

## 15.2: Appendix B- Physical Constants

The following table lists values from *The Nist Reference on Constants, Units, and Uncertainty* of fundamental physical constants used in thermodynamic calculations. Except for those marked “exact,” they are the 2010 CODATA (Committee on Data for Science and Technology) recommended values. The number in parentheses at the end of a value is the standard deviation uncertainty in the right-most digits of the value.

Physical quantity	Symbol	Value in SI units
Avogadro constant	$N_A$	$6.022\,141\,29(27) \times 10^{23} \text{ mol}^{-1}$
elementary charge	$e$	$1.602\,176\,565(35) \times 10^{-19} \text{ C}$
Faraday constant	$F$	$9.648\,533\,65(21) \times 10^4 \text{ C mol}^{-1}$
gas constant <sup>a</sup>	$R$	$8.314\,4621(75) \text{ J K}^{-1} \text{ mol}^{-1}$
magnetic constant <sup>b</sup>	$\mu_0$	$4\pi \times 10^{-7} \text{ N A}^{-2} \text{ (exact)}$
electric constant <sup>c</sup>	$\epsilon_0$	$8.854\,187\,817 \dots \times 10^{-12} \text{ C}^2 \text{ J}^{-1} \text{ m}^{-1} \text{ (exact)}$
speed of light in vacuum	$c_0$	$2.997\,924\,58 \times 10^8 \text{ m s}^{-1} \text{ (exact)}$
standard acceleration of free fall <sup>d</sup>	$g_n$	$9.806\,65 \text{ m s}^{-2} \text{ (exact)}$

<sup>a</sup>or molar gas constant

<sup>b</sup>or permeability of vacuum

<sup>c</sup>or permittivity of vacuum

<sup>d</sup>or standard acceleration of gravity

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