

Unit Conversion Factors

Mass

1 kg = 1000 g = 10^{-3} metric ton = 2.2046 lb = 35.274 oz
1 lb = 0.45359 kg = 453.59 g = 16 oz = 5×10^{-4} ton (short)
1 ton (short) = 2000 lb = 907.18 kg = 0.90718 metric ton

Temperature

$T(K) = T(^{\circ}C) + 273.15 = (5/9)(T(^{\circ}F) - 32)$
 $T(^{\circ}F) = 1.8 T(^{\circ}C) + 32 = T(^{\circ}R) - 459.67$

Pressure

1 bar = 0.1 MPa = 100 kPa = 10^5 Pa = 750.062 mm Hg (at 0°C)
= 33.4553 ft H₂O (at 4°C) = 14.50377 lbf/in² (psi) = 0.9869233 atm
1 atm = 0.101325 MPa = 101.325 kPa = 1.01325×10^5 Pa = 760 mm Hg (at 0°C)
= 33.89864 ft H₂O (at 4°C) = 14.69595 lbf/in² (psi) = 1.01325 bar

Volume

1 cm³ = 1 mL = 0.001 L = 0.06102374 in³ = 3.5315×10^{-5} ft³
= 0.033814 fl. oz. (U.S.) = 2.6418×10^{-4} gal (U.S.)
1 liter (L) = 1000 cm³ = 1 dm³ = 0.001 m³ = 61.02374 in³ = 0.03531467 ft³
= 33.814 fl. oz. (U.S.) = 1.056688 qt (U.S. liquid) = 0.26417205 gal (U.S.) = 0.21997 gal (U.K.)
1 ft³ = 28317 cm³ = 28.316847 L = 7.480519 gal (U.S.) = 0.803564 bushels (U.S. dry)
1 barrel (bbl) oil = 42 gal (U.S.) = 158.987 L = 1.333 barrels (U.S. liquid)

Density

1 g/cm³ = 1000 kg/m³ = 1 kg/L = 62.42796 lb/ft³ = 8.345404 lb/gal (U.S.) = 0.0361279 lb/in³

Energy

1 J = 0.001 kJ = 1 kg m²/s² = 10^7 erg = 0.2389 cal = 2.7778×10^{-7} kWh
= 0.737562 ft lbf = 9.47817×10^{-4} Btu = 0.009869 L atm = 0.0003485 ft³ atm
1 kcal = 1000 cal = 4.184 kJ = 4184 J = 3086 ft lbf = 3.966 Btu
1 Btu = 1.055 kJ = 1055 J = 252 cal = 778.16 ft lbf = 3.929×10^{-4} hp h

Power

1 kW = 1 kJ/s = 1000 J/s = 860.4 kcal/h = 3412 Btu/h = 737.6 ft lbf/s = 1.3405 hp
1 hp = 745.7 J/s = 641.88 kcal/h = 2545 Btu/h = 550 ft lbf/s = 0.7457 kW

Physical Constants

Ideal gas constant R:

$83.144 \text{ bar cm}^3/\text{gmol K} = 82.057 \text{ atm cm}^3/\text{gmol K} = 62.361 \text{ mmHg L/gmol K}$
 $= 0.083144 \text{ bar L/gmol K} = 0.082057 \text{ atm L/gmol K} = 1.314 \text{ atm ft}^3/\text{lbmol K}$
 $= 555.0 \text{ mmHg ft}^3/\text{lbmol } ^\circ\text{R} = 10.73 \text{ psi ft}^3/\text{lbmol } ^\circ\text{R} = 0.7302 \text{ atm ft}^3/\text{lbmol } ^\circ\text{R}$
 $= 8.3144 \text{ J/gmol K} = 1.9872 \text{ cal/gmol K} = 1.9872 \text{ Btu/lbmol } ^\circ\text{R} = 1544.3 \text{ ft lbf/lbmol } ^\circ\text{R}$

Acceleration due to gravity $g_c = 9.8066 \text{ m/s}^2 = 980.66 \text{ cm/s}^2 = 32.174 \text{ ft/s}^2$

Speed of light in vacuum $c = 2.99792 \times 10^8 \text{ m/s}$