Measurement units style guide

A writer's guide to the correct usage of metric measurement units

This guidance is based on British and internationally agreed standards and represents best practice. It gives advice on how to use and write metric units, mistakes to avoid, what to do about conversions, and where to find further information. A brief explanation of how the metric system works is also given.

Some common units

	name	symbol
length	millimetre	mm
	centimetre	cm
	metre	m
	kilometre	km
mass (weight)	milligram	mg
	gram	g
	kilogram	kg
	tonne	t
area	square metre	m^2
	hectare	ha
	square kilometre	km^2
volume	millilitre	mL or ml
	cubic centimetre	cm^3
	litre	L or l
	cubic metre	m^3
power	watt	W
	kilowatt	kW
	megawatt	MW
speed (velocity)	metres per second	m/s
	kilometres per hour	km/h
energy	joule	J
	kilowatt-hour	kWh
electrical units	ampere	A
	volt	V
temperature	degree Celsius	°C
pressure	pascal	Pa
	bar	bar

Basic rules

Capitals and lower case

- **Names** of metric units, whether alone or combined with a prefix, always start with a lower case letter (except at the beginning of a sentence) - e.g. metre, milligram, watt.
- The **symbols** for metric units are also written in lower case - except those that are named after persons - e.g. m for metre, but W for watt (the unit of power, named after the Scottish engineer, James Watt). Note that this rule applies even when the prefix symbol is in lower case, as in kW for kilowatt. The symbol for litre (L) is an exception.
- Symbols for **prefixes** meaning a million or more are written in capitals, and those meaning a thousand or less are written in lower case - thus, mL for millilitre, kW for kilowatt, MJ for megajoule (the unit of energy).

Plurals

- Symbols do not change and are **never pluralised**: 25 kg (but 25 kilograms)

Punctuation and spacing

- Do not put a full stop (period) after a unit symbol (except at the end of a sentence).
- Where there is room, leave a (non-breaking) **space** between the number and the unit - e.g. 25 kg, 100 m, 37 ºC.

Other points

- Symbols should always be written in roman (regular upright) font and **never italicised** - even within surrounding italic text. (This is to avoid confusion with scientific symbols such as "*m*" meaning "mass" or "*V*" meaning volume).
- The symbol for "per" (meaning "divided by") is "/" (slash). Thus the symbol for "kilometres per hour" is "km/h" (as on car speedometers). Similarly, unit prices are shown as £6.99/kg.

How the metric system works

It is easy to use and write metric units correctly if you know how the system works. It is simple and logical and consists of **units** and **prefixes**.

Units measure a unique physical property such as length, mass or time. The most common units used in non-scientific writing are listed on the front page.

A **prefix** is a way of multiplying or dividing the unit by 10, 100, or 1000 etc. For example, the prefix "kilo-" means "1000". So kilometre means 1000 metres, and a kilogram is 1000 grams.

Similarly, the prefix "milli" means "divided by one thousand". So millilitre means 0.001 (one thousandth or 1/1000) of a litre, and a milligram is 0.001 (one thousandth or 1/1000) of a gram. The most common prefixes in general use are listed below.

Most common prefixes

Symbol	Name	Value
T	tera	x 1 000 000 000 000
G	giga	x 1 000 000 000
M	mega	x 1 000 000
k	kilo	x 1000
h	hecto	x 100
da	deca	x 10
	(no prefix)	x 1
d	deci	x 0.1
c	centi	x 0.01
m	milli	x 0.001
µ	micro	x 0.000 001
n	nano	x 0.000 000 001

Combining prefixes and units

Names

The prefix name and the unit name are combined to form a single word

milli	+	litre	gives	millilitre	(a thousandth of a litre)
kilo	+	metre	gives	kilometre	(a thousand metres)
mega	+	watt	gives	megawatt	(a million watts)

Symbols

Similarly the prefix symbol and the unit symbol are combined to form a single symbol

m + L	gives	mL	(millilitre)
k + m	gives	km	(kilometre)
M + W	gives	MW	(megawatt)

NB - The case of both the prefix symbol and the unit symbol remain unchanged when they are combined.

Which units to use?

Because of the flexibility of the metric system there is a choice of possible units to describe something - e.g. the width of a kitchen unit could be given as 500 mm, or 50 cm, or 0.5 m. The following advice is offered:

- Avoid unnecessarily large numbers or trailing zeroes - e.g. write 4 m rather than 4000 mm. For clothes sizes, prefer 95 cm to 950 mm.
- Use whole numbers and avoid decimal points if possible - e.g. write 25 mm rather than 2.5 cm.

Symbols and abbreviations

Symbols are **not the same** as abbreviations.

Symbols such as %, $ and © are universally understood because they are independent of language. Abbreviations like KPH, cc, mgw and sqm are language-dependent and possibly ambiguous – even in English.

Standard symbols (as listed on the front page) should be used in preference to invented abbreviations.

Reserve the symbol m to mean "metres" - hence, avoid using the abbreviation "m" to denote "miles" or "millions" (especially where ambiguity is possible - e.g. on road signs)

General advice and recommendations

This guidance is based on British and internationally agreed standards and represents best practice. The recommendations should be followed where possible. However, there may be situations where they are not appropriate - for example, when writing about motoring in a UK context. Writers therefore need to assess their target audience (taking into account their age range, educational level, nationality etc) and decide whether any of these recommendations can be disregarded in the particular case.

