

# International System of Units (SI) Check-List

J Bruce Prior [n7rr@hotmail.com](mailto:n7rr@hotmail.com)

The International System of Units, also called SI, is honored mostly in the breach. Most people who try to use SI do so incorrectly. For more detail, you may wish to download the PDF document NIST Special Publication 811, 2008 Edition, by Ambler Thompson and Barry N. Taylor: *Guide for the Use of the International System of Units (SI)* <http://physics.nist.gov/cuu/pdf/sp811.pdf>. Here is a simple check-list to help you to avoid revealing yourself as SI-challenged:

1. Except for **degrees Celsius**, SI **units** like **microfarads** and **millivolts** are **always** written in lower case and are almost always pluralized. (See #4 below for exceptions to the usual pluralizing standard.) Because of their phonetics, some SI units like **megahertz** are written the same in singular and plural.

2. SI **symbols** like **kHz** and **μV** are written in lower case or UPPER CASE Latin or Greek characters or in combinations of both. SI symbols are the most universal parts of SI, and are **never pluralized**. Be careful with UPPER and lower case: UPPER CASE **M** is the SI symbol for the **mega-** prefix; lower case **m** is the symbol for **meters** or **metres** as well as the **milli-** prefix; lower case Greek **μ** is the symbol for the **micro-** prefix. With the advent of computer word processors, using **u** as a substitute for **μ** is an obsolete practice. UPPER CASE **K** is the SI symbol for thermodynamic temperature in **kelvins** and lower case **k** is the SI symbol for the **kilo-** prefix. One should not be used in place of the other.

3. With three exceptions, SI **values** and SI **symbols** are **always separated with spaces** and **never with anything else**. Those exceptions are the symbols for angular degrees, minutes and seconds. **The 100 m dash** and **a 10 A fuse** are correct expressions. It is also correct to write: **The summit of Mount Hood in Oregon is located at N 45°22'24.6" W 121°41'45.6"**.

4. When used in an adjectival sense in English, SI **values** and spelled-out SI **units** are separated with hyphens and are not pluralized: **the 100-meter dash** and **a 10-ampere fuse** are correct expressions. When accompanying values of exactly 1 or -1, SI units are not pluralized.

5. Abbreviations do not exist in SI. Instead of abbreviations like **amps** and **secs**, use SI **symbols** like **A** and **s** or fully spelled-out SI **units** like **amperes** and **seconds**. Note that the **symbol** for the time unit **minutes** is **min**, which is not an abbreviation, and therefore not pluralized and not followed by a period.

6. Except at the end of a sentence, an SI **symbol** is never followed by a dot or period. To avoid confusion, try not to end sentences with SI symbols if possible.

7. Fractional SI values are decimalized and preceded with a zero or other integers: **0.529 μm** or **0.529 micrometers**.

8. Since either a dot or a comma may be used in SI as a decimal marker, **the comma should never be used as a separator for long integers or long fractions**. Segment values with five digits or more utilizing spaces or half spaces. Using a word-processor, create a half space by changing the font size of a regular space to about half the value of the rest of the text. The speed of light, whose symbol is italic *c*, is **299 792 458 m/s** or **299 792.458 km/s** or **299.792 458 Mm/s** when written in SI. The speed of light may also be written as **299 792,458 km/s** or **299,792 458 Mm/s** without any change in meaning.

9. SI **symbols** should never include suffixes. Instead of **115 VAC**, write **AC 115 V** or **115 volts alternating current** in correct SI. The purpose of the International System of Units is to communicate quantitative information clearly across languages and cultures and professional disciplines.

10. Avoid orphaned values. Instead of **9-15 volts** or **9-15 V**, write **9 volts to 15 volts** or **9 V to 15 V** in correct SI.

11. SI dates are rendered with numerals in descending order. The origin of what became the International System of Units began in Paris on **1875-05-20** with an international treaty. SI time is reckoned in the 24-hour system, often with the time zone specified: **1445 UTC** or **0657 EST**.

12. SI standards have changed over time. Avoid obsolete expressions like **degrees kelvin**, **mhos**, **cubic centimeters**, **microns**, **parts per million (ppm)**, **parts per billion (ppb)**, etc. and multiple prefixes like **μμ** or **micromicro-**.