



Conversion factors

Space indicates thousands: 1 000.00

Acceleration:

$$1 g = 9.81 m/s^2 = 981 Gal$$

$$1 Gal = 1 cm/s^2 = 0.01 m/s^2$$

$$1 m/s^2 = 100 Gal$$

Notes:

- Gal is not an SI unit.

Angle:

$$1 circle = 360^\circ = 400 grades$$

Area:

$$1 ft^2 = 0.0929 m^2$$

$$1 in^2 = 6.452 \times 10^{-4} m^2$$

Density:

$$1 lb/ft^3 = 16.018 kg/m^3$$

$$1 slug/ft^3 = 515.379 kg/m^3$$

Energy:

$$1 Btu = 1,055.06 J$$

$$1 cal = 4.186 J$$

$$1 hp h = 0.7457 kWh$$

$$1 erg = 10^{-7} J$$

$$1 Btu/lb_m = 2.326 kJ/kg$$

$$1 Btu/(lb_m^\circ F) = 4.1868 kJ/(kgK)$$

Force (NPL - National Physical Laboratory, 2014):

Pound – force: $1 lbf = 4.44822 N$

$$1 kip = 1\ 000 lbf = 4\ 448.22 N$$

Kilopond = kilogram – force:

$$1 kp = 1 kg = 9.80665 N$$

Dyne: $1 dyn = 10^{-5} N = 10 \mu N$

Poundal: $1 pdl = 0.138255 N$

Grain – force: $1 grf = 635.4602 \mu N$

Ounce – force: $1 ozf = 278.0139 mN$

Sthène: $1 sthène = 1.0 kN$

$$1 US ton – force = 2\ 000 lbf = 8\ 869.443 N$$

$$1 tonne = 1\ 000 kg = 9.80655 kN$$

$$1 UK ton – force = 2\ 240 lbf = 9.964016 kN$$

Heat flow rate:

$$1 Btu/s = 1,055.1 W$$

$$1 Btu/h = 0.2931 W$$

$$1 hk (metric horse power) = 0.735499 kW$$

$$1 hp = 0.74570 kW$$

Heat transfer coefficient:

$$1 Btu/h^\circ F = 5.678 W/m^2K$$

Illumination (lux lx):

Foot-candles to lux: $1 fc = 10.76 lx$

Foot-Lamberts to candela/m²: $1 fl = 3.426 cd/m^2$

Length:

$$1 ft = 0.3048 m$$

$$= 12 in$$

$$1 in = 25.4 mm$$

$$1 mile = 1.6093 km = 5,280 ft$$

$$1 nm = 1.852 km$$

$$1 Nautical Mile (nm) = Sea Mile$$

$$1 Angstrom = 10^{-10} m$$

$$Yard: 1 yd = 0.914 m$$

Luminous Flux:

$$1 candle power = 12.566 lumen = 0.0188 W$$

Mass:

$$1 lb_m = 0.4536 kg = 4.45 N = 16 oz = 7000 grain$$

$$1 grain = 0.0648 g$$

$$1 slug = 14.594 kg$$

$$1 oz = 28.35 g$$

$$1 fl oz = 1 oz$$

$$1 tonne = 1000 kg = 1.10231131 short tons$$

$$1 metric ton = 1000 kg$$

$$1 short ton = 907.18474 kg$$

$$1 long ton = 1016.0469088 kg$$

$$1 troy pound = 12 troy ounces$$

$$1 troy ounce = 31.1034768 g$$

$$1 pennyweight = 24 grain$$

$$1 carat = 0.200 g$$

Note:

- US ton = short ton = 2 000 lbf.
- UK ton = long ton = 2 240 lbf.

Power:

$$1 Btu/s = 1,055.1 W$$

$$1 Btu/h = 0.2931 W$$

$$1 hp = 745.7 W$$

$$1 refrigeration ton = 3,516 W = 3.516 kW$$

$$1 cooling tower ton = 15,000 Btu/h$$

Pressure:

$$1 atm = 101.325 kPa = 101,325 Pa$$

$$1 Pa = 10^{-5} Bar = 1.45 \times 10^{-4} psi$$

$$1 psi = 6.8948 kPa$$

$$1 psf = 47.88 Pa$$

$$1 mm Hg = 133 Pa$$

Speed:

$$1 ft/s = 0.3048 m/s$$

$$1 knot = 1.852 km/h$$

Stress:

$$1 psi = 6,8948 Pa$$

$$1 ksi = 6.8948 MPa$$

Structural Mechanics:

$$1 ksi\sqrt{in} = 1.0792 MPa\sqrt{m}$$

Temperature:

$$^{\circ}F = ^{\circ}C \frac{9}{5} + 32$$

$$^{\circ}C = \frac{5}{9} [^{\circ}F - 32]$$

$$^{\circ}R = \frac{5}{9} K$$

Torque and Moment:

$$1 \text{ ft lb} = 1.356 \text{ Nm}$$

Viscosity (Dynamic)

$$1 \text{ lb}/(\text{ft} \cdot \text{s}) = 1.4879 \text{ Pa} \cdot \text{s}$$

$$\begin{aligned} 1 \text{ cP} &= 10^{-3} \text{ Pa} \cdot \text{s} \\ &= 0.001 \text{ Ns}/\text{m}^2 \\ &= 0.01 \text{ Poise} \end{aligned}$$

Viscosity (Kinematic)

$$\begin{aligned} 1 \text{ cSt} &= 10^{-6} \text{ m}^2/\text{s} \\ &= 0.01 \text{ St} \end{aligned}$$

Volume:

$$1 \text{ ft}^3 = 0.02832 \text{ m}^3$$

$$1 \text{ in}^3 = 1.6387 \times 10^{-5} \text{ m}^3$$

$$1 \text{ Gallon (US)} = 3.785 \ell$$

$$1 \text{ Imp. Gallon (UK)} = 4.546 \ell$$

$$1 \text{ pt} = 0.568 \ell$$

$$1 \text{ dm}^3 = \ell \text{ (Liter)}$$

Multiples

Factor	Prefix	Symbol
10^{-12}	Pico	<i>p</i>
10^{-9}	Nano	<i>n</i>
10^{-6}	Micro	μ
10^{-3}	Milli	<i>m</i>
10^3	Kilo	<i>K</i>
10^6	Mega	<i>M</i>
10^9	Giga	<i>G</i>
10^{12}	Tera	<i>T</i>
10^{15}	Peta	<i>P</i>
10^{18}	Exa	<i>E</i>

1. Bibliography

NPL - National Physical Laboratory. (2014, 10 07). *National Physical Laboratory*. Retrieved from Si Unit of Force: <http://www.npl.co.uk/reference/faqs/si-unit-of-force>