

PJLA Update Notification

Update Notification # 77

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Form/Procedure/Policy: N/A

Attention: Specialty Gas Reference Material Producers (RMP)

It has recently come to our attention that while all the contributions for product uncertainty are evaluated using the EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, the final combined uncertainty per ISO 17034:2016 is not part of the protocol.

ISO 33405 (current replacement for ISO Guide 35) 6.13 identifies value assignment as “the process of combining the results from the homogeneity and stability assessment with the results from the characterization studies to determine the assigned values and their uncertainties.”

ISO 17034:2016 requires in clause 7.13.6, “For certified values, the RMP shall consider, at a minimum, uncertainty contributions of each of the following: characterization, between unit and within unit homogeneity, and changes of property values during transport.”

ISO 33405:2024 identifies: the basic model of the uncertainty of the CRM calculation as:

$$U_{CRM} = \sqrt{(u_{CHAR})^2 + (u_{hom})^2 + (u_{sts})^2 + (u_{lts})^2}$$

Where:

- U_{CRM} denotes the combined uncertainty associated with the property value of the CRM,
- u_{CHAR} denotes the standard uncertainty contribution from the characterization of the property value,
- u_{hom} denotes the uncertainty standard contribution from the assessment of homogeneity,
- u_{sts} denotes the uncertainty standard contribution from the transport stability, and
- u_{lts} denotes the uncertainty standard contribution from long term storage stability.

Due to their inherent nature, inert gas stability contributions may be considered negligible.

The stability established by the US EPA Gas protocol, must be incorporated into the product uncertainty for certified components, if the contribution is not negligible as compared to the characterization uncertainty.

Another approach may include the approach described in *Stability study and uncertainty evaluation of CO2 certified reference materials for greenhouse gases monitoring* / Durbiano, F.; Pennecchi, F. R.; Rolle, F.; Pavarelli, S.; Sega, M.. - In: *MEASUREMENT*. – ISSN 0263-2241. - 232:(2024), p. 114653. [[10.1016/j.Measurement.2024.114653](https://doi.org/10.1016/j.Measurement.2024.114653)], this calculation may be simplified as

$$U_{CRM} = \sqrt{(u_{grav})^2 + (u_{ver})^2 + (u_{stab})^2}$$

Where: U CRM denotes the combined uncertainty associated with the property value of the CRM
u grav denotes the uncertainty standard contribution from the gravimetric preparation
u ver denotes the uncertainty standard contribution from the verification, and
u stab denotes the uncertainty standard contribution from the stability assessment.

Also note, a certified reference material certificate with at least one certified value, shall include the uncertainty for the certified property value, per the above or an equivalent equation.

When the EPA Protocol is used with the ISO 17034 combined uncertainty determination, the product may be reported as a CRM.

When the EPA Protocol is used without the ISO 17034 combined uncertainty determination, the product may be reported as a RM.

If you have any question regarding the above, please free to contact PJLA directly.

Thank you for your attention to this matter.

PJLA Management