.285 \times 10^{-3} = \text{Btu}$$

$$x 5.0505 \times 10^{-7} = \text{hp-h}$$

$$x 3.238 \times 10^{-4} = \text{kcal}$$

FOOT-POUNDS-FORCE PER HOUR -- ft-lbf/h (power)

NOTE: Divide by 60 and refer to Foot-Pounds-Force Per Minute.

FOOT-POUNDS-FORCE PER MINUTE -- ft-lbf/min (power)

$$x 2.2597 \times 10^{-2} = \text{W}^*$$

$$x 7.716 \times 10^{-2} = \text{Btu/h}$$

$$x 3.030 \times 10^5 = \text{hp}$$

$$x 3.2405 \times 10^4 = \text{kcal/min}$$

$$x 60 = \text{ft-lbf/h}$$

$$x 1.667 \times 10^{-2} = \text{ft-lbf/s}$$

FOOT-POUNDS-FORCE PER SECOND -- ft-lbf/s (power)

NOTE: Multiply by 60 and refer to Foot-Pounds-Force Per Minute.

GALLONS, Imperial -- gal (volume)

$$x 4.546 \times 10^{-3} = \text{m}^3^*$$

$$x 2.774 \times 10^2 = \text{in}^3$$

$$x 0.1605 = \text{ft}^3$$

$$x 1.537 \times 10^2 = \text{oz, U.S. fluid}$$

$$x 160 = \text{oz, Imp. fluid}$$

$$x 1.2009 = \text{gal, U.S.}$$

$$x 4.546 = \text{L}$$

$$x 2.859 \times 10^{-2} = \text{bbl}$$

GALLONS, U.S. -- gal (volume)

$$x 3.7854 \times 10^{-3} = \text{m}^3^*$$

$$x 2.31 \times 10^2 = \text{in}^3$$

$$x 0.1337 = \text{ft}^3$$

$$x 128 = \text{oz, U.S. fluid}$$

$$x 1.3323 \times 10^2 = \text{oz, Imp. fluid}$$

$$x 0.8327 = \text{gal, Imp.}$$

$$x 3.7854 = \text{L}$$

$$x 8 = \text{pt}$$

$$x 4 = \text{qt}$$

$$x 2.3810 \times 10^{-2} = \text{bbl}$$

GALLONS PER HOUR, U.S. -- U.S. gph (volume per unit time)

NOTE: Divide by 60 and refer to Gallons Per Minute, U.S.

GALLONS PER MINUTE, U.S. -- U.S. gpm (volume per unit time)

$$x 6.3090 \times 10^{-5} = \text{m}^3/\text{s}^*$$

$$x 2.31 \times 10^2 = \text{in}^3/\text{min}$$

$$x 0.1337 = \text{cfm}$$

$$x 60 = \text{U.S. gph}$$

$$x 1.667 \times 10^{-2} = \text{U.S. gps}$$

$$x 6.309 \times 10^{-2} = \text{L/s}$$

$$x 1.4400 \times 10^{-3} = \text{million U.S. gpd}$$

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GALLONS PER SECOND, U.S. -- U. S. gps (volume per unit time)

NOTE: Multiply by 60 and refer to Gallons Per Minute, U.S.

GRAINS, Avoirdupois or Troy -- gr (mass)

x 6.480×10^{-5} = kg*
x 6.480×10^{-2} = g
x 2.2857×10^{-3} = oz, av.
x 2.0833×10^{-3} = oz, troy
x 1.4286×10^{-4} = lb, av.
x 1.7361×10^{-4} = lb, troy
x 4.1667×10^{-2} = dwt

GRAMS--g (mass)

x 10^{-3} = kg*
x 3.5274×10^{-2} = oz, av.
x 3.2151×10^{-2} = oz, troy
x 2.2046×10^{-3} = lb, av.
x 2.6792×10^{-3} = lb, troy
x 15.432 = gr
x 0.6430 = dwt

GRAMS PER CUBIC CENTIMETRE -- g/cm³ (mass per unit volume)

