

CCQM-K10.2018
BTEX in Nitrogen at 5 nmol mol⁻¹
Support to Measurement Capabilities

Preamble

This guidance note is aimed at reviewers of calibration and measurement capabilities, supported by the participation in a key comparison. In principle, support to measurement capabilities is limited to those measurement results that are consistent with the key comparison reference value (KCRV). In this key comparison [1], several measurement results were not consistent with the KCRV. For those results, this guidance note provides larger expanded uncertainties, based on the GAWG strategy document [2]. The idea behind these larger uncertainties is that:

- a) National Metrology Institutes (NMIs) can still use their participation in a key comparison to support their measurement service;
- b) The stated uncertainty is large enough to ensure comparability with the KCRV and the results of other NMIs;
- c) There is a harmonised way of dealing with discrepant results in relation to CMCs.

Discrepant measurement results can occur for a number of reasons. For a discussion of the measurement result in CCQM-K10.2018, see the final report [1]. In case of incidental discrepant results, the default response would be to investigate the cause of the discrepancy and to resolve it [3]. Hence, the attached table should not be viewed as:

- a) A substitute for appropriate corrective measures from the side of the NMI to resolve the discrepancy;
- b) A consent from the GAWG that the submitted measurement result is acceptable;
- c) A guarantee that a CMC submitted in accordance with this guidance note will be accepted by reviewers in the review process by the Regional Metrology Organisations;
- d) Support for the metrological traceability of the measurement result submitted;
- e) A direction or recommendation to assessors in peer reviews or accreditation visits.

Support to CMCs

Table 1 shows the ranges of the amount fractions and associated expanded uncertainties supported by participation in CCQM-K10.2018 [1], calculated in accordance with the GAWG Strategy document [2]. Values in red indicate uncertainties that have been inflated because the submitted measurement result was not consistent with the KCRV. Values in bold indicate lower boundaries that have been increased to ensure that the associated uncertainty does not exceed 100 % relative.

References

- [1] C.E. Cecelski, G.C. Rhoderick, A.M. Possolo, J. Carney, M. Vokoun, J. Privoznikova, S. Lee, J.H. Kang, Y.D. Kim, D.H. Kim, T. Macé, C. Sutour, C. Pascale, N. Ntsasa, J. Tshilongo, M. Jozela, N. Leshabane, G. Lekoto, D.R. Worton, P.J. Brewer, F. Farrow-Dunn, S. Moreno, K. Wirtz, V. Stummer, L.A. Konopelko, A.V. Kolobova, Y.A. Kustikov, A.Y. Klimov, O.V. Efremova, J.I.T. van Wijk, and A. van der Veen. CCQM-K10.2018 BTEX in nitrogen at 5 nmol mol⁻¹. *Metrologia*, to be published.
- [2] P. Brewer and A. M. H. van der Veen. *CCQM-GAWG strategy for comparisons and CMC claims*. Gas Analysis Working Group, Sèvres, France, October 2019.
- [3] ISO. *ISO/IEC 17025 General requirements for the competence of testing of calibration laboratories*. International Organization for Standardization, Geneva, Switzerland, 2017. Third Edition.

Table 1. Ranges and expanded uncertainties ($k = 2$) supported by CCQM-K10.2018, per component and per NMI.^a

	/ nmol mol ⁻¹					/ nmol mol ⁻¹			
	LB	U(LB)	UB	U(UB)		LB	U(LB)	UB	U(UB)
BENZENE					TOLUENE				
KRISS	1.000	0.196	10000	384	KRISS	1.000	0.200	10000	408
LNE	1.005	1.005	10000	1970	LNE	1.021	1.021	10000	2081
NIST	1.000	0.084	10000	165	NIST	1.000	0.070	10000	143
NMISA	1.000	0.607	10000	1190	NMISA	1.000	0.614	10000	1250
NPL	1.000	0.100	10000	196	NPL	1.000	0.100	10000	204
VNIIM	1.066	1.066	10000	2089	VNIIM	1.003	1.003	10000	2044
VSL	1.000	0.100	10000	196	VSL	1.000	0.100	10000	204
METAS	2.351	2.351	10000	4618	METAS	1.090	1.090	10000	2201
UBA	1.000	0.040	10000	79	UBA	1.000	0.050	10000	101
CHMI	1.000	0.314	10000	617	CHMI	1.000	0.240	10000	485
ETHYLBENZENE					<i>p</i> -XYLENE				
KRISS	1.000	0.182	10000	391	KRISS	1.000	0.236	10000	482
LNE	1.036	1.036	10000	2225	LNE	1.124	1.124	10000	2299
NIST	1.000	0.116	10000	249	NIST	1.000	0.132	10000	270
NMISA	1.000	0.730	10000	1567	NMISA	1.172	1.172	10000	2395
NPL	1.000	0.100	10000	215	NPL	1.000	0.100	10000	204
VNIIM	1.128	1.128	10000	2422	VNIIM	1.298	1.298	10000	2654
VSL	1.000	0.152	10000	326	VSL	1.000	0.194	10000	397
METAS	1.053	1.053	10000	2276	METAS	2.385	2.385	10000	2432
UBA	1.000	0.040	10000	86	UBA	1.000	0.140	10000	143
CHMI	1.000	0.252	10000	545	CHMI	1.000	0.534	10000	544
<i>m</i> -XYLENE					<i>o</i> -XYLENE				
KRISS	1.000	0.236	10000	488	KRISS	1.000	0.236	10000	488
LNE	1.194	1.194	10000	2467	LNE	1.000	0.949	10000	1961
NIST	1.000	0.168	10000	347	NIST	1.000	0.164	10000	339
NMISA	1.906	1.906	10000	3939	NMISA	1.383	1.383	10000	2858
NPL	1.000	0.100	10000	207	NPL	1.000	0.100	10000	207
VNIIM	1.414	1.414	10000	2923	VNIIM	1.148	1.148	10000	2372
VSL	1.000	0.196	10000	405	VSL	1.000	0.202	10000	417
METAS	2.388	2.388	10000	2435	METAS	1.250	1.250	10000	2625
UBA	1.000	0.140	10000	143	UBA	1.000	0.060	10000	126
CHMI	1.000	0.534	10000	544	CHMI	1.000	0.290	10000	609

^a UBA and CHMI cannot make separate claims for *p*-xylene and *m*-xylene.