

Mechanical Engineering Conversion Factors

compiled by Dr. K. Clark Midkiff

g_c	$g_c = 1 = 32.178 \frac{\text{ft} \cdot \text{lbm}}{\text{lb}_f \cdot \text{sec}^2} = 1 \frac{\text{kg} \cdot \text{m}}{\text{N} \cdot \text{s}^2} = 1 \frac{\text{slug} \cdot \text{ft}}{\text{lb}_f \cdot \text{sec}^2}$
ANGULAR VELOCITY	<p>1 RPM = 1 rev/min = 1/60 rev/sec = $2\pi/60$ rad/sec = 0.10472 rad/sec</p> <p>1 rad/sec = $1/2\pi$ rev/sec = $60/2\pi$ rev/min = 9.549 RPM</p> <p>1 Hz = 1 hertz = 1 rev/sec = 60 rev/min = 60 RPM</p> <p>1 Hz = 1 hertz = 1 rev/sec = 2π rad/sec = 6.283 rad/sec</p>
LENGTH	<p>1 in = 2.54 cm = 0.0254 m = 25.4 mm</p> <p>1 m = 3.2808 ft = 39.37 in = 100 cm = 10^6 μm = 10^{10} Angstrom</p> <p>1 ft = 0.3048 m = 12 in = 30.48 cm = 0.33333 yd</p> <p>1 km = 1000 m = 0.621 mi</p> <p>1 mi = 5280 ft = 1760 yd = 1609.4 m</p>
AREA	<p>1 m² = 10.76 ft² = 10⁴ cm²</p> <p>1 ft² = 144 in² = 0.09291 m² = 929.1 cm²</p>
VOLUME	<p>1 gal = 0.13368 ft³ = 3.785 L = 4 qt = 8 pints = 16 cups = 256 Tbsp</p> <p>1 L = 10⁻³ m³ = 10³ cm³ = 1.057 qt = 0.03531 ft³</p> <p>1 m³ = 35.31 ft³ = 1000 L = 264.1 gal = 1.308 yd³</p>
TIME	1 hr = 60 min = 3600 s, 1 yr = 52.14 wks = 365 days = 8760 hr
MASS	<p>1 lbm = 0.4536 kg = 453.6 g = 16 oz. Av. = 0.031081 slugs</p> <p>1 kg = 1000 g = 2.2046 lbm = 35.27 oz. Av. = 0.068521 slugs</p>
FORCE	<p>1 N = 1 kg·m/s² = 0.2248 lbf = 105 dyn = 10⁵ g·cm/s²</p> <p>1 lbf = 4.448 N = 4.448 x 10⁵ dyn</p>
ENERGY	<p>1 J = 1 kg·m²/s² = 10⁷ g·cm²/s² = 1 N·m = 0.7376 ft·lbf</p> <p>1 Btu = 778.16 ft·lbf = 1.055 x 10⁶ erga = 252 cal = 1055.0 J</p> <p>1 cal = 4.186 J = 3.088 ft·lbf</p> <p>1 kcal = 4186 J = 1000 cal = 3.968 Btu</p> <p>1 kJ = 0.94781 Btu = 0.23884 kcal = 1kPa·m³ = 6.242 x 10²¹ eV</p>
POWER	<p>1 W = 1 kg·m²/s³ = 1 J/s = 1 N·m/s = 3.412 Btu/hr</p> <p>1 hp = 550 ft·lbf/s = 746 W = 33000 ft·lbf/min = 2545 Btu/h</p> <p>1 kW = 1000 W = 3412 Btu/h</p>
PRESSURE	<p>1 atm = 14.696 lbf/in² = 760 torr = 101325 Pa = 29.92 in Hg</p> <p>1 Pa = 1 N/m² = 1 kg/m·s² = 1 J/m³ = 1.4504 x 10⁻⁴ lbf/in²</p> <p>1 lbf/in² = 1 psi = 6894.6 Pa = 2.0418 in Hg = 144 lbf/ft²</p> <p>1 in Hg = 3376.8 Pa = 0.4898 lbf/in² = 13.57 in H₂O</p> <p>1 in H₂O = 248.8 Pa = 0.0361 lbf/in²</p>