NOTE: Divide by 1000 and refer to Kilograms Per Cubic Metre.*

GRAMS PER CUBIC METRE -- g/m³ (mass per unit volume)

NOTE: Divide by 1000 and refer to Kilograms Per Cubic Metre.*

GRAMS PER LITRE (g/L) -- see Kiloqrams Per Cubic Metre* (mass per unit volume)

HECTARES -- ha (area)

x 10^4 = m²*
x 3.861×10^{-3} = mj²
x 2.4711 = acre

HORSEPOWER, Boiler -- boiler hp (power)

x 9.8095×10^3 = W*
x 3.3446×10^4 = Btu/h
x 13.1548 = hp (mechanical)
x 1.407×10^2 = kcal/min
x 4.3411×10^5 = ft-lbf/min

HORSEPOWER, Mechanical -- hp (power)

x 7.457×10^2 = W*
x 2.543×10^3 = Btu/h
x 10.694 = kcal/min
x 3.30×10^4 = ft-lbf/min
x 1.0139 = metric hp
x 7.6018×10^{-2} = boiler hp

NOTE: In most conversions, this is the type of horsepower assumed unless otherwise stated.

HORSEPOWER, Metric -- metric hp (power)

x 7.3550×10^2 = W*
x 2.51×10^3 = Btu/h
x 0.9863 = hp (mechanical)
x 10.55 = kcal/min

HORSEPOWER-HOURS -- hp-h (energy)

x 2.6845×10^6 = J*
x 0.7457 = kW-h
x 2.546×10^3 = Btu
x 6.416×10^2 = kcal
x 1.98×10^6 = ft-lb

INCHES -- in (length)

x 2.54×10^{-2} = m*
x 8.3333 x 10^{-2} = ft
x 2.7778×10^{-2} = yd
x 1.5783×10^{-5} = mi, statute

INCHES OF MERCURY, at 0°C -- inHg (pressure)

x 3.3864×10^3 = Pa*
x 04912 = psi
x 25.4 = mmHg at 0°C
x 13.608 = in H₂O at 60°F
x 1.1340 = ftH₂O at 60°F
x 3.3421×10^{-2} = atm
x 3.3864×10^{-2} = bar
x 3.4532×10^{-2} = kgf/cm²

NOTE: Where a qualifying temperature is noted, the values for this unit vary with temperature.

INCHES OF WATER, at 68°F -- inH₂O (pressure)

x 2.4886×10^2 = Pa*
x 3.6094×10^{-2} = psi
x 1.8666 = mmHg at 0°C
x 7.3486×10^{-2} = inHg at 0°C
x 8.333×10^{-2} = ftH₂O at 60°F
x 2.4560×10^{-3} = atm
x 2.4886×10^{-3} = bar
x 2.5377×10^{-3} = kgf/cm²

NOTE: Where a qualifying temperature is noted, the values for this unit vary with temperature.

*** JOULES -- J (energy)**

x 2.778×10^{-7} = kW-h
x 9.485×10^{-4} = Btu
x 3.725×10^{-7} = hp-h
x 2.390×10^{-4} = kcal
x 0.7376 = ft-lbf

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KELVIN -- K (temperature)

K -- 273.15 = °C*
1.8K -- 459.67 = °F
1.8K = °R

KILOCALORIES, International Table -- kcal (energy)

x 4.184 x 10³ = J*
x 1.1622 x 10⁻³ = JkW-h
x 3.9683 = Btu
x 1.5586 x 10⁻³ = hp-h
x 3.0860 x 10³ = ft-lbf
x 10³ = cal

KILOCALORIES PER MINUTE, International Table -- kcal/min (power)

x 69.733 = W*
x 2.3810 x 10² = Btu/h
x 9.3514 x 10⁻² = hp
x 3.0860 x 10³ = ft-lbf/min
* Indicates proper SI unit

