



The role of measurement uncertainty in the validation of a measurement procedure

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Dear Editor,

Measurement procedure is defined as “detailed description of a measurement according to one or more measurement principles and to a given measurement method, based on a measurement model and including any calculation to obtain a measurement result” [1]. This entry in the International Vocabulary of Metrology (VIM) includes a note informing that “a measurement procedure can include a statement concerning a target measurement uncertainty”.

Whereas measurement result (result of a measurement) is defined as “set of quantity values being attributed to a measurand together with any other available relevant information” [1]. Similarly, to the above definition, a note states “a measurement result is generally expressed as a single measured quantity value and a measurement uncertainty”.

Combining both definitions, one should derive a sensible conclusion that measurement uncertainty, associated with a measurement result, shall also be acknowledged as being part of the measurement procedure followed to provide such result. Consequently, measurement uncertainty shall be recognized as an additional performance characteristic commonly evaluated during the validation of a measurement procedure.

In particular, when a measurement procedure, recognized as a standard procedure, is followed to provide a measurement result used to assess the conformity of an item against a predefined legal limit, the associated measurement uncertainty, preferentially estimated nearby the legal limit, needs to be realistically estimated. Recognising measurement uncertainty as a performance characteristic which must be included in the list for a full measurement procedure

validation would guarantee the need for the evidence of its correct evaluation.

Statements like “strictly, measurement uncertainty is not a performance characteristic of a measurement procedure but a property of the results obtained using that measurement procedure” [2] should be critically reviewed. Actually, measurement uncertainty shall be recognized and used as an important metric to judge the fitness for purpose and hence the validity of a measurement procedure.

The former statement justifies the present suggestion to recognize measurement uncertainty as an additional performance characteristic of any measurement procedure.

Author contributions Both authors equally contributed to the present Correspondence Letter.

Data Availability No datasets were generated or analysed during the current study.

Declarations

Competing interests The authors declare no competing interests.

References

1. Joint Committee for Guides in Metrology, International vocabulary of metrology - basic and general concepts and associated terms. VIM, 3rd ed. (2008), JCGM 200, BIPM, 2012. www.bipm.org.
2. Magnusson B, Örnemark U (eds) Eurachem guide: the fitness for purpose of analytical methods – a laboratory guide to method validation and related topics. 2nd ed. (2014). ISBN 978-91-87461-59-0. www.eurachem.org.

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