

Unit Conversion Factors

Quantity	Equivalent units
Mass	$1 \text{ kg} = 1000 \text{ g} = 10^{-3} \text{ metric ton} = 2.2046 \text{ lb} = 35.274 \text{ oz.}$ $1 \text{ lb} = 0.45359 \text{ kg} = 453.59 \text{ g} = 16 \text{ oz.} = 5 \times 10^{-4} \text{ ton (short)}$ $1 \text{ ton (short)} = 2000 \text{ lb} = 907.18 \text{ kg} = 0.90718 \text{ metric ton}$
Temperature	$T(\text{K}) = T(^{\circ}\text{C}) + 273.15 = (5/9)T(^{\circ}\text{R})$ $T(^{\circ}\text{F}) = 1.8 T(^{\circ}\text{C}) + 32 = T(^{\circ}\text{R}) - 459.67$
Pressure	$1 \text{ bar} = 0.1 \text{ MPa} = 100 \text{ kPa} = 10^5 \text{ Pa} = 750.062 \text{ mm Hg (at } 0^{\circ}\text{C)}$ $= 33.4553 \text{ ft H}_2\text{O (at } 4^{\circ}\text{C)} = 14.50377 \text{ lb}_f/\text{in}^2 \text{ (psi)} = 0.9869233 \text{ atm}$ $1 \text{ atm} = 0.101325 \text{ MPa} = 101.325 \text{ kPa} = 1.01325 \times 10^5 \text{ Pa} = 760 \text{ mm Hg (at } 0^{\circ}\text{C)}$ $= 33.89864 \text{ ft H}_2\text{O (at } 4^{\circ}\text{C)} = 14.69595 \text{ lb}_f/\text{in}^2 \text{ (psi)} = 1.01325 \text{ bar}$
Volume	$1 \text{ cm}^3 = 1 \text{ mL} = 0.001 \text{ L} = 0.06102374 \text{ in}^3 = 3.5315 \times 10^{-5} \text{ ft}^3$ $= 0.033814 \text{ fl. oz. (U.S.)} = 2.6418 \times 10^{-4} \text{ gal (U.S.)}$ $1 \text{ liter (L)} = 1000 \text{ cm}^3 = 1 \text{ dm}^3 = 0.001 \text{ m}^3 = 61.02374 \text{ in}^3 = 0.03531467 \text{ ft}^3$ $= 33.814 \text{ fl. oz. (U.S.)} = 1.056688 \text{ qt (U.S. liquid)} = 0.26417205 \text{ gal (U.S.)} = 0.21997 \text{ gal (U.K.)}$ $1 \text{ ft}^3 = 28317 \text{ cm}^3 = 28.316847 \text{ L} = 7.480519 \text{ gal (U.S.)} = 0.803564 \text{ bushels (U.S. dry)}$ $1 \text{ barrel (bbl) oil} = 42 \text{ gal (U.S.)} = 158.987 \text{ L} = 1.333 \text{ barrels (U.S. liquid)}$
Density	$1 \text{ g/cm}^3 = 1000 \text{ kg/m}^3 = 1 \text{ kg/L} = 62.42796 \text{ lb/ft}^3 = 8.345404 \text{ lb/gal (U.S.)} = 0.0361279 \text{ lb/in}^3$
Energy	$1 \text{ J} = 0.001 \text{ kJ} = 1 \text{ kg m}^2/\text{s}^2 = 10^7 \text{ erg} = 0.2389 \text{ cal} = 2.7778 \times 10^{-7} \text{ kWh}$ $= 0.737562 \text{ ft lb}_f = 9.47817 \times 10^{-4} \text{ Btu} = 0.009869 \text{ L atm} = 0.0003485 \text{ ft}^3 \text{ atm}$ $1 \text{ kcal} = 1000 \text{ cal} = 4.184 \text{ kJ} = 4184 \text{ J} = 3086 \text{ ft lb}_f = 3.966 \text{ Btu}$ $1 \text{ Btu} = 1.055 \text{ kJ} = 1055 \text{ J} = 252 \text{ cal} = 778.16 \text{ ft lb}_f = 3.929 \times 10^{-4} \text{ hp h}$
Power	$1 \text{ kW} = 1 \text{ kJ/s} = 1000 \text{ J/s} = 860.4 \text{ kcal/h} = 3412 \text{ Btu/h} = 737.6 \text{ ft lb}_f/\text{s} = 1.3405 \text{ hp}$ $1 \text{ hp} = 745.7 \text{ J/s} = 641.88 \text{ kcal/h} = 2545 \text{ Btu/h} = 550 \text{ ft lb}_f/\text{s} = 0.7457 \text{ kW}$

Physical Constants

Ideal gas constant R	$83.144 \text{ bar cm}^3/\text{gmol K} = 82.057 \text{ atm cm}^3/\text{gmol K} = 62.361 \text{ mmHg L/gmol K}$ $= 0.083144 \text{ bar L/gmol K} = 0.082057 \text{ atm L/gmol K} = 1.314 \text{ atm ft}^3/\text{lbmol K}$ $= 555.0 \text{ mmHg ft}^3/\text{lbmol } ^{\circ}\text{R} = 10.73 \text{ psi ft}^3/\text{lbmol } ^{\circ}\text{R} = 0.7302 \text{ atm ft}^3/\text{lbmol } ^{\circ}\text{R}$ $= 8.3144 \text{ J/gmol K} = 1.9872 \text{ cal/gmol K} = 1.9872 \text{ Btu/lbmol } ^{\circ}\text{R} = 1544.3 \text{ ft lb}_f/\text{lbmol } ^{\circ}\text{R}$
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	$2.99792 \times 10^8 \text{ m/s}$