*** KILOGRAMS -- kg (mass)**

x 10³ = g
x 35.274 = oz. av.
x 32.151 = oz. troy
x 2.2046 = lb, av.
x 2.6792 = lb, troy
x 1.5432 x 10⁴ = gr
x 6.4301 x 10² = dwt
x 9.8420 x 10⁻⁴ = long ton
x 1.1023 x 10⁻³ = short ton
x 10⁻³ = t

*** KILOGRAMS PER CUBIC METRE -- kg/m³ (mass per unit volume)**

x 10³ = g/m³
x 10⁻³ = g/cm³
x 3.6127 x 10⁻⁵ = lb/in³
x 8.3454 x 10³ = lb/U.S. gal
x 1.0022 x 10⁻² = lb/Imp. gal
x 9.9908 x 10³ = ppm_{H₂O} at 60°F

KILOGRAMS PER HOUR -- kg/h (mass per unit time)

NOTE: Divide by 3600 and refer to Kilograms Per Second.*

KILOGRAMS PER MINUTE -- kg/min (mass per unit time)

NOTE: Divide by 60 and refer to Kilograms Per Second.*

*** KILOGRAMS PER SECOND -- kg/s (mass per unit time)**

x 1.3228 x 10² = lb/min
x 60 = kg/min
x 3.600 x 10³ = kg/h

KILOGRAMS-FORCE -- kgf (force)

x 9.8067 = N*
x 2.2046 = lbf
x 9.8067 x 10⁵ = dynes

KILOGRAMS-FORCE PER SQUARE CENTIMETRE -- kgf/cm² (pressure)

x 9.8067 x 10⁴ = Pa*
x 14.223 = psi
x 7.3556 x 10² = mmHg at 0°C
x 28.959 = inHg at 0°C
x 3.9406 x 10² = inH₂O at 60°F
x 32.838 = ftH₂O at 60°F
x 0.9678 = atm
x 0.9807 = bar

NOTE: Where a qualifying temperature is noted, the values for this unit vary with temperature.

KILOGRAMS-FORCE TIMES METRES -- kgf x m (torque)

x 9.8067 = N-m*
x 7.2330 = lbf x ft

KILOMETRES -- km (length)

NOTE: Multiply by 1000 and refer to Metres.*

KILOMETRES PER HOUR -- km/h (velocity)

x 0.2778 = m/s*
x 0.6214 = mph
x 54.681 = ft/min
x 0.5400 = kn

KILOPASCALS -- kPa (pressure)

NOTE: Multiply by 1000 and refer to Pascals.*

KILOPONDS -- see Kilograms-force (force)

KILOWATTS -- kW (power)

NOTE: Multiply by 1000 and refer to Watts.*

KILOWATT-HOURS -- kW-h (energy)

x 3.600 x 10⁶ = J*
x 10³ = W-h
x 3.4095 x 10³ = Btu
x 1.3410 = hp-h
x 8.5918 x 10² = kcal
x 2.6552 x 10⁶ = ft-lbf

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KNOTS, International -- kn (velocity)

x 0.5144 = m/s*
x 1.852 = km/h
x 1.1508 = mph
x 1.0127 x 10² = ft/min
* Indicates proper SI unit

LITRES -- L (volume)

x 10⁻³ = m³*
x 61.024 = in³
x 3.5315 x 10⁻² = ft³
x 33.814 = oz, U.S. fluid
x 35.195 = oz, Imp. fluid
x 0.2642 = gal, U.S.
x 0.2200 = gal, Imp.
x 6.2898 x 10⁻³ = bbl

LITRES PER SECOND -- L/s (volume per unit time)

x 10⁻³ = m³/s*
x 3.6614 x 10³ = in³/min
x 2.1189 = cfm
x 15.850 = U.S. gpm
x 2.2824 x 10⁻² = million U.S. gpd

MEGAPASCALS -- MPa (pressure)

NOTE: Multiply by 1000000 and refer to Pascals.*

MEGAWATTS -- MW (power)

