

Constants

UNIVERSAL GAS CONSTANT

$$\bar{R} = \begin{cases} 8.314 \text{ kJ/kmol} \cdot \text{K} \\ 1545 \text{ ft} \cdot \text{lbf/lbmol} \cdot ^\circ\text{R} \\ 1.986 \text{ Btu/lbmol} \cdot ^\circ\text{R} \end{cases}$$

STANDARD ACCELERATION OF GRAVITY

$$g = \begin{cases} 9.80665 \text{ m/s}^2 \\ 32.174 \text{ ft/s}^2 \end{cases}$$

STANDARD ATMOSPHERIC PRESSURE

$$1 \text{ atm} = \begin{cases} 1.01325 \text{ bar} \\ 14.696 \text{ lbf/in.}^2 \end{cases}$$

TEMPERATURE RELATIONS

$$T(^{\circ}\text{R}) = 1.8 T(\text{K})$$

$$T(^{\circ}\text{C}) = T(\text{K}) - 273.15$$

$$T(^{\circ}\text{F}) = T(^{\circ}\text{R}) - 459.67$$

$$G_c = 32.174 \frac{\text{lbm} \cdot \text{ft}}{\text{lbf} \cdot \text{s}^2}$$

Values of Selected Physical Constants

Quantity	Symbol	SI Units	cgs Units
Avogadro's number	N_A	6.023×10^{23} molecules/mol	6.023×10^{23} molecules/mol
Boltzmann's constant	k	1.38×10^{-23} J/atom-K	1.38×10^{-16} erg/atom-K 8.62×10^{-5} eV/atom-K
Bohr magneton	μ_B	9.27×10^{-24} A-m ²	9.27×10^{-21} erg/gauss ^a
Electron charge	e	1.602×10^{-19} C	4.8×10^{-10} statcoul ^b
Electron mass	—	9.11×10^{-31} kg	9.11×10^{-28} g
Gas constant	R	8.31 J/mol-K	1.987 cal/mol-K
Permeability of a vacuum	μ_0	1.257×10^{-6} henry/m	unity ^a
Permittivity of a vacuum	ϵ_0	8.85×10^{-12} farad/m	unity ^b
Planck's constant	h	6.63×10^{-34} J-s	6.63×10^{-27} erg-s 4.13×10^{-15} eV-s
Velocity of light in a vacuum	c	3×10^8 m/s	3×10^{10} cm/s

^a In cgs-emu units.

^b In cgs-esu units.

Unit Abbreviations

A = ampere	in. = inch	N = newton
Å = angstrom	J = joule	nm = nanometer
Btu = British thermal unit	K = degrees Kelvin	P = poise
C = Coulomb	kg = kilogram	Pa = Pascal
°C = degrees Celsius	lb _f = pound force	s = second
cal = calorie (gram)	lb _m = pound mass	T = temperature
cm = centimeter	m = meter	μm = micrometer (micron)
eV = electron volt	Mg = megagram	W = watt
°F = degrees Fahrenheit	mm = millimeter	psi = pounds per square inch
ft = foot	mol = mole	
g = gram	MPa = megapascal	

SI Multiple and Submultiple Prefixes

Factor by Which Multiplied	Prefix	Symbol
10^9	giga	G
10^6	mega	M
10^3	kilo	k
10^{-2}	centi ^a	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p

^a Avoided when possible.