

# *International System of Units (SI)*

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Multiplication factor	Prefix	Symbol
$10^{18}$	exa	E
$10^{15}$	peta	P
$10^{12}$	tera	T
$10^9$	giga	G
$10^6$	mega	M
$10^3$	kilo	k
$10^2$ *	hecto	h
$10^1$ *	deka	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

\* Prefixes of 100, 10, 0.1, and 0.01 are not formal SI units

From:  
Downs, R.J. 1988. HortScience 23:881-812.

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## Seven basic SI units

<b>Physical quantity</b>	<b>Unit</b>	<b>Symbol</b>
Length	meter	m
Mass	kilogram	kg
Time	second	s
Electrical current	ampere	A
Thermodynamic temperature	kelvin	K
Amount of substance	mole	mol
Luminous intensity	candela	cd

## Supplementary SI units

<b>Physical quantity</b>	<b>Unit</b>	<b>Symbol</b>
Plane angle	radian	rad
Solid angle	steradian	sr

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## Derived SI units with special names

<b>Physical quantity</b>	<b>Unit</b>	<b>Symbol</b>	<b>Derivation</b>
Absorbed dose	gray	Gy	$\text{J kg}^{-1}$
Capacitance	farad	F	$\text{A s V}^{-1}$
Conductance	siemens	S	$\text{A V}^{-1}$
Disintegration rate	becquerel	Bq	$\text{l s}^{-1}$
Electrical charge	coulomb	C	$\text{A s}$
<b>Electrical potential</b>	<b>volt</b>	<b>V</b>	<b><math>\text{W A}^{-1}</math></b>
<b>Energy</b>	<b>joule</b>	<b>J</b>	<b><math>\text{N m}</math></b>
<b>Force</b>	<b>newton</b>	<b>N</b>	<b><math>\text{kg m s}^{-2}</math></b>
Illumination	lux	lx	$\text{lm m}^{-2}$
Inductance	henry	H	$\text{V s A}^{-1}$
Luminous flux	lumen	lm	$\text{cd sr}$
Magnetic flux	weber	Wb	$\text{V s}$
Magnetic flux density	tesla	T	$\text{Wb m}^{-2}$
<b>Pressure</b>	<b>pascal</b>	<b>Pa</b>	<b><math>\text{N m}^{-2}</math></b>
<b>Power</b>	<b>watt</b>	<b>W</b>	<b><math>\text{J s}^{-1}</math></b>
<b>Resistance</b>	<b>ohm</b>	<b><math>\Omega</math></b>	<b><math>\text{V A}^{-1}</math></b>
<b>Volume</b>	<b>liter</b>	<b>L</b>	<b><math>\text{dm}^3</math></b>

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### Non-SI units accepted for use with SI

<b>Name</b>	<b>Symbol</b>	<b>Value</b>
Nautical mile	n m <sup>-1</sup>	1852 m
Knot	kn	1.852 km h <sup>-1</sup>
Hectare	ha	10 <sup>4</sup> m <sup>2</sup>
Millibar	mbar	10 <sup>2</sup> Pa
Curie	Ci	37 GBq
Roentgen	R	2.58 X 10 <sup>-4</sup> C kg <sup>-1</sup>
Ton	t	10 <sup>3</sup> kg

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### Units prohibited by SI rules

<b>Physical quantity</b>	<b>Unit</b>	<b>SI value</b>
Energy	calorie, gram	4.184 J
Energy	Btu	1054.35 J
Energy	erg	$10^{-7}$ J
Force	dyne	$10^{-5}$ N
Magnetic flux	maxwell	$10^{-8}$ Wb
Length	micron	1 $\mu$ m
Length	millimicron	1 nm
Length	Angstrom	0.1 nm
Luminance	stilb	$10^4$ cd m <sup>-2</sup>
Conductance	mho	1 S
Photo flux density	Einstein	1 mol

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## Basic rules of SI

Not different from the metric system ... just a selection of certain units

Multiples of a SI unit should increase or decrease by a factor of 1000

Write units in full or denoted by correct symbols

Except for Celsius, unit names are never capitalized

Prefixes and all symbols that indicate  $\leq 10^3$  are written in lower case except for proper names

Separate a numerical value and its symbol (e.g., 400 W *not* 400W)

When a numerical value is used as an adjective, use a hyphen between the value and its symbols (e.g., a 400-W lamp *not* a 400 W lamp)

# *International System of Units (SI)*

## Basic rules of SI

Symbols are not changed in the plural form

Unit names follow normal grammatical rules for plural forms; *lux*, *hertz*, and *siemens* are never changed to a plural form

Use a space between units, e.g., km h<sup>-1</sup> *not* kmh<sup>-1</sup>

Division of one unit can be expressed by a solidus or a negative index; only one solidus may be used

Only the numerator should be changed in multiples of 1000; the denominator must remain as the base value; the one exception is kg

<b>Proper</b>	<b>Improper</b>
J/s	---
J s <sup>-1</sup>	---
W m <sup>-2</sup> s <sup>-1</sup>	W/m <sup>2</sup> /s
μW m <sup>-2</sup> s <sup>-1</sup>	W mm <sup>-2</sup> s <sup>-1</sup>
kW m <sup>-2</sup> s <sup>-1</sup>	W km <sup>-2</sup> h <sup>-1</sup>
μmol m <sup>-2</sup> s <sup>-1</sup>	μmol cm <sup>-2</sup> s <sup>-1</sup>
mol m <sup>-2</sup> s <sup>-1</sup>	mol m <sup>-2</sup> h <sup>-1</sup>
μmol kg <sup>-1</sup>	---

Consult Downs, R.J. 1988. HortScience 23:881-812 for more detailed information