NOTE: Multiply by 1000000 and refer to Watts.*

*** METRES--m (length)**

x 10⁶ = μm
x 10³ = mm
x 10² = cm
x 10⁻³ = km
x 39.370 = in
x 3.2808 = ft
x 1.0936 = yd
x 6.2137 x 10⁻⁴ = mi, statute
x 5.3996 x 10⁻⁴ = mi, nautical

METRES PER MINUTE--m/min (velocity)

NOTE: Divide by 60 and refer to Metres Per Second.*

*** METRES PER SECOND -- m/s (velocity)**

x 60 = m/min
x 10² = cm/s
x 3.6 = km/h
x 2.2369 = mph
x 1.9685 x 10² = ft/min
x 1.9438 = kn

*** METRES PER SECOND SQUARED -- m/s²**

(acceleration)
x 3.281 = ft/s²

METRIC TONS -- see Tonnes (mass)

MICROMETRES -- μm (length)

x 1.000 x 10⁻⁶ = m*

MICRONS -- see Micrometres (length)

MILES, Statute -- mi (length)

x 1.6093 x 10³ = m*
x 6.3360 x 10⁴ = in
x 5.280 x 10³ = ft
x 1.760 x 10³ = yd
x 0.8690 = mi, nautical

MILES, International Nautical -- mi (length)

x 1.852 x 10³ = m*
x 7.2913 x 10⁴ = in
x 6.0761 x 10³ = ft
x 2.0254 x 10³ = yd
x 1.1508 = mi, statute

MILES PER HOUR, Statute -- mph (velocity)

x 0.4470 = m/s*
x 1.6093 = km/h
x 88 = ft/min
x 0.8690 = kn

MILLIBARS -- mbar (pressure)

x 10⁻³ = bars

MILLILITRES--see Cubic Centimetres (volume)

MILLIMETRES--mm (length)

NOTE: Divide by 1000 and refer to Metres.*

MILLIMETRES OF MERCURY, at 0°C -- mmHg (pressure)

x 1.3332 x 10² = Pa*
x 1.9337 x 10⁻² = psi
x 0.10 = cmHg at 0°C
x 3.9370 x 10⁻² = inHg at 0°C
x 0.5357 = inH₂O at 60°F
x 4.4644 x 10⁻² = ftH₂O at 60°F
x 1.3158 x 10⁻³ = atm
x 1.3332 x 10⁻³ = bar
x 1,3595 x 10⁻³ = kgf/cm²

NOTE: Where a qualifying temperature is noted, the values for this unit vary with temperature.

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MILLION GALLONS PER DAY, U.S. -- million U.S. gpd (volume per unit time)

x $4.3813 \times 10^{-2} = \text{m}^3/\text{s}^*$
x $1.6042 \times 10^5 = \text{in}^3/\text{min}$
x 92.834 = cfm
x 43.813 = L/s
x $6.9444 \times 10^2 = \text{U.S. gpm}$

MINUTES, Angular -- ' (plane angles)

x $2.9089 \times 10^{-4} = \text{rad}^*$
x $1.667 \times 10^{-2} = ^\circ$, angular
x 60 = ", angular

NEWTONS -- N (force)

x 0.1020 = kgf
x 0.2248 = lbf
x $10^5 = \text{dynes}$

*** NEWTON-METRES -- N-m (torque)**

x 0.1020 = kgf x m
x 0.7376 = lbf x ft

OUNCES, Avoirdupois -- av. oz (mass)

x $2.8350 \times 10^{-2} = \text{kg}^*$
x 28.350 = g
x 0.9115 = oz, troy
x 0.0625 = lb, av.
x $7.595 \times 10^{-2} = \text{lb, troy}$
x $4.375 \times 10^2 = \text{gr}$
x 18.229 = dwt

OUNCES, Fluid, Imperial -- oz (volume)

x $2.8412 \times 10^{-5} = \text{m}^3^*$
x 1.7339 = in^3
x $1.0034 \times 10^{-3} = \text{ft}^3$
x 0.9608 = oz, U.S. fluid
x $7.5060 \times 10^{-3} = \text{gal, U.S.}$
x $6.25 \times 10^{-3} = \text{gal, Imp.}$
x $2.8412 \times 10^{-2} = \text{L}$

