

## SI units.

<i>Quantity</i>	<i>Name of unit</i>	<i>Symbol</i>	<i>Definition</i>
<b>Basic units</b>			
Length	meter	m	
Mass	kilogram	kg	
Time	second	s	
Electric current	ampere	A	
Temperature	degree Kelvin	°K	
<b>Derived units</b>			
Force	newton	N	$\text{kg m s}^{-2}$
Pressure	pascal	Pa	$\text{N m}^{-2} = \text{kg m}^{-1} \text{s}^{-2}$
Energy	joule	J	$\text{kg m}^2 \text{s}^{-2}$
Power	watt	W	$\text{J s}^{-1} = \text{kg m}^2 \text{s}^{-3}$
Electrical potential difference	volt	V	$\text{W A}^{-1} = \text{kg m}^2 \text{s}^{-3} \text{A}^{-1}$
Electrical charge	coulomb	C	A s
Electrical resistance	ohm	$\Omega$	$\text{V A}^{-1} = \text{kg m}^2 \text{s}^{-3} \text{A}^{-2}$
Electrical capacitance	farad	F	$\text{A s V}^{-1} = \text{kg}^{-1} \text{m}^{-2} \text{s}^4 \text{A}^2$
Frequency	hertz	Hz	$\text{s}^{-1}$
Celsius temperature	degree Celsius	°C	°K – 273.15
Temperature interval	degree	deg or °	K or C need not be specified
<b>Acceptable</b>			
Volume	liter	l	$10^{-3} \text{ m}^3$
Pressure	millibar	mbar or mb	$10^2 \text{ Pa}$

## Decimal multiples of units.

<i>Multiple</i>	<i>Prefix</i>	<i>Symbol</i>
$10^{12}$	tera	T
$10^9$	giga	G
$10^6$	mega	M
$10^3$	kilo	k
$10^2$	hecto	h
10	deca	da
$10^{-1}$	deci	d
$10^{-2}$	centi	c
$10^{-3}$	milli	m
$10^{-6}$	micro	$\mu$
$10^{-9}$	nano	n
$10^{-12}$	pico	p
$10^{-15}$	femto	f
$10^{-18}$	atto	a

Some useful numerical values.

### Universal constants

Universal gas constant ( $R^*$ )	$8.3143 \times 10^3 \text{ J deg}^{-1} \text{ kmol}^{-1}$
Boltzmann's constant ( $k$ )	$1.381 \times 10^{-23} \text{ J deg}^{-1} \text{ molecule}^{-1}$
Avogadro's number ( $N_A$ )	$6.022 \times 10^{26} \text{ kmol}^{-1}$
Stefan-Boltzmann constant ( $s$ )	$5.6696 \times 10^{-8} \text{ W m}^{-2} \text{ deg}^{-4}$
Planck's constant ( $h$ )	$6.6262 \times 10^{-34} \text{ J s}$
Velocity of light ( $c^*$ )	$2.998 \times 10^8 \text{ m s}^{-1}$
Permittivity of a vacuum ( $e_0$ )	$8.85 \times 10^{-12} \text{ C}^2 \text{ N}^{-1} \text{ m}^{-2}$

### The earth

Average radius ( $R_E$ )	$6.37122 \times 10^6 \text{ m}$
Acceleration due to gravity at surface of earth ( $g_0$ )	$9.80665 \text{ m s}^{-2}$
Angular velocity of rotation ( $O$ )	$7.292 \times 10^{-5} \text{ rad s}^{-1}$
Average distance from sun to surface of earth ( $d$ )	$1.50 \times 10^{11} \text{ m}$
Solar irradiance on a perpendicular plane at distance $d$ from sun	$1.38 \times 10^3 \text{ W m}^{-2}$

### Dry air

Apparent molecular weight ( $M_d$ )	28.97
Gas constant ( $R_d$ )	$287.06 \text{ J deg}^{-1} \text{ kg}^{-1}$
Density at $0^\circ\text{C}$ and 1000 mb	$1.275 \text{ kg m}^{-3}$
Specific heat at constant pressure ( $c_p$ )	$1004 \text{ J deg}^{-1} \text{ kg}^{-1}$
Specific heat at constant volume ( $c_v$ )	$717 \text{ J deg}^{-1} \text{ kg}^{-1}$
Thermal conductivity at $0^\circ\text{C}$	$2.40 \times 10^{-2} \text{ J m}^{-1} \text{ s}^{-1} \text{ deg}^{-1}$

### Water substance

Molecular weight ( $M_w$ )	18.016
Gas constant for water vapor ( $R_v$ )	$461 \text{ J deg}^{-1} \text{ kg}^{-1}$
Density of liquid water at $0^\circ\text{C}$	$1.000 \times 10^3 \text{ kg m}^{-3}$
Density of ice at $0^\circ\text{C}$	$0.917 \times 10^3 \text{ kg m}^{-3}$
Specific heat of water vapor at constant pressure	$1952 \text{ J deg}^{-1} \text{ kg}^{-1}$
Specific heat of water vapor at constant volume	$1463 \text{ J deg}^{-1} \text{ kg}^{-1}$
Specific heat of liquid water at $0^\circ\text{C}$	$4218 \text{ J deg}^{-1} \text{ kg}^{-1}$
Specific heat of ice at $0^\circ\text{C}$	$2106 \text{ J deg}^{-1} \text{ kg}^{-1}$
Latent heat of vaporization at $0^\circ\text{C}$	$2.501 \times 10^6 \text{ J kg}^{-1}$
Latent heat of vaporization at $100^\circ\text{C}$	$2.25 \times 10^6 \text{ J kg}^{-1}$
Latent heat of fusion at $0^\circ\text{C}$	$3.34 \times 10^5 \text{ J kg}^{-1}$