

DIMENSIONS AND UNITS

To get the value of a quantity in Gaussian units, multiply the value expressed in SI units by the conversion factor. Multiples of 3 in the conversion factors result from approximating the speed of light $c = 2.9979 \times 10^{10}$ cm/sec $\approx 3 \times 10^{10}$ cm/sec.

Physical Quantity	Sym- bol	Dimensions		SI Units	Conversion Factor	Gaussian Units
		SI	Gaussian			
Capacitance	C	$\frac{t^2 q^2}{ml^2}$	l	farad	9×10^{11}	cm
Charge	q	q	$\frac{m^{1/2} l^{3/2}}{t}$	coulomb	3×10^9	statcoulomb
Charge density	ρ	$\frac{q}{l^3}$	$\frac{m^{1/2}}{l^{3/2} t}$	coulomb /m ³	3×10^3	statcoulomb /cm ³
Conductance		$\frac{tq^2}{ml^2}$	$\frac{l}{t}$	siemens	9×10^{11}	cm/sec
Conductivity	σ	$\frac{tq^2}{ml^3}$	$\frac{1}{t}$	siemens /m	9×10^9	sec ⁻¹
Current	I, i	$\frac{q}{t}$	$\frac{m^{1/2} l^{3/2}}{t^2}$	ampere	3×10^9	statampere
Current density	\mathbf{J}, \mathbf{j}	$\frac{q}{l^2 t}$	$\frac{m^{1/2}}{l^{1/2} t^2}$	ampere /m ²	3×10^5	statampere /cm ²
Density	ρ	$\frac{m}{l^3}$	$\frac{m}{l^3}$	kg/m ³	10^{-3}	g/cm ³
Displacement	\mathbf{D}	$\frac{q}{l^2}$	$\frac{m^{1/2}}{l^{1/2} t}$	coulomb /m ²	$12\pi \times 10^5$	statcoulomb /cm ²
Electric field	\mathbf{E}	$\frac{ml}{t^2 q}$	$\frac{m^{1/2}}{l^{1/2} t}$	volt/m	$\frac{1}{3} \times 10^{-4}$	statvolt/cm
Electro- motance	$\mathcal{E},$ Emf	$\frac{ml^2}{t^2 q}$	$\frac{m^{1/2} l^{1/2}}{t}$	volt	$\frac{1}{3} \times 10^{-2}$	statvolt
Energy	U, W	$\frac{ml^2}{t^2}$	$\frac{ml^2}{t^2}$	joule	10^7	erg
Energy density	w, ϵ	$\frac{m}{lt^2}$	$\frac{m}{lt^2}$	joule/m ³	10	erg/cm ³

Physical Quantity	Sym- bol	Dimensions		SI Units	Conversion Factor	Gaussian Units
		SI	Gaussian			
Force	F	$\frac{ml}{t^2}$	$\frac{ml}{t^2}$	newton	10^5	dyne
Frequency	f, ν	$\frac{1}{t}$	$\frac{1}{t}$	hertz	1	hertz
Impedance	Z	$\frac{ml^2}{tq^2}$	$\frac{t}{l}$	ohm	$\frac{1}{9} \times 10^{-11}$	sec/cm
Inductance	L	$\frac{ml^2}{q^2}$	$\frac{t^2}{l}$	henry	$\frac{1}{9} \times 10^{-11}$	sec ² /cm
Length	l	l	l	meter (m)	10^2	centimeter (cm)
Magnetic intensity	H	$\frac{q}{lt}$	$\frac{m^{1/2}}{l^{1/2}t}$	ampere- turn/m	$4\pi \times 10^{-3}$	oersted
Magnetic flux	Φ	$\frac{ml^2}{tq}$	$\frac{m^{1/2}l^{3/2}}{t}$	weber	10^8	maxwell
Magnetic induction	B	$\frac{m}{tq}$	$\frac{m^{1/2}}{l^{1/2}t}$	tesla	10^4	gauss
Magnetic moment	m, μ	$\frac{l^2q}{t}$	$\frac{m^{1/2}l^{5/2}}{t}$	ampere-m ²	10^3	oersted- cm ³
Magnetization	M	$\frac{q}{lt}$	$\frac{m^{1/2}}{l^{1/2}t}$	ampere- turn/m	10^{-3}	oersted
Magneto- motance	$\mathcal{M},$ Mmf	$\frac{q}{t}$	$\frac{m^{1/2}l^{1/2}}{t^2}$	ampere- turn	$\frac{4\pi}{10}$	gilbert
Mass	m, M	m	m	kilogram (kg)	10^3	gram (g)
Momentum	p, P	$\frac{ml}{t}$	$\frac{ml}{t}$	kg-m/s	10^5	g-cm/sec
Momentum density		$\frac{m}{l^2t}$	$\frac{m}{l^2t}$	kg/m ² -s	10^{-1}	g/cm ² -sec
Permeability	μ	$\frac{ml}{q^2}$	1	henry/m	$\frac{1}{4\pi} \times 10^7$	—