OUNCES, Fluid, U.S. -- oz (volume)

x $2.9574 \times 10^{-5} = \text{m}^3^*$
x 1.8047 = in^3
x $1.0444 \times 10^{-3} = \text{ft}^3$
x 1.0408 = oz, Imp. fluid
x $7.8125 \times 10^{-3} = \text{gal, U.S.}$
x $6.5053 \times 10^{-3} = \text{gal, Imp.}$
x $2.9573 \times 10^{-2} = \text{L}$

OUNCES, Troy -- troy oz (mass)

x $3.1103 \times 10^{-2} = \text{kg}^*$
x 31.103 = g
x 1.0971 = oz, av.
x $8.3333 \times 10^{-2} = \text{lb, troy}$
x $6.857 \times 10^{-2} = \text{lb, av.}$

PARTS PER MILLION, by weight (mass) in water at 60°F -- ppm or ppm in H₂O at 60°F (mass per unit volume)

x $9.9908 \times 10^{-4} = \text{kg}/\text{m}^3^*$
x $3.6094 \times 10^{-8} = \text{lb}/\text{in}^3$
x $8.3377 \times 10^{-6} = \text{lb}/\text{U.S. gal}$
x $1.0013 \times 10^{-5} = \text{lb}/\text{Imp. gal}$

*** PASCALS -- Pa (pressure)**

x $10^{-3} = \text{kPa}$
x $10^{-6} = \text{MPa}$
x $1.4504 \times 10^{-4} = \text{psi}$
x $7.5006 \times 10^{-3} = \text{mmHg at } 0^\circ\text{C}$
x $2.9530 \times 10^{-4} = \text{inHg at } 0^\circ\text{C}$
x $4.0186 \times 10^{-3} = \text{inH}_2\text{O at } 60^\circ\text{F}$
x $3.3488 \times 10^{-4} = \text{ftH}_2\text{O at } 60^\circ\text{F}$
x $9.8692 \times 10^{-6} = \text{atm}$
x $10^{-5} = \text{bar}$
x $1.0197 \times 10^{-5} = \text{kgf}/\text{cm}^2$
x 10 = dynes/cm^2

NOTE: Where a qualifying temperature is noted, the values for this unit vary with temperature.

PENNYWEIGHTS -- dwt (mass)

x $1.5552 \times 10^{-3} = \text{kg}^*$
x 1.5552 = g
x $5.4857 \times 10^{-2} = \text{oz, av.}$
x $5.00 \times 10^{-2} = \text{oz, troy}$
x $3.4286 \times 10^{-3} = \text{lb, av.}$
x $4.167 \times 10^{-3} = \text{lb, troy}$
x 24 = gr

PINTS, Fluid -- pt (volume)

x $4.7316 \times 10^{-4} = \text{m}^3^*$
x 28.875 = in^3
x $1.671 \times 10^{-2} = \text{ft}^3$
x 16 = oz, U.S. fluid
x 16.653 = oz, Imp. fluid
x 0.125 = gal, U.S.
x 0.1041 = gal, Imp.
x 0.4732 = L
x 0.5 = qt

POISES -- P (absolute viscosity)

x 0.1000 = $\text{Pa}\cdot\text{s}^*$
x 100 = cP
x $2.0885 \times 10^{-3} = \text{lb}\cdot\text{s}/\text{ft}^2$
x 0.0672 = $\text{lb}/\text{ft}\cdot\text{s}$

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POUNDS, Avoirdupois -- lb (mass)

x 0.4536 = kg*
x 4.5359 x 10² = g
x 16 = oz, av.
x 14.583 = oz, troy
x 1.2153 = lb, troy
x 7.00 x 10³ = gr
x 2.9167 x 10² = dwt
x 5.00 x 10⁻⁴ = short ton
x 4.464 x 10⁻⁴ = long ton
x 4.536 x 10⁻⁴ = t

