

# SI unit rules and style conventions

## *Checklist for reviewing manuscripts*

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#1  **GENERAL**

Only units of the SI and those units recognized for use with the SI are used to express the values of quantities. Equivalent values in other units are given in parentheses following values in acceptable units only when deemed necessary for the intended audience.

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#2  **ABBREVIATIONS**

Abbreviations such as sec, cc, or mps are avoided and only standard unit symbols, prefix symbols, unit names, and prefix names are used.

proper: s or second;  $\text{cm}^3$  or cubic centimeter; m/s or meter per second

improper: sec; cc; mps

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#3  **PLURALS**

Unit symbols are unaltered in the plural.

proper:  $l = 75 \text{ cm}$

improper:  $l = 75 \text{ cms}$

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#4  **PUNCTUATION**

Unit symbols are not followed by a period unless at the end of a sentence.

proper: The length of the bar is 75 cm.  
The bar is 75 cm long.

improper: The bar is 75 cm. long.

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#5  **MULTIPLICATION  
& DIVISION**

A space or half-high dot is used to signify the multiplication of units. A solidus (*i.e.*, slash), horizontal line, or negative exponent is used to signify the division of units. The solidus must not be repeated on the same line unless parentheses are used.

proper: The speed of sound is about  $344 \text{ m}\cdot\text{s}^{-1}$  (meters per second)  
The decay rate of  $^{113}\text{Cs}$  is about  $21 \text{ ms}^{-1}$  (reciprocal milliseconds)  
 $\text{m/s}$ ,  $\text{m}\cdot\text{s}^{-2}$ ,  $\text{m}\cdot\text{kg}/(\text{s}^3\cdot\text{A})$ ,  $\text{m}\cdot\text{kg}\cdot\text{s}^{-3}\cdot\text{A}^{-1}$   
 $\text{m/s}$ ,  $\text{m s}^{-2}$ ,  $\text{m kg}/(\text{s}^3 \text{ A})$ ,  $\text{m kg s}^{-3} \text{ A}^{-1}$

improper: The speed of sound is about  $344 \text{ ms}^{-1}$  (reciprocal milliseconds)  
The decay rate of  $^{113}\text{Cs}$  is about  $21 \text{ m}\cdot\text{s}^{-1}$  (meters per second)  
 $\text{m}\div\text{s}$ ,  $\text{m/s/s}$ ,  $\text{m}\cdot\text{kg}/\text{s}^3/\text{A}$

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#6  **TYPEFACE**

Variables and quantity symbols are in italic type. Unit symbols are in roman type. Numbers should generally be written in roman type. These rules apply irrespective of the typeface used in the surrounding text.

proper: She exclaimed, “*That dog weighs* 10 kg!”  
 $t = 3 \text{ s}$ , where  $t$  is time and s is second  
 $T = 22 \text{ K}$ , where  $T$  is thermodynamic temperature, and K is kelvin

improper: He exclaimed, “*That dog weighs 10 kg!*”  
 $t = 3 \text{ s}$ , where t is time and s is second  
 $T = 22 \text{ K}$ , where T is thermodynamic temperature, and K is kelvin

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#7  **TYPEFACE**

Superscripts and subscripts are in italic type if they represent variables, quantities, or running numbers. They are in roman type if they are descriptive.

*quantities are italic:*  $c_p$ , specific heat capacity at constant pressure

*running numbers are italic:*  $x = \bar{X} = \frac{1}{n} \sum_{i=1}^n X_i$

descriptors are roman:  $m_p$ , mass of a proton

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#8  **ABBREVIATIONS**

The combinations of letters “ppm,” “ppb,” and “ppt,” and the terms part per million, part per billion, and part per trillion, and the like, are not used to express the values of quantities.

proper: 2.0  $\mu\text{L/L}$ ;  $2.0 \times 10^{-6} V$ ;  
4.3  $\text{nm/m}$ ;  $4.3 \times 10^{-9} l$ ;  
7  $\text{ps/s}$ ;  $7 \times 10^{-12} t$ ,

where  $V$ ,  $l$ , and  $t$  are the quantity symbols for volume, length, and time.

improper: “ppm,” “ppb,” and “ppt,” and the terms part per million, part per billion, and part per trillion, and the like

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#9  **UNIT  
MODIFICATIONS**

Unit symbols (or names) are not modified by the addition of subscripts or other information. The following forms, for example, are used instead.

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#10  **PERCENT**

The symbol % is used to represent simply the number 0.01.

proper:  $l_1 = l_2(1 + 0.2 \%)$ , or  
 $D = 0.2 \%$ ,

where  $D$  is defined by the relation  $D = (l_1 - l_2)/l_2$ .

improper: The length  $l_1$  exceeds the length  $l_2$  by 0.2 %.

