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SI Unit rules and style conventions

Check List for Reviewing Manuscripts

The NIST Reference on Constants, Units, and Uncertainty

#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.

#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; cm^3 or cubic centimeter; m/s or meter per second

improper: sec; cc; mps

#3
Plurals

Unit symbols are unaltered in the plural.

proper: l = 75 cm

improper: l = 75 cms

#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.

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

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

#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. For more details, see

Typefaces for symbols in scientific manuscripts

proper: She exclaimed, "***That dog weighs*** 10 kg***!***"
t = 3 s, where t is time and s is second
T = 22 K, where T is thermodynamic temperature, and K is kelvin

improper: He exclaimed, "***That dog weighs 10 kg!***
t = 3 s, where t is time and s is second
T = 22 K, where T is thermodynamic temperature, and K is kelvin

#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.

subscript category	**typeface**	**proper usage**
quantity	*italic*	c_p, specific heat capacity at constant pressure
descriptive	roman	m_{p}, mass of a proton
running number	*italic*	$x = \bar{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$

#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 µL/L; 2.0 x 10^{-6} V;
4.3 nm/m; 4.3 x 10^{-9} l;
7 ps/s; 7 x 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

#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.

proper: V_{max} = 1000 V
a mass fraction of 10 %

improper: V= 1000 $\mathrm{V}_{\mathrm{max}}$
10 % (m/m) or 10 % (by weight)

#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 %

#11 ☐ **Information & units**

Information is not mixed with unit symbols or names.

proper: the water content is 20 mL/kg

improper: 20 mL H_2O/ kg
20 mL of water/ kg

#12 ☐ **Math notation**

It is clear to which unit symbol a numerical value belongs and which mathematical operation applies to the value of a quantity.

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

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 %)

#13 ☐ **Unit symbols & names**

Unit symbols and unit names are not mixed and mathematical operations are not applied to unit names.

proper: kg/m^3, kg · m^{-3}, or kilogram per cubic meter

improper: kilogram/m^3, kg/cubic meter, kilogram/cubic meter, kg per m^3, or kilogram per meter^3.

#14 ☐ **Numerals & unit symbols**

Values of quantities are expressed in acceptable units using Arabic numerals and symbols for units.

proper: m = 5 kg
the current was 15 A

improper: m = five kilograms
m = five kg
the current was 15 amperes

#15 ☐ **Unit spacing**

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.

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."

improper: a 25-kg sphere
an angle of 2 ° 3 ’ 4 ″

#16
Digit spacing

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.

proper: 15 739.012 53

improper: 15739.01253
15,739.012 53

#17
Quantity equations

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.

proper: $(l/\mathrm{m}) = 3.6^{-1}\ [v/(\mathrm{km/h})](t/\mathrm{s})$

improper: $l = 3.6^{-1}\ vt$, accompanied by text saying,
"where *l* is in meters, *v* is in kilometers per second, and *t* is in seconds"

#18
Standard symbols

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*), lb *x* (meaning $\log_2 x$), ln *x* (meaning $\log_e x$), or lg *x* (meaning $\log_{10} x$).

proper: tan *x*
R for resistance
A_r for relative atomic mass

improper: tg *x* for tangent of *x*
words, acronyms, or ad hoc groups of letters

#19
Weight vs. mass

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
Quotient quantity

A quotient quantity is written explicitly.

proper: mass divided by volume

improper: mass per unit volume

#21
Object & quantity

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.")

proper: A body of mass 5 g

improper: A mass of 5 g

#22
Obsolete Terms

The obsolete terms normality, molarity, and molal and their symbols N, M, and m are not used.

proper: amount-of-substance concentration of B (more commonly called concentration of B), and its symbol c_B and SI unit mol/m^3 (or a related acceptable unit)
molality of solute B, and its symbol b_B or m_B and SI unit mol/kg (or a related unit of the SI)

improper: normality and the symbol N, molarity and the symbol M
molal and the symbol m

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