


SI Base Units & Derived Units

International System of Units (SI) Reference Guide

SI BASE UNITS

QUANTITY	UNIT	SYMBOL	DEFINITION
 Length	meter	m	Distance traveled by light in vacuum in 1/299,792,458 of a second
 Mass	kilogram	kg	Defined by the Planck constant being exactly $6.62607015 \times 10^{-34}$ J·s
 Time	second	s	Duration of 9,192,631,770 periods of radiation from cesium-133 atom transition
 Electric current	ampere	A	The flow of $1/1.602176634 \times 10^{-19}$ times the elementary charge e per second
 Temperature	kelvin	K	Defined by the Boltzmann constant being exactly 1.380649×10^{-23} J/K
 Amount of substance	mole	mol	Exactly $6.02214076 \times 10^{23}$ elementary entities (Avogadro constant)
 Luminous intensity	candela	cd	Luminous intensity of a source emitting 540×10^{12} Hz radiation at 1/683 W/sr

COMMON DERIVED UNITS

QUANTITY	UNIT	SYMBOL	SI BASE UNITS	DEFINITION
 Force	newton	N	$\frac{\text{kg} \cdot \text{m}}{\text{s}^2}$	Force required to accelerate 1 kg of mass at 1 m/s^2
 Pressure	pascal	Pa	$\frac{\text{kg}}{\text{m} \cdot \text{s}^2}$	Pressure of 1 newton of force applied over 1 square meter
 Energy	joule	J	$\frac{\text{kg} \cdot \text{m}^2}{\text{s}^2}$	Energy transferred when 1 newton of force moves an object 1 meter
 Power	watt	W	$\frac{\text{kg} \cdot \text{m}^2}{\text{s}^3}$	Rate of energy transfer equal to 1 joule per second
 Electric charge	coulomb	C	$\text{A} \cdot \text{s}$	Charge transported by a constant current of 1 ampere in 1 second
 Voltage	volt	V	$\frac{\text{kg} \cdot \text{m}^2}{\text{A} \cdot \text{s}^3}$	Potential difference that moves 1 joule of energy per coulomb of charge
 Capacitance	farad	F	$\frac{\text{A}^2 \cdot \text{s}^4}{\text{kg} \cdot \text{m}^2}$	Capacitance that stores 1 coulomb of charge at 1 volt potential
 Resistance	ohm	Ω	$\frac{\text{kg} \cdot \text{m}^2}{\text{A}^2 \cdot \text{s}^3}$	Resistance that allows 1 ampere of current when 1 volt is applied
 Frequency	hertz	Hz	$\frac{1}{\text{s}}$	One complete cycle or oscillation per second