POUNDS, Troy--lb (mass)

x 0.3732 = kg*
x 3.732 x 10² = g
x 12 = oz, av.
x 13.166 = oz, troy
x 0.8229 = lb, troy
x 5.760 x 10³ = gr
x 2.40 x 10² = dwt
x 4.1143 x 10⁻⁴ = short ton
x 3.6735 x 10⁻⁴ = long ton
x 3.7324 x 10⁻⁴ = t

POUNDS PER CUBIC FOOT -- lb/ft³ (mass per unit volume)

x 16.018 = kg/m³*
x 5.787 x 10⁻⁴ = lb/in³
x 0.1337 = lb/U.S. gal
x 0.1605 = lb/Imp. gal
x 1.6033 x 10⁻⁴ = ppm inH₂O at 60°F

POUNDS PER CUBIC INCH--lb/in³(mass per unit volume)

x 2.7680 x 10⁴ = kg/m³*
x 1.728 x 10³ = lb/ft³
x 2.31 x 10² = lb/U.S. gal
x 2.774 x 10² = lb/Imp. gal
x 2.7705 x 10⁷ = ppm inH₂O at 60°F
* Indicates proper SI unit

POUNDS PER HOUR -- lb/h (mass per unit time)

NOTE: Divide by 60 and refer to Pounds Per Minute.

POUNDS PER IMPERIAL GALLON -- lb/gal (mass per unit volume)

x 99.776 = kg/m³*
x 3.6047 x 10⁻³ = lb/in³
x 0.8327 = lb/U.S. gal
x 9.9868 x 10⁴ = ppm inH₂O at 60°F

POUNDS PER MINUTE -- lb/min (mass per unit time)

x 7.5599 x 10⁻³ = kg/s*
x 1.667 x 10⁻² = lb/s
x 60 = lb/h

POUNDS PER SECOND -- lb/s (mass per unit time)

NOTE: Multiply by 60 and refer to Pounds Per Minute.

POUNDS PER U.S. GALLON -- lb/gal (mass per unit volume)

x 1.1983 x 10² = kg/m³*
x 4.3290 x 10⁻³ = lb/in³
x 1.2010 = lb/Imp. gal
x 1.1994 x 10⁵ = ppm inH₂O at 60°F

POUNDS-FORCE -- lbf (force)

x 4.4482 = N*
x 0.4536 = kgf
x 4.4482 x 10⁵ = dynes

POUNDS-FORCE TIMES FEET -- lbf x ft (torque)

x 1.3558 = N-m*
x 0.1383 = kgf x m

POUNDS-FORCE PER SQUARE INCH -- psi (pressure)

x 6.895 x 10³ = Pa*
x 51.715 = mmHg at 0°C
x 2.036 = inHg at 0°C
x 27.705 = inH₂O at 60°F
x 2.3088 = ftH₂O at 60°F
x 6.8046 x 10⁻² = atm
x 6.895 x 10⁻² = bar
x 7.031 x 10⁻² = kgf/cm²

NOTE: Where a qualifying temperature is noted, the values for this unit vary with temperature.

QUARTS, Fluid -- qt (volume)

x 9.4635 x 10⁻⁴ = m³*
x 57.75 = in³
x 3.342 x 10⁻² = ft³
x 32 = oz, U.S. fluid
x 33.31 = oz, Imp. fluid
x 0.25 = gal, U.S.
x 0.2082 = gal, Imp.
x 0.9464 = L

*** RADIANS -- rad (plane angles)**

x 57.296 = °, angular
x 3.4377 x 10³ = ', angular
x 2.0626 x 10⁵ = ", angular

*** RADIANS PER SECOND -- rad/s (angular velocity)**

x 57.296 = °/s
x 9.5493 = r/min (rpm)

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REVOLUTIONS PER MINUTE -- r/min

(angular velocity)

$$\times 0.1047 = \text{rad/s}^*$$

$$\times 6 = \text{°/s}$$

$$\times 1.667 \times 10^{-2} = \text{r/s}$$

NOTE: A common variation of the short form of this category is rpm.