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#11  **INFORMATION  
& UNITS**

Information is not mixed with unit symbols or names.

proper: the water content is 20 mL/kg

improper: 20 mL  $\text{H}_2\text{O}$ / kg  
20 mL of water/ kg

#12 <input type="checkbox"/> <b>MATH NOTATION</b>	<p data-bbox="470 126 1518 1923">It is clear to which unit symbol a numerical value belongs and which mathematical operation applies to the value of a quantity.</p> <p data-bbox="682 210 1185 420">proper: 35 cm x 48 cm 1 MHz to 10 MHz or (1 to 10) MHz 20 °C to 30 °C or (20 to 30) °C 123 g ± 2 g or (123 ± 2) g 70 % ± 5 % or (70 ± 5) % 240 x (1 ± 10 %) V</p> <p data-bbox="649 462 1299 672">improper: 35 x 48 cm 1 MHz–10 MHz or 1 to 10 MHz 20 °C–30 °C or 20 to 30 °C 123 ± 2 g 70 ± 5 % 240 V ± 10 % (one cannot add 240 V and 10 %)</p>
#13 <input type="checkbox"/> <b>UNIT SYMBOLS &amp; NAMES</b>	<p data-bbox="470 735 1518 945">Unit symbols and unit names are not mixed and mathematical operations are not applied to unit names.</p> <p data-bbox="682 819 1250 861">proper: kg/m<sup>3</sup>, kg · m<sup>-3</sup>, or kilogram per cubic meter</p> <p data-bbox="649 871 1477 945">improper: kilogram/m<sup>3</sup>, kg/cubic meter, kilogram/cubic meter, kg per m<sup>3</sup>, or kilogram per meter<sup>3</sup>.</p>
#14 <input type="checkbox"/> <b>NUMERALS &amp; UNIT SYMBOLS</b>	<p data-bbox="470 1008 1518 1260">Values of quantities are expressed in acceptable units using Arabic numerals and symbols for units.</p> <p data-bbox="682 1071 1006 1134">proper: m = 5 kg the current was 15 A</p> <p data-bbox="649 1155 1071 1260">improper: m = five kilograms m = five kg the current was 15 amperes</p>
#15 <input type="checkbox"/> <b>UNIT SPACING</b>	<p data-bbox="470 1323 1518 1627">There is a space between the numerical value and unit symbol, even when the value is used in an adjectival sense, except in the case of superscript units for plane angle.</p> <p data-bbox="682 1407 1494 1543">proper: a 25 kg sphere an angle of 2° 3' 4" If the spelled-out name of a unit is used, the normal rules of English apply: "a roll of 35-millimeter film."</p> <p data-bbox="649 1554 1006 1627">improper: a 25-kg sphere an angle of 2 ° 3 ' 4 "</p>
#16 <input type="checkbox"/> <b>DIGIT SPACING</b>	<p data-bbox="470 1690 1518 1923">The digits of numerical values having more than four digits on either side of the decimal marker are separated into groups of three using a thin, fixed space counting from both the left and right of the decimal marker. Commas are not used to separate digits into groups of three.</p> <p data-bbox="682 1806 941 1848">proper: 15 739.012 53</p> <p data-bbox="649 1858 941 1923">improper: 15739.01253 15,739.012 53</p>

#17 <input type="checkbox"/> <b>QUANTITY EQUATIONS</b>	Equations between quantities are used in preference to equations between numerical values, and symbols representing numerical values are different from symbols representing the corresponding quantities. When a numerical-value equation is used, it is properly written and the corresponding quantity equation is given where possible.
	<p>proper: <math>(l/m) = 3.6^{-1} [v(\text{km/h})](t/s)</math></p> <p>improper: <math>l = 3.6^{-1} vt</math>, accompanied by text saying, “where <math>l</math> is in meters, <math>v</math> is in kilometers per second, and <math>t</math> is in seconds”</p>
#18 <input type="checkbox"/> <b>STANDARD SYMBOLS</b>	Standardized quantity symbols are used. Similarly, standardized mathematical signs and symbols are used. More specifically, the base of “log” in equations is specified when required by writing $\log_a x$ (meaning log to the base $a$ of $x$ ), $\text{lb } x$ (meaning $\log_2 x$ ), $\ln x$ (meaning $\log_e x$ ), or $\lg x$ (meaning $\log_{10} x$ ).
	<p>proper: <math>\tan x</math>  <math>R</math> for resistance  <math>A_r</math> for relative atomic mass</p> <p>improper: <math>\text{tg } x</math> for tangent of <math>x</math>  words, acronyms, or ad hoc groups of letters</p>
#19 <input type="checkbox"/> <b>WEIGHT VS. MASS</b>	When the word “weight” is used, the intended meaning is clear. (In science and technology, weight is a force, for which the SI unit is the newton; in commerce and everyday use, weight is usually a synonym for mass, for which the SI unit is the kilogram.)
#20 <input type="checkbox"/> <b>QUOTIENT QUANTITY</b>	A quotient quantity is written explicitly.
	<p>proper: mass divided by volume</p> <p>improper: mass per unit volume</p>
#21 <input type="checkbox"/> <b>OBJECT &amp; QUANTITY</b>	An object and any quantity describing the object are distinguished. (Note the difference between “surface” and “area,” “body” and “mass,” “resistor” and “resistance,” “coil” and “inductance.”)
	<p>proper: A body of mass 5 g</p> <p>improper: A mass of 5 g</p>
#22 <input type="checkbox"/> <b>OBSOLETE TERMS</b>	The obsolete terms molarity, normality, and molal are not used.
	<p>proper: amount-of-substance concentration of B (more commonly called concentration of B) and its symbol <math>c_B</math> and SI unit <math>\text{mol/m}^3</math> (or a related acceptable unit)</p> <p>molality of solute B, and its symbol <math>b_B</math> or <math>m_B</math> and SI unit <math>\text{mol/kg}</math> (or a related unit of the SI)</p> <p>improper: Molarity and the symbol <math>M</math>, normality and the symbol <math>N</math>  molal and the symbol <math>m</math></p>