CCQM-K165
Dimethyl sulfide in nitrogen at 5 nmol mol^{-1}
Support to Calibration and Measurement Capabilities (CMCs)

1. Preamble

This guidance note is aimed at reviewers of calibration and measurement capabilities (CMCs), 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, one measurement result was not consistent with KCRV [1]. For the result, this guidance note provides larger expanded uncertainties, based on GAWG strategy document, GAWG/19-41 [2]. The idea behind the 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 harmonized way of dealing with discrepant results in relation to CMCs.

Discrepant measure results can occur for a number of reasons. For a discussion of the measurement result in CCQM-K165 [1], refer to the final report. 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 Organizations;
d) Support for the metrological traceability of the measurement result submitted;
e) A direction or recommendation to assessors in peer reviews or accreditation visits.

2. Support for CMCs

HFTLS statements in CCQM-K165

The results from this comparison can be used to underpin NMIs' calibration and measurement capability claims for DMS in both air and nitrogen at the amount-of-substance fraction from 1 nmol mol^{-1} to 100 μmol mol^{-1}.

Table 1, 2, 3, and 4 show the ranges of the amount fractions and the expanded uncertainties supported by the participation in CCQM-K165, calculated in accordance with the GAWG Strategy document, GAWG/19-41 [2].

Table 1. Supported ranges and expanded uncertainties (k =2) for amount fractions from 1 nmol mol^{-1} to about 5 nmol mol^{-1}.

	Lower Bound (LB) / nmol mol^{-1}	Upper Bound (UB) / nmol mol^{-1}	U(LB) / nmol mol^{-1}	U(UB) / nmol mol^{-1}
KRISS	1.000	5.089	0.066	0.066
NIM	1.000	5.114	0.154	0.154
NPL	1.000	5.126	0.38	0.38
VNIIM	1.000	5.119	0.24	0.24

Table 2. Supported ranges and expanded uncertainties (k =2) for amount fractions from 5 nmol mol^{-1} to about 100 000 nmol mol^{-1}.

	Lower Bound (LB) / nmol mol^{-1}	Upper Bound (UB) / nmol mol^{-1}	U(LB) / nmol mol^{-1}	U(UB) / nmol mol^{-1}
KRISS	5.089	100 000	0.066	1297
NIM	5.114	100 000	0.154	3011
NPL	5.126	100 000	0.38	7318
VNIIM	5.119	100 000	0.24	4688

Table 3. Supported ranges and relative expanded uncertainties (k =2) for amount fractions from 1 nmol mol^{-1} to about 5 nmol mol^{-1}.

	Lower Bound (LB) / nmol mol^{-1}	Upper Bound (UB) / nmol mol^{-1}	U(LB) / %	U(UB) / %
KRISS	1.000	5.089	6.6	1.3
NIM	1.000	5.114	15	3.0
NPL	1.000	5.126	38	7.3
VNIIM	1.000	5.119	24	4.7

Table 4. Supported ranges and relative expanded uncertainties (k =2) for amount fractions from 5 nmol mol^{-1} to about 100 000 nmol mol^{-1}.

	Lower Bound (LB) / nmol mol^{-1}	Upper Bound (UB) / nmol mol^{-1}	U(LB) / %	U(UB) / %
KRISS	5.089	100 000	1.3	1.3
NIM	5.114	100 000	3.0	3.0
NPL	5.126	100 000	7.3	7.3
VNIIM	5.119	100 000	4.7	4.7

References

[1] CCQM-K165 dimethyl sulfide in nitrogen at 5 nmol mol^{-1}. Metrologia, to be published.

[2] P. Brewer and A. M. H. van Veen. CCQM-GAWG strategy for comparisons and CMC claims (GAWG/19-41). Gas Analysis Working Group, Sevres, France, October 2019.

[3] ISO. ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories. Geneva: ISO, 2017.