Special Pub. 344
superseded by SP 398

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
Washington, D.C. 20234

NBS Spec. Publ. 344
Issued March 1971

GENERAL PHYSICAL CONSTANTS

The values of constants given in the table on the other side of this card are taken from Taylor, Parker, and Langenberg, Rev. Mod. Phys. **41**, p. 375 (1969). These should be considered interim values pending completion of the work of the Task Group on Fundamental Constants of the Committee on Data for Science and Technology, International Council of Scientific Unions.

The International System of Units (SI)

The International System of Units (SI), established in 1960 by the General Conference of Weights and Measures under the Treaty of the Metre, is based on: the metre (m) for length, defined as 1 650 763.73 wavelengths in vacuum corresponding to the transition $2p_{10}-5d_5$ of krypton 86; the kilogram (kg) for mass, defined as the mass of the prototype kilogram at Sèvres, France; the second (s) for time, defined as the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of cesium 133; the kelvin (K) for temperature, defined as 1/273.16 of the thermodynamic temperature of the triple point of water; the ampere (A) for electric current, defined as the current that, if flowing in two infinitely long parallel wires in vacuum separated by one metre would produce a force between the wires of 2×10^{-7} newton per metre of length; and the candela (cd) for luminous intensity, defined as the luminous intensity of 1/600 000 square metre of a blackbody at the temperature of freezing platinum.

DEFINED VALUES AND CONVERSION FACTORS

Atomic mass unit (u)	1/12 the mass of an atom of the ^{12}C nuclide
Standard acceleration of free fall	9.806 65 m/s^2, 980.665 cm/s^2
Standard atmosphere	101 325 N/m^2, 1 013 250 dyn/cm^2
Thermochemical calorie	4.184 J, 4.184×10^7 ergs
Int. Steam Table calorie	4.1868 J, 4.1868×10^7 ergs
Liter	0.001 cubic metre
Mole (mol)	amount of substance comprising as many elementary entities as there are atoms in 0.012 kg of ^{12}C
Inch	0.0254 m, 2.54 cm
Pound, avdp	0.453 592 37 kg, 453.592 37 g

Reprinted from NBS Technical News Bulletin, March 1971. Supersedes NBS Misc. Publ. 253.
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Constant	Symbol	Value	Uncertainty*	Units: Système Internat. (SI)	Units: Centimetre-gram-second (cgs)
Speed of light in vacuum	c	2.997 925 0	± 10	$\times 10^{8}$ m/s	$\times 10^{10}$ cm/s
Elementary charge	e	1.602 191 7	70	10^{-19} C	10^{-20} $cm^{1/2}g^{1/2}$†
		4.803 250	21		10^{-10} $cm^{3/2}g^{1/2}s^{-1}$‡
Avogadro constant	N_A	6.022 169	40**	10^{23} mol^{-1}	10^{23} mol^{-1}
Atomic mass unit	u	1.660 531	11**	10^{-27} kg	10^{-24} g
Electron rest mass	m_e	9.109 558	54	10^{-31} kg	10^{-28} g
Proton rest mass	m_p	1.672 614	11**	10^{-27} kg	10^{-24} g
Faraday constant	F	9.648 670	54**	10^{4} C/mol	10^{3} $cm^{3/2}g^{1/2}mol^{-1}$†
Planck constant	h	6.626 196	50	10^{-34} J · s	10^{-27} erg · s
Fine structure constant	α	7.297 351	11	10^{-3}	10^{-3}
Charge to mass ratio for electron	e/m_e	1.758 802 8	54	10^{11} C/kg	10^{7} $cm^{1/2}g^{-1/2}$†
		5.272 759	16		10^{17} $cm^{3/2}g^{-1/2}s^{-1}$‡
Rydberg constant	R_∞	1.097 373 12	11	10^{7} m^{-1}	10^{5} cm^{-1}
Gyromagnetic ratio of proton	γ_p	2.675 196 5	82	10^{8} rad · $s^{-1}T^{-1}$	10^{4} rad · $s^{-1}G^{-1}$†
(uncorrected for diamag., H_2O)	γ'_p	2.675 127 0	82	10^{8} rad · $s^{-1}T^{-1}$	10^{4} rad · $s^{-1}G^{-1}$†
Bohr magneton	μ_B	9.274 096	65	10^{-24} J/T	10^{-21} erg/G†
Gas constant	R	8.314 34	35	10^{0} J · $K^{-1}mol^{-1}$	10^{7} erg · $K^{-1}mol^{-1}$
Boltzmann constant	k	1.380 622	59	10^{-23} J/K	10^{-16} erg/K
First radiation constant ($2\pi hc^2$)	c_1	3.741 844	28	10^{-16} W · m^2	10^{-5} erg · cm^2s^{-1}
Second radiation constant	c_2	1.438 833	61	10^{-2} m · K	10^{0} cm · K
Stefan-Boltzmann constant	σ	5.669 61	96	10^{-8} W · $m^{-2}K^{-4}$	10^{-5} erg · $cm^{-2}s^{-1}K^{-4}$
Gravitational constant	G	6.673 2	31	10^{-11} . $N \cdot m^2/kg^2$	10^{-8} dyn · cm^2/g^2

*Based on 1 std. dev.; applies to last digits in preceding column. †Electromag. system. ‡Electrostatic system.
**These values may be in conflict with data available since the Taylor, Parker, Langenberg review. Pending a complete new readjustment of the constants, it would be prudent to multiply the above uncertainties by 3.

☆ GPO : 1971 OL—439-689