

## MEASUREMENT UNITS

### SI base units

Base quantity	Unit name	Unit symbol
Length.	Meter.	m
Mass.	Kilogram.	kg
Time.	Second.	s
Electric current.	Ampere.	A
Thermodynamic temperature	Kelvin.	K
Amount of substance.	Mole.	mol
Luminous intensity.	Candela.	cd

### Examples of SI coherent derived units expressed in terms of SI base units

Derived quantity		SI coherent derived unit	
Name	Symbol	Name	Symbol
Area.	A	Square meter.	m <sup>2</sup>
Volume.	V	Cubic meter.	m <sup>3</sup>
Speed.	v	Meter per second.	m/s
Acceleration.	a	Meter per second squared.	m/s <sup>2</sup>
Wavenumber.	$\sigma, \tilde{\nu}$	Reciprocal meter.	m <sup>-1</sup>
Density, mass density.	$\rho$	kilogram per cubic meter.	kg/m <sup>3</sup>
Surface density.	$\rho_A$	kilogram per squared meter.	kg/m <sup>2</sup>
Specific volume.	v	Cubic meter per kilogram.	m <sup>3</sup> /kg
Current density.	j	Ampere per square meter.	A/m <sup>2</sup>
Magnetic field strength.	H	Ampere per meter.	A/m
Amount-of-substance concentration.	c	Mole per cubic meter	mol/m <sup>3</sup>
Amount concentration	$\rho, \gamma$	kilogram per cubic meter.	kg/m <sup>3</sup>
Luminance.	L <sub>v</sub>	candela per square meter.	cd/m <sup>2</sup>
Refractive index.	N	One.	1
Relative permeability.	$\mu_r$	One.	1

### SI Prefixes

Factor	Name	Symbol	Factor	Name	Symbol
10 <sup>1</sup>	Deka.	da	10 <sup>-1</sup>	Deci.	d
10 <sup>2</sup>	Hecto.	h	10 <sup>-2</sup>	Centi.	c
10 <sup>3</sup>	Kilo.	k	10 <sup>-3</sup>	Milli.	m
10 <sup>6</sup>	Mega.	M	10 <sup>-6</sup>	Micro.	$\mu$
10 <sup>9</sup>	Giga.	G	10 <sup>-9</sup>	Nano.	n
10 <sup>12</sup>	Tera.	T	10 <sup>-12</sup>	Pico.	p
10 <sup>15</sup>	Peta.	P	10 <sup>-15</sup>	Femto.	f
10 <sup>18</sup>	Exa.	E	10 <sup>-18</sup>	Atto.	a
10 <sup>21</sup>	Zetta.	Z	10 <sup>-21</sup>	Zepto.	z
10 <sup>24</sup>	Yotta.	Y	10 <sup>-24</sup>	Yocto.	y

## SI coherent derived units with special names and symbols

Derived quantity	Coherent derived unit			
	Name	Symbol	Expression in terms of other SI units	Expression in terms of SI base units
Plane angle.	Radian.	rad	1	m/m
Solid angle.	Steradian.	sr	1	m <sup>2</sup> /m <sup>2</sup>
Frequency.	Hertz.	Hz	–	s <sup>-1</sup>
Force.	Newton.	N	–	m kg s <sup>-2</sup>
Pressure, stress.	Pascal.	Pa	N/m <sup>2</sup>	m <sup>-1</sup> kg s <sup>-2</sup>
Energy, work, amount of heat.	Joule.	J	N m	m <sup>2</sup> kg s <sup>-2</sup>
Power, radiant flux.	Watt.	W	J/s	m <sup>2</sup> kg s <sup>-3</sup>
Electric charge, amount of electricity.	Coulomb.	C	–	s A
Electric potential difference, electromotive force.	Volt.	V	W/A	m <sup>2</sup> kg s <sup>-3</sup> A <sup>-1</sup>
Capacitance.	Farad.	F	C/V	m <sup>-2</sup> kg <sup>-1</sup> s <sup>4</sup> A <sup>2</sup>
Electric resistance.	Ohm.	Ω	V/A	m <sup>2</sup> kg s <sup>-3</sup> A <sup>-2</sup>
Electric conductance.	Siemens.	S	A/V	m <sup>-2</sup> kg <sup>-1</sup> s <sup>3</sup> A <sup>2</sup>
Magnetic flux.	Weber.	Wb	V s	m <sup>2</sup> kg s <sup>-2</sup> A <sup>-1</sup>
Magnetic flux density.	Tesla.	T	Wb/m <sup>2</sup>	kg s <sup>-2</sup> A <sup>-1</sup>
Inductance.	Henry.	H	Wb/A	m <sup>2</sup> kg s <sup>-2</sup> A <sup>-2</sup>
Celsius temperature.	Degree Celsius.	°C	–	K
Luminous flux.	Lumen.	lm	cd sr	cd
Illuminance.	Lux.	lx	lm/m <sup>2</sup>	m <sup>-2</sup> cd
Activity referred to a radionuclide.	Becquerel.	Bq	–	s <sup>-1</sup>
Absorbed dose, specific energy (imparted), kerma.	Gray.	Gy	J/kg	m <sup>2</sup> s <sup>-2</sup>
Dose equivalent, dose equivalent index.	Sievert.	Sv	J/kg	m <sup>2</sup> s <sup>-2</sup>
Catalytic activity.	Katal.	kat	–	s <sup>-1</sup> mol

