



# TYPESSETTING FOR TECHNICAL WRITING

Uwe R. Zimmer

*It is assumed that you are familiar with structuring and writing a technical / scientific report. This document is about the delivery of your excellent text – not the writing of it. If you look for support in technical / scientific writing itself, then check out the offerings from the Academic Skills and Learning Centre<sup>1</sup> at the ANU. A nice and short introduction to scientific writing is for instance the Scientific Writing Booklet<sup>2</sup> by Marc E. Tischler from the Department of Biochemistry and Molecular Biophysics at the University of Arizona.*

## Purpose

Good typesetting is the technical skill which enables your reader to take in your material smooth, fast, and efficient. Bad typesetting is the technical skill which slows down your reader and makes him dizzy after a few pages and wishing he would be doing something else right now.

## Fonts

Technical documents are dominantly set in serif-fonts. Popular choices are Palatino, Sabon, Minion, Caslon, Cambria and Garamond (or fonts which are related to those). Among the sans-serif fonts, Helvetica and Calibri are frequently used. One way to choose your font is here<sup>3</sup>.

Mixing of fonts is possible, and frequently fonts for headlines are chosen to be different from body fonts for better optical separation in contemporary documents. More than two fonts in the same document is rare. Older documents will mostly be set in a single base font.

## Font formats

Fonts formats which are based on cubic Bézier curves (PostScript, OpenType) should be always preferred over font formats which have been optimised for fast screen rendering only (like TrueType). Given the computing power on an average desktop in the last ten years, there is also no technical need for screen render font formats any more. TrueType versions of the fonts Arial and Time-New-Roman should specifically be avoided (superior replacements are also provided on the systems where those fonts were considered standard for a while). Historic versions of Computer-Modern should also be avoided.

## Font sizes

Most technical documents are set in size 10 or 11 points.

## Font spacing

Metric based or optical kerning should always be activated. Automatic ligatures should be activated where available (not all fonts will come with ligatures).

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1 <https://academicskills.anu.edu.au/>

2 <http://cbc.arizona.edu/sites/default/files/marc/Sci-Writing.pdf>

3 [http://inspirationlab.files.wordpress.com/2010/04/infographiclarge\\_v2.png](http://inspirationlab.files.wordpress.com/2010/04/infographiclarge_v2.png)

## Font styles

Fonts come in a number of varieties (font faces) which include different weights (“Light”, “Roman”, “Bold”, etc.) and other variations (“Italics” for instance). Underline is not a typographically used font face (besides required by syntactical constraints). Underline has been used with early mechanical typewriters as the font or font face could not be changed and the only way to emphasize something was to backspace and type underscores. The style “underline” is not used outside of this specific niche as any other system has much neater ways to distinguish elements (size, weight, variations). Headlines and other elements which need to be distinguished are either selected from a different font or by adding a little in size or weight (or both). If you use a variety of faces (Bold, Italics, etc.) inside your body text, make sure you use them always with the same meaning. For instance use Italics to *emphasize* something or as a way to indicate foreign or technical terms, but not all of it at once.

## Word spacing

This is mostly done automatically by your paragraph alignment system, yet pay attention to accidental “double spaces” in your text as well as the spacing between numbers and units.

The spaces between numbers and units are “thin spaces” or “l-spaces”, which means that they optically stay closer – especially when a paragraph is justified. This looks like: 1 kg as opposed to the wrong formats: 1kg or 1 kg. The only exception to this rule is in case of percentages, which are attached without space, as in: 5%.

## Paragraph alignment

Paragraphs are either left aligned or justified. To avoid ugly line or word stretching in justified text, automatic hyphenation should be activated.

## Paragraph spacing

Line spacing inside paragraphs is commonly about 1.2 times the font size. So in a 10 point body font document the line spacing (“leading”) is usually set to 12 point. Paragraphs also need to be distinguishable. This is done by either adding a little extra space between paragraphs (2-3 extra points are sufficient) or by indenting the first line by a few centimetres. The first line after a headline is never indented though. Empty lines are never used to space paragraphs – those are again methods stemming from mechanical typewriters and are obsolete.

## Headline spacing

Headlines are placed closer to the text which they are preceding, yet there is still space between the headline and the following text.

## Keep things together and pages aligned

As some parts of your text will have a connection, attempt to keep them optically together. Avoid for instance to have a headline as the last line on a page or column. While headlines are set to have space above them, this does not apply if the headline is the first line on a page or in a column (most systems will do this automatically).

## Column justification and balancing

Over a multi-page document and especially if you format for left and right pages it is common to justify columns vertically (such that the upper and the lower edge of the columns are identical over multiple pages). This is not universally followed and many technical documents have varying lower edges. Although vertical column justification is very common in multi-column documents as differing lower edges would be much more obvious there. Especially on the last page of a multi-column document the columns will need to be balanced.

## Graphs and diagrams

All graphs and diagrams need to be embedded in vector formats (i.e. not as a “bitmap” or “picture”), besides when required by the nature of the diagram (screen-shots, photos, historic scans and alike). Graph axis need to be complete and a legend be provided where necessary. References to graphs and diagrams are always set in uppercase: Figure 1.

## Tables

Specific attention need to be paid to number formats and units in tables (see below). Tables are commonly set without any lines or shades, which are only added where optical separation does not clearly communicate the structure. Long lines which might be hard to follow in a wide table are often marked by alternating shadings. Lines might be required in a dense table with narrow columns or to separate a header line from the body lines of a table. Outside lines or boxes around a table are hardly every used. Frequently none or only a small number of lines are necessary to communicate the structure of a table. References to tables are always set in uppercase: Table 1.

## Colour

Colour should be used sparsely and only as a means to emphasis or separate things. Too many colours means everything – and thus nothing – is emphasised, and the only effect is that it looks chaotic.

## References

Cross-referencing inside documents and to outside sources is usually an essential part of a technical / scientific document. Make sure your systems support your cross-referencing to keep numbers and formats consistent. References to figures for instance will most likely change while you write your document, so make sure you use your cross-reference tools rather than typing in a number. Making the prefix (e.g. “Figure”) part of your cross-reference also ensures consistency.

## Numbers, units and equations

We already said above in the word spacing section that numbers and units are separated by a “thin space”. It is also essential to format the numbers and units themselves correctly. General rule with numeric literals is to provide the exact number of digits which are supported by your measurements and not the number of digits which are used in the representation of the number in your computer. Writing 2.000000000 will only make sense if this number has actually been determined or measured up to a  $10^{-9}$  precision, otherwise this is wrong.

SI-units (Le Système international d’unités) are to be used by default in technical / scientific papers, while specific communities will prefer units which are common to their fields. Flight-levels for instance are commonly referred to in feet rather than metres.

Dimension prefixes are lowercase for kilo and smaller (k-, m-, n-, p-, f-, ... for: kilo, milli, nano, pico, femto, ...) and uppercase for mega and larger (M-, G-, T-, ... for mega, giga, terra, ...). Computer science has an exception from this rule which is to write a capital K for kilobyte, indicating that 1 Kbyte is usually referring to  $2^{10}$  bytes instead of  $10^3$  bytes.

Units as well as numerical literals are written with a roman typeface (meaning upright and not italics), while identifiers are usually set in italics, which makes  $x$  kg as well as 10 kg consistent expressions. Identifiers in equations are often Greek letters which consequently would also be set in italics, yet many textbooks will present the Greek letter identifiers in upright, roman form simply because the early mathematical Greek fonts did not have an italics font-face on many systems.