An analyst's guide to precision

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shortfall may be the cause of the frequently-disappointing performance obtained from procedures taken from the literature. A convenient way to estimate σ_r is *a* within-run duplication of typical test materials.

application sectors. The function $\sigma = \sqrt{\alpha^2 + (\beta \quad)^2}$, for concentration with adjustable parameters α, β, has been found to fit standard deviations from particular procedures in many different types of analysis and conditions of measurement.

Standard deviations estimated from a small number of results are themselves very variable. The commonly-used sample size of ten results is 'small' in this context: it gives standard deviations with their own relative standard error of 22%, so estimates could easily be as low as 0.5 times, or as high as 1.5 times, the true value. Standard deviations calculated from even smaller numbers of results should be treated with suitable caution.

Most of the issues raised in this Brief are covered in more detail in a critical survey of precision in *A q, a M ,* , 2012, **4**, 1598–1611, and in various issues of *AMC T , a B ,* . 'VIM3' refers to the *I , a a a , q, , a a , , , a , , , , v (VIM)*, 3rd Edition, JCGM 200:2008. (Free download from http://www.bipm.org/vim.) Meanwhile it seems fit to finish with a quotation from Aristotle: "It is the mark of an educated mind to rest satisfied with the degree of precision that the nature of the subject admits and not to seek exactness where only an approximation is possible".

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