Conversions

Conversions between metric and non-metric units are best avoided if possible as they interrupt the free flow of the sentence and distract attention. Where they are unavoidable - for example, if quoting from original material, or if the target audience is unlikely to be familiar with the source units - the following principles should be followed:

- In ordinary prose provide the conversion (in brackets) at first mention only. **Do not convert every occurrence throughout the text**.
- **Avoid spurious precision** – that is, do not make the converted figure more precise than the original – e.g. 20 000 feet converts to 6000 m (or 6 km) – not 6096 m.

Temperature

The Celsius temperature scale is now so widely used and understood that it is unnecessary (except for American audiences) to give conversions to Fahrenheit. Readers can be expected to assume that any reference to "degrees" means "degrees Celsius", and it is therefore unnecessary to add the word "Celsius". [Note that the term "centigrade" is obsolete and has been replaced by "Celsius"].

Beware of trying to convert differences in temperature by reading from tables of absolute values, as these will give the wrong answer! (e.g. a difference of 10 ºC is 18 ºF - not 50 ºF).

Useful symbols

Some measurement symbols do not have their own keys. On Windows PCs and laptops, to obtain the desired symbol

1. Press ALT (keep it pressed)
2. On the keyboard's number keypad, type the symbol's 4-digit code (listed below)
3. Release the ALT key

name	symbol	code
degree	°	0176
squared	²	0178
cubed	³	0179
micro	µ	0181
non-breaking space		0160

Avoid mixing metric and imperial units in the same text

There are good reasons for avoiding mixing metric and imperial in the same text.

- Incompatible units make it more difficult to relate information - e.g where distances are given in metres and areas in acres.
- The intrusion of imperial units undermines the integrity of the metric system, in which all units are related in a consistent way.

However, in certain contexts, where imperial units are well established (e.g. miles on UK road signs), it may sometimes be necessary to accept some mixing – e.g. "as visibility was down to 100 metres, the speed limit was reduced to 40 MPH." In such a case it may be helpful to give a conversion in kilometres per hour (km/h) (or metres per second (m/s)).

Energy

The joule (J) should be preferred to the "calorie" since the former is directly related to other metric units (e.g. a watt is a joule per second), whereas the value of a "calorie" depends experimentally on heating water and is not part of the international system (SI). However, "calories" are so widespread in popular usage that it would be unrealistic to ignore them. Possible strategies are:

- use joules as the primary measure but give the "calorie" equivalent in brackets - preferably at first mention only; or
- provide a conversion factor (or table)

"Calories" should not be used as a synonym for "energy". Thus instead of "calorie intake" write "energy intake."

More on punctuation

To avoid possible confusion it is best to avoid using the comma as either the thousands separator or the decimal marker.

Use a (non-breaking) space as the **thousands separator** - e.g. 25 000 (but this may be omitted if there are only 4 digits - e.g. 5000).

The **decimal marker** should be a full stop (period or dot) on the line.

Some common mistakes

Mistakes often occur because of a misunderstanding of the rules [see “Basic rules” on the front page]. These are some of the more common mistakes.

- Using invented abbreviations instead of correct international symbols
- Using a wrong symbol
- Pluralising symbols
- Writing symbols in italics
- Getting the case wrong - i.e. capitals instead of lower case (or vice versa)
- Omitting the oblique stroke (forward slash) in quoting prices
- Omitting the space between number and symbol (but this rule can be relaxed where there is insufficient room)

Here are some examples of such mistakes.

Mistake	Why is it incorrect?	Correct version
The temperature was 25C ✘	C is the symbol for coulomb (a unit of electrical charge). Should use correct symbol. Also no space between number and symbol.	The temperature was 25 °C ✓
The speed limit is 50KPH ✘	Non-standard abbreviation (language dependent). Should use international symbol and leave space after number.	The speed limit is 50 km/h ✓
Cathedral 2Kms ✘	Symbol should be lower case and not pluralised. Should leave space between number and symbol.	Cathedral 2 km ✓
Price 90p kilo ✘	“kilo” is a prefix meaning “1000”. Should use correct symbol “kg” and insert “/” to indicate “per”.	Price 90p/kg ✓
Contents 5 LTRS ✘	LTRS is a clumsy, invented abbreviation. Should use symbol L (not pluralised).	Contents 5 L ✓
3kw heater ✘	Symbol for “watt” is always upper case (capital) - even when combined with a prefix. Also there should be a space between number and symbol.	3 kW heater ✓
Printed on 90gsm paper ✘	Non-standard invented abbreviation. Should use correct symbol g/m^2. Also there should be a space between number and symbol.	Printed on 90 g/m^2 paper ✓

Further information on the metric system and how to write it can be obtained from the following websites:

- International Bureau of Weights and Measures (BIPM) bipm.org/en/home/
- National Institute of Standards and Technology (NIST) (an agency of the US Department of Commerce) nist.gov/pml/wmd/metric/metric-program.cfm
- UK Metric Association (UKMA) ukma.org.uk
- Think metric! thinkmetric.org.uk/

See also BS ISO 80000-1:2009
obtainable from the British Standards Institution at bsigroup.co.uk/