

Compulsory conventions

Authors are requested to comply with agreed rules and conventions laid down in VIM3, GUM, IUPAC Green Book (see "Conventions on Scientific Presentation" of the section **Preparing a manuscript**). The following examples shall highlight some conventions which seem to be disregarded easily in the daily laboratory routine.

Basic Concepts

- 1 the **measurand** should be stated,
e.g., "mass fraction of Pb in waste water" - **not** "determination of Pb"
- 2 **measurement uncertainty** of a measurement result x should be clearly evaluated (see GUM:1995; Richter W (2008) Accred Qual Assur 13:113)
standard uncertainty u
relative standard uncertainty u/x
expanded uncertainty U with a coverage factor $k > 1$
relative expanded uncertainty U/x with a coverage factor $k > 1$
- 3 the metrological **traceability** of the results to generally accepted references, such as Certified Reference Materials (CRM), should be outlined.

Quantities and Units

- 4 **single letters** of the Latin or Greek alphabet are employed as symbols for quantities, these letters are printed in italic (sloping) type
e.g., m for mass, γ for mass concentration
- 5 symbols of **units** are written using Roman (upright) font, e.g., kg, mol/L
- 6 **Units** must not be mixed with other symbols, names or information,
e.g., "The water content is 20 mL/kg" - **not** "... 20 mL H₂O /kg"
- 7 various quantities can be used to describe the chemical composition of a sample; the used one must clearly be identified, e.g.,
mass concentration (mass per volume, recommended symbol γ),
mass fraction (mass per mass, recommended symbol w),
amount-of-substance fraction (recommended symbol x),
(see Tutorials: Richter W (2007) Accred Qual Assur 12:497-498;
Dybkaer R (2007) Accred Qual Assur 12:661-662)
- 8 please note:
 - the use of wt-%, % (v/v), vol-%, ppbv, M, M, mM, N, N, mN, "atomic weight", "molecular weight", etc. is **obsolete**;
 - abbreviations such as ppm, ppb, ppt are not to be used to substitute notations like nL/L.

Equations

- 9 in equations **single-letter symbols** should exclusively be used,
no abbreviations (such as CV, SD, RSD, LOD) and
certainly not words (e.g., concentration = mass of residuum / volume solvent)

- 10 in a **chain of equations** such as $x = a + b = c$ the units of all links must be compatible.
e.g., $x = \sqrt{(3.9 \text{ g})^2 + (0.89 \text{ g})^2} = 4.0 \text{ g}$
- 11 the **vector multiplication operator** \times should not be used between scalars
for clarity, however, it is acceptable between numbers such as 1.2×10^{-6} and
for specifications such as "10 m \times 100 μm "

Quantity Calculus and Percentage

- 12 Equations used to calculate a measurement result from input data must deal with 'quantity values' (i.e., "number times unit"), rather than with their numerical values (i.e., "quantity value divided by unit") in order to preserve their general applicability.
(see VIM3, no. 1.21; IUPAC Green Book, chapters 1.1 and 7.1)
- 13 The use of quantity symbols for their numerical values is not acceptable
e.g., " m is mass in g" cannot denote "mass divided by gram"
(see Tutorial: Richter W (2008) *Accred Qual Assur* 13:731
[DOI 10.1007/s00769-008-0455-x](https://doi.org/10.1007/s00769-008-0455-x))
- 14 the term '**percentage**' is used with different meanings - to avoid misunderstandings
- please do not complicate equations unnecessarily by multiplying with "100 %"
- in any case refrain from arbitrarily introducing a factor of 100 in equations