

TEN GUIDELINES FOR STANDARDS ENGINEERS

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Introduction

Standards documents should be well written and correct editorially as well as technically. Care must be exercised to avoid errors in grammar, spelling, syntax, abbreviations, symbols, and format.

This abbreviated set of guidelines is offered for the benefit of those involved in preparing and publishing technical documents in general and standards documents in particular. Obviously this brief outline can be neither comprehensive nor rigorous but should help the user recognize and avoid many of the more frequently encountered types of editorial errors. For greater detail, consult documents such as JM-7, *Style Manual for Standards and Other Publications of JEDEC*; IEEE/ASTM SI 10, *Standard for Use of the International System of Units (SI): The Modern Metric System*; *The Gregg Reference Manual* (Glencoe); and Fowler's *Modern English Usage* (Oxford).

Basic guidelines

1. Leave a space between a number and its units.

Examples 25 °C; 11 K; 35 mm; 120 V; 3 dB; 500 Ω; 512 Mb; 128 MB; 100 pF; 250 GHz.

Exceptions Angles, e.g., 48°38'30"; feet and inches, e.g., 6' 2".

Note When used as compound adjectives, terms are hyphenated, e.g., a 10-s interval, a 50 000-Ω resistor; a 500-kHz bandwidth; a 256-Mb SRAM.

2. Do not separate multiple symbols that represent a single unit or omit any part of the symbol.

Examples 760 mmHg (not 760 mm Hg or 760 mm); 100 °C (not 100° C, 100°C, 100 C, 100C, 100 °, 100°, 100 Celsius, or 100 deg, although 100 deg C may be written if the ° symbol is unavailable).

3. Do not alter abbreviations or unit symbols.

Technical abbreviations are not followed by a period (in the USA) or pluralized. Quantity symbols (like *I* for current) may be modified, but unit symbols (like A for amperes) may not.

Examples rms; ADC; ESD; 30 h (not 30 hr or 30 hrs); 5 cm (not 5 cm.); $V_{dc} = 32 V$ (not $V = 32 V_{dc}$).

4. When unit names are spelled out, use the singular when the quantity is one or less.

Examples 1.76 inches, but 0.76 inch (not 0.76 inches); 0.8 volt (not 0.8 volts); 0.75 newton; 0.01 watt.

Note All decimal numbers lower than 1.0 should be preceded by a zero.

5. Use only standard abbreviations and symbols

Examples ac, dc (not AC or a.c., DC or d.c.); s (not sec); ms (not msec or millisecc); h (not hr); Hz (not cps, cycles/s, or c/s); MHz (not mc/s, mc, megacycles, or megacycles per sec); °C (not C); K (not °K); A (not amp or amps); mA (not ma, milliamps, or mils); MΩ (not megΩ, M-ohms, or megs); pF (not pf,

$\mu\mu\text{f}$, $\mu\mu\text{F}$, or puffs); μm (not μ or microns); cm^3 (not cc); g (not gm); kg (not kgm or Kg); Pa (in preference to mmHg, torrs, or millibars); Mb (not Mbit); MB (not Mbyte); kb/s (not kbps).

Note 1 Lowercase abbreviations, but not lowercase unit symbols, may be capitalized if the context demands it; e.g., ALL AC POWER SUPPLIES MUST BE LESS THAN 80 mm HIGH. DC bias voltages may not exceed 100 mV.

Note 2 Ambiguity arises in the use of symbols relating to storage devices. The symbol GB, e.g., represents a gigabyte, which, for most purposes, equals 1 000 000 000 bytes. But for storage devices, 1 GB = 1 073 741 824 (2 to the 30th) bytes. Similarly, the symbol MB represents a megabyte, which, for most purposes, equals 1 000 000 bytes. But for storage devices, 1 MB = 1 048 576 (2 to the 20th) bytes. This ambiguity diminishes in the case of the kilobyte, whose symbol can be either kB or KB, since 1 kB always equals 1 000 bytes, and 1 KB always equals 1 024 (2 to the 10th) bytes. The same comments apply to bits (Gb, Mb, kb, and Kb).

Note 3 As illustrated above, spaces are the preferred mode for setting off groups of three digits in a large number (counting in either direction from the decimal point).

6. Do not misuse words or abbreviations.

Examples Write *a criterion* (not *a criteria*); *the criteria are* (not *the criteria is*); *a phenomenon* (not *a phenomena*); *an MOS transistor* (not *a MOS transistor*); *an LSI device* (not *a LSI device*); use *i.e.*, only to mean *that is*; use *e.g.*, to mean *for example*; *unique* (never *more unique*); *optimum* (not *more optimum*); *the principal factors* (not *the principle factors*); *worst case* (not *worse case*); *an alternative method* (not *an alternate method*); *ensure* (not *insure*); *It led the list* (not *It lead the list*); *the book's Foreword* (not *the book's Forward*); *cont, cont., or cont'd* (not *con't*); *fewer than 20 rejects* (not *less than 20 rejects*); *The United States comprises* (not *is comprised of*) *50 states*; *the predominant mode* (not *the predominate mode*); *a contaminant* (not *a contaminate*); *etc.* (not *and etc.*); *an effect* (not *an affect*); *its properties* (not *it's properties*) *were affected* (not *effected*); *regardless* (not *irregardless*); *the switch is actuated* (not *activated*). Ratio vs quotient: A ratio is a *dimensionless* quotient, e.g., 2/3 or 3/2; quantities like *mV/°C*, *m/s*, and *W/(cm·°C)* are also *quotients* but, having dimensions, are not *ratios*. The plural of *die* is *dice* or *dies*, but *die* has been so commonly *misused* in the industry as the plural form that it has now found *de facto* acceptance.