## Examples of SI coherent derived units expressed with the aid of SI derived units having special names and symbols

Derived quantity	SI Coherent derived unit		
	Name	Symbol	Expression in terms of SI base units
Dynamic viscosity.	Pascal second.	Pas	m <sup>-1</sup> kg s <sup>-1</sup>
Moment of force.	Newton meter.	N m	m <sup>2</sup> kg s <sup>-2</sup>
Surface tension.	Newton per meter.	N/m	kg s <sup>-2</sup>
Angular velocity.	Radian per second.	rad/s	m m <sup>-1</sup> s <sup>-1</sup> = s <sup>-1</sup>
Angular acceleration.	Radian per second squared.	rad/s <sup>2</sup>	m m <sup>-1</sup> s <sup>-2</sup> = s <sup>-2</sup>
Heat flux density, irradiance.	Watt per square meter.	W/m <sup>2</sup>	kg s <sup>-3</sup>
Heat capacity, entropy.	Joule per kelvin.	J/K	m <sup>2</sup> kg s <sup>-2</sup> K <sup>-1</sup>
Specific heat capacity, specific entropy.	Joule per kilogram kelvin.	J/(kg K)	m <sup>2</sup> s <sup>-2</sup> K <sup>-1</sup>
Specific energy.	Joule per kilogram.	J/kg	m <sup>2</sup> s <sup>-2</sup>
Thermal conductivity.	Watt per meter kelvin.	W/(m K)	m kg s <sup>-3</sup> K <sup>-1</sup>
Energy density.	Joule per cubic meter.	J/m <sup>3</sup>	m <sup>-1</sup> kg s <sup>-2</sup>
Electric field strength.	Volt per meter.	V/m	m kg s <sup>-3</sup> A <sup>-1</sup>
Electric charge density.	Coulomb per cubic meter.	C/m <sup>3</sup>	m <sup>-3</sup> s A
Surface charge density.	Coulomb per square meter.	C/m <sup>2</sup>	m <sup>-2</sup> s A
Electric flux density, electric displacement.	Coulomb per square meter.	C/m <sup>2</sup>	m <sup>-2</sup> s A
Permittivity.	Farad per meter.	F/m	m <sup>-3</sup> kg <sup>-1</sup> s <sup>4</sup> A <sup>2</sup>
Permittivity.	Henry per meter.	H/m	m kg s <sup>-2</sup> A <sup>-2</sup>
Molar energy.	Joule per mole.	J/mol	m <sup>2</sup> kg s <sup>-2</sup> mol <sup>-1</sup>
Molar entropy, molar heat capacity.	Joule per mole kelvin.	J/(mol K)	m <sup>2</sup> kg s <sup>-2</sup> K <sup>-1</sup> mol <sup>-1</sup>
Exposure (x and γ rays).	Coulomb per kilogram.	C/kg	kg <sup>-1</sup> s A
Absorbed dose rate.	Gray per second.	Gy/s	m <sup>2</sup> s <sup>-3</sup>
Radiant intensity.	Watt per steradian.	W/sr	m <sup>4</sup> m <sup>-2</sup> kg s <sup>-3</sup> = m <sup>2</sup> kg s <sup>-3</sup>
Radiance.	Watt per square meter steradian.	W/(m <sup>2</sup> sr)	m <sup>2</sup> m <sup>-2</sup> kg s <sup>-3</sup> = kg s <sup>-3</sup>
Catalytic activity concentration.	Katal per cubic meter.	kat/m <sup>3</sup>	m <sup>-3</sup> s <sup>-1</sup> mol