Physical Quantity	Symbol	Dimensions		SI Units	Conversion Factor	Gaussian Units
		SI	Gaussian			
Permittivity	ϵ	$\frac{t^2 q^2}{ml^3}$	1	farad/m	$36\pi \times 10^9$	—
Polarization	\mathbf{P}	$\frac{q}{l^2}$	$\frac{m^{1/2}}{l^{1/2}t}$	coulomb/m ²	3×10^5	statcoulomb/cm ²
Potential	V, ϕ	$\frac{ml^2}{t^2 q}$	$\frac{m^{1/2}l^{1/2}}{t}$	volt	$\frac{1}{3} \times 10^{-2}$	statvolt
Power	P	$\frac{ml^2}{t^3}$	$\frac{ml^2}{t^3}$	watt	10^7	erg/sec
Power density		$\frac{m}{lt^3}$	$\frac{m}{lt^3}$	watt/m ³	10	erg/cm ³ -sec
Pressure	p, P	$\frac{m}{lt^2}$	$\frac{m}{lt^2}$	pascal	10	dyne/cm ²
Reluctance	\mathcal{R}	$\frac{q^2}{ml^2}$	$\frac{1}{l}$	ampere-turn/weber	$4\pi \times 10^{-9}$	cm ⁻¹
Resistance	R	$\frac{ml^2}{tq^2}$	$\frac{t}{l}$	ohm	$\frac{1}{9} \times 10^{-11}$	sec/cm
Resistivity	η, ρ	$\frac{ml^3}{tq^2}$	t	ohm-m	$\frac{1}{9} \times 10^{-9}$	sec
Thermal conductivity	κ, k	$\frac{ml}{t^3}$	$\frac{ml}{t^3}$	watt/m-deg (K)	10^5	erg/cm-sec-deg (K)
Time	t	t	t	second (s)	1	second (sec)
Vector potential	\mathbf{A}	$\frac{ml}{tq}$	$\frac{m^{1/2}l^{1/2}}{t}$	weber/m	10^6	gauss-cm
Velocity	\mathbf{v}	$\frac{l}{t}$	$\frac{l}{t}$	m/s	10^2	cm/sec
Viscosity	η, μ	$\frac{m}{lt}$	$\frac{m}{lt}$	kg/m-s	10	poise
Vorticity	ζ	$\frac{1}{t}$	$\frac{1}{t}$	s ⁻¹	1	sec ⁻¹
Work	W	$\frac{ml^2}{t^2}$	$\frac{ml^2}{t^2}$	joule	10^7	erg

INTERNATIONAL SYSTEM (SI) NOMENCLATURE⁶

Physical Quantity	Name of Unit	Symbol for Unit	Physical Quantity	Name of Unit	Symbol for Unit
*length	meter	m	electric potential	volt	V
*mass	kilogram	kg	electric resistance	ohm	Ω
*time	second	s	electric conductance	siemens	S
*current	ampere	A	electric capacitance	farad	F
*temperature	kelvin	K	magnetic flux	weber	Wb
*amount of substance	mole	mol	magnetic inductance	henry	H
*luminous intensity	candela	cd	magnetic intensity	tesla	T
†plane angle	radian	rad	luminous flux	lumen	lm
†solid angle	steradian	sr	illuminance	lux	lx
frequency	hertz	Hz	activity (of a radioactive source)	becquerel	Bq
energy	joule	J	absorbed dose (of ionizing radiation)	gray	Gy
force	newton	N			
pressure	pascal	Pa			
power	watt	W			
electric charge	coulomb	C			

*SI base unit

†Supplementary unit

METRIC PREFIXES

Multiple	Prefix	Symbol	Multiple	Prefix	Symbol
10^{-1}	deci	d	10	deca	da
10^{-2}	centi	c	10^2	hecto	h
10^{-3}	milli	m	10^3	kilo	k
10^{-6}	micro	μ	10^6	mega	M
10^{-9}	nano	n	10^9	giga	G
10^{-12}	pico	p	10^{12}	tera	T
10^{-15}	femto	f	10^{15}	peta	P
10^{-18}	atto	a	10^{18}	exa	E