7. Distinguish between “which” and “that”.

The word “that” is used to introduce a *restrictive* clause, i.e., one that is required to limit the noun it modifies. (Most definitions therefore include the word “that” rather than “which”.)

Example The version of the device that is in a surface-mounted package allows increased component density.

The word “which” is used to introduce a *nondefining* or *descriptive* clause, i.e., one that only adds further information about a subject already identified.

Example The new version of the device, which is in a surface-mounted package, allows increased component density.

Note As used in the above sense, “which” is always preceded by a comma; “that” is not preceded by a comma unless it is separated from its antecedent by intermediate words or symbols.

8. Do not hyphenate words containing prefixes or suffixes

Examples *subclause, subcommittee, cochairperson, electromechanical, microelectronic, nonrepetitive, nonlinear, nonvolatile, nonhermetic, antistatic, bidirectional, interrelated, piezoelectric, preconditioned, pretest, retest.* (Compound nouns, whether hyphenated, like *trade-off, tie-in, and follow-up*, or not, like *breakdown, layout, and setup*, are generally written as two unhyphenated words when used as verbs.)

Exceptions Hyphens may be used if necessary to avoid ambiguity, e.g., *un-ionized, re-sign, re-formed.*

9. Avoid spelling errors.

The following list of words, while far from complete, contains many of the more frequently encountered misspellings in technical publications:

<i>accommodate</i>	<i>acknowledgment</i>	<i>affect (verb)</i>	<i>algorithm</i>	<i>aperture</i>
<i>asymmetric</i>	<i>asymptotic</i>	<i>auxiliary</i>	<i>boundary</i>	<i>canceled</i>
<i>cancellation</i>	<i>category</i>	<i>commitment</i>	<i>comparison</i>	<i>compatible</i>
<i>complementary</i>	<i>concomitant</i>	<i>consistent</i>	<i>consensus</i>	<i>contaminant (noun)</i>
<i>dependent</i>	<i>desiccator</i>	<i>deterrent</i>	<i>develop</i>	<i>discrete</i>
<i>dissipate</i>	<i>effect (noun)</i>	<i>ensure</i>	<i>excellent</i>	<i>existence</i>
<i>flexible</i>	<i>fluorescent</i>	<i>fusible</i>	<i>focused</i>	<i>homogeneous</i>
<i>hydrofluoric</i>	<i>hysteresis</i>	<i>impedance</i>	<i>incompatible</i>	<i>independent</i>
<i>its (possessive)</i>	<i>it's (it is)</i>	<i>judgment</i>	<i>labeled</i>	<i>liaison</i>
<i>metallurgy</i>	<i>miniature</i>	<i>navigate</i>	<i>noticeable</i>	<i>occurred</i>
<i>occurrence</i>	<i>occurring</i>	<i>optimize</i>	<i>oriented</i>	<i>peripheral</i>
<i>personnel</i>	<i>phosphorus (noun)</i>	<i>precede</i>	<i>predominant</i>	<i>preferred</i>
<i>principal (adj)</i>	<i>privilege</i>	<i>proceed</i>	<i>procedure</i>	<i>producible</i>
<i>proprietary</i>	<i>questionnaire</i>	<i>receive</i>	<i>recurred</i>	<i>recurrence</i>
<i>recurring</i>	<i>referred</i>	<i>regardless</i>	<i>reproducible</i>	<i>rescind</i>
<i>rescission</i>	<i>separate</i>	<i>signaled</i>	<i>signaling</i>	<i>specimen</i>
<i>supersede</i>	<i>susceptible</i>	<i>transferred</i>	<i>vertical</i>	<i>vacuum</i>

10. Maintain appropriate precision when converting from one system of units to another.

In converting one system of units into another, take care to retain the original degree of precision, which should be neither sacrificed nor exaggerated. As a rule of thumb, maintain approximately the same number of significant figures in the conversion as in the original number.

Example 1 Convert 2.7 inches to 69 mm, 2.70 inches to 68.6 mm, and 2.700 inches to 68.58 mm.

Example 2 A box is 0.98 in x 1.30 in x 1.88 in, with ± 0.02 -inch tolerance on each dimension. To convert to mm, first convert the tolerance (0.02 in) to 0.5 mm (not 0.508 mm or 0.51 mm). Then the dimensions become 24.9 mm (not 24.892 mm), 33.0 mm (not 33.020 mm), and 47.8 mm (not 47.752 mm), ± 0.5 mm.

Example 3 The pallets will support 600 lb–1100 lb. Convert these figures to 270 kg–500 kg (not to 272.2 kg–499.1 kg, or to 272 kg–499 kg). While all of the numbers within the parentheses are more accurate conversions than 270 and 500, they should not be used because they are unduly precise.

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