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EDITORIAL

Does accreditation ensure competence in measurement?

(cont'd from a previous issue [1])

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Accreditation for a measurement activity is usually granted for a given type of measurement. That seems certainly more suitable than giving an overall accreditation to a laboratory. But should not accreditation also specify the 'measurement uncertainty' i.e. complying with the definition as given in the International Vocabulary of Metrology VIM (entry 2.26 in [2]), for which the measuring competence is accredited? Every experienced analyst knows that a same measurement procedure can yield a mediocre result (i.e. with a large measurement uncertainty) or a very good result (i.e. with a small measurement uncertainty) depending on how the measurement is carried out. If performed with care and competence, and using professional skill and judgement, it will yield a reliable result that is trustworthy. It is reasonably sure that the measured quantity value delivered, if repeated anywhere else, will be found to lie within its once stated measurement uncertainty. But if carried out quickly and without skillful attention to the details, it will end in an unreliable result: sooner or later it is likely to be found not to lie within its once stated measurement uncertainty (especially if only a small coverage factor of, e.g., 1 was used). Attempts to make a measurement uncertainty look small, yield a nice but unrealistic image, and are self-penalizing because, in the end, the performance of such a laboratory will be known as being "variable," hence unreliable. The "attempt" to look nice will turn out to be a pitfall, as the laboratory concerned will not continue to inspire confidence.

Assessors examining out various kinds of measurements should not stick to the widespread belief that a given measurement method[1] (entry 2.5 in [2]) has a constant overall measurement uncertainty implying "once achieved, always valid." Used on the same measurand in the same material, a careful application of a given measurement procedure leads to smaller measurement uncertainties than a sloppy application of the same procedure, and will raise the reputation of the laboratory concerned.

[Of course, a reasonable estimate of the measurement uncertainty associated with a given measurement procedure can be made on the basis of previous experience with similar measurement results, but that does not guarantee the same measurement uncertainty for any subsequent result. A measurement procedure does simply not have a constant or automatically fixed measurement uncertainty. That uncertainty is dependent upon the care with which the measurement is carried out.]

The consequence of the above: an assessor also has to evaluate the way a given measurement procedure is applied by the analyst (through the implementation of, e.g. internal quality control measures) in order to be able to detect whether declared measurement uncertainties are consistent with declared professional skills and competence of the analyst. It implies knowledge by the assessor of how evaluation of measurement uncertainty is performed, and that, in turn, requires knowledge about how metrological traceability has been established. That may be a reasonably tough challenge.

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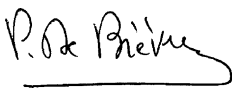
[1] Assessors better use the concept 'measurement procedure' (entry 2.6 in [2]) that does not only cover 'measurement method' but also the 'measurement principle' used as basis for the procedure, the measurement instrumentation, as well as the detailed recipe by means of which the measurement is carried out and the measurement result obtained.

Delivering a paid service, accreditation bodies face the choice between two very important priorities: assess, possibly improve, the credibility of measurement laboratories' results by their accreditation work (a laudable goal), as well as making money for their own organization (to survive, a reasonable aim). One expects that the former is considered the most important and has the "survival" as consequence.

But things might also go wrong (or might be so perceived by the outside world) when the "survival" is considered the highest priority (i.e. becomes the aim) and has "accreditation" as consequence, thus unavoidably deviating somewhat the attention from the initial aim of accreditation: providing independent assurance of competence of a measurement laboratory in a given type of measurement.

It is worthwhile to point out the importance of understanding "what" is being assessed. It is imperative that accreditation bodies give lots of attention to the metrological education and training of their assessors of measurement laboratories. Assessors must even be capable of answering (critical) technical questions from the analysts whom they are accrediting on the matters being assessed.

Assessors must have a credible scientific/technical authority in the knowledge of the measurement procedures they are assessing.



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By the way, looking for justification of metrology in chemistry?

Sony electronics lost EUR 110·10^6 in sales (and EUR 52 10^6 in profits) due to debate on the credibility of measuring the level of Cd in Sony play station cables, exceeding maximum admissible limits.
quoted by R Kaarls at the 5th Brasilian Congress of Metrology, 09 November 2009 in Salvador, Bahia, Brasil.

References

1. De Bièvre P (2008) Does accreditation ensure competence in measurement? Accred Qual Assur 13:1–2
2. BIPM, IEC, IFCC, ILAC, IUPAC, IUPAP, ISO, OIML, The international vocabulary of metrology—basic and general concepts and associated terms (VIM), edition 3, JCGM 200:2008 http://www.bipm.org/vim