REVOLUTIONS PER SECOND -- r/s

(angular velocity)

NOTE: Multiply by 60 and refer to Revolutions Per Minute.

SECONDS, Angular -- " (plane angles)

$$\times 4.8481 \times 10^{-6} = \text{rad}^*$$

$$\times 2.778 \times 10^{-4} = \text{°}, \text{angular}$$

$$\times 1.667 \times 10^{-2} = \text{'}, \text{angular}$$

SQUARE CENTIMETRES -- cm² (area)

NOTE: Divide by 10000 and refer to Square Metres.*

* Indicates proper SI unit

SQUARE FEET -- ft² (area)

$$\times 9.2903 \times 10^{-2} = \text{m}^{2*}$$

$$\times 1.44 \times 10^2 = \text{in}^2$$

$$\times 3.5870 \times 10^{-8} = \text{mi}^2$$

$$\times 2.2957 \times 10^{-5} = \text{acre}$$

$$\times 9.29 \times 10^{-6} = \text{ha}$$

SQUARE INCHES -- in² (area)

$$\times 6.4516 \times 10^{-4} = \text{m}^{2*}$$

$$\times 6.944 \times 10^{-3} = \text{ft}^2$$

* SQUARE METRES -- m² (area)

$$\times 10^4 = \text{cm}^2$$

$$\times 1.550 \times 10^3 = \text{in}^2$$

$$\times 10.764 = \text{ft}^2$$

$$\times 2.4711 \times 10^{-4} = \text{acre}$$

$$\times 10^{-4} = \text{ha}$$

$$\times 1 = \text{ca}$$

SQUARE MILES -- mi² (area)

$$\times 2.5900 \times 10^6 = \text{m}^{2*}$$

$$\times 6.40 \times 10^2 = \text{acre}$$

$$\times 2.5900 \times 10^2 = \text{ha}$$

STOKES -- St (kinematic viscosity)

$$\times 10^{-4} = \text{m}^2/\text{s}^*$$

$$\times 1.076 \times 10^{-3} = \text{ft}^2/\text{s}$$

$$\times 10^2 = \text{cSt}$$

TONNES -- t (mass)

$$\times 10^3 = \text{kg}^*$$

$$\times 2.2046 \times 10^3 = \text{lb, av.}$$

$$\times 2.679 \times 10^3 = \text{lb, troy}$$

$$\times 0.9842 = \text{long ton}$$

$$\times 1.1023 = \text{short ton}$$

TONS -- long ton (mass)

$$\times 1.016 \times 10^3 = \text{kg}^*$$

$$\times 2.240 \times 10^3 = \text{lb, av.}$$

$$\times 2.722 \times 10^3 = \text{lb, troy}$$

$$\times 1.120 = \text{short ton}$$

$$\times 1.016 = \text{t}$$

TONS -- ton or short ton (mass)

$$\times 9.072 \times 10^2 = \text{kg}^*$$

$$\times 2 \times 10^3 = \text{lb, av.}$$

$$\times 2.4306 \times 10^3 = \text{lb, troy}$$

$$\times 0.8929 = \text{long ton}$$

$$\times 0.9072 = \text{t}$$

TORR--see Millimetres of Mercury (pressure)

* WATTS -- W (power)

$$\times 10^{-3} = \text{kW}$$

$$\times 10^{-6} = \text{MW}$$

$$\times 3.414 = \text{Btu/h}$$

$$\times 1.3410 \times 10^{-3} = \text{hp}$$

$$\times 1.432 \times 10^{-2} = \text{kcal/min}$$

$$\times 44.2357 = \text{ft-lbf/min}$$

WATT-HOURS -- W-h (energy)

NOTE: Divide by 1000 and refer to Kilowatt-hours.

YARDS -- yd (length)

$$\times 0.9144 = \text{m}^*$$

$$\times 36 = \text{in}$$

$$\times 3 = \text{ft}$$

$$\times 5.682 \times 10^{-4} = \text{mi, statute}$$

$$\times 4.937 \times 10^{-4} = \text{mi, nautical}$$