



Policy on Measurement Uncertainty for Calibration and Testing Laboratories

The following paragraphs define the responsibilities of testing/calibration laboratories seeking accreditation to ISO/IEC 17025:2005 by PJLA with regard to the estimation of measurement uncertainty.

The calculation of uncertainty for a measurement is an effort to set reasonable bounds for the measurement result according to standardized rules. These rules are established in the GUM.

Prior to Pre-Assessment

The applicant laboratory shall have and shall apply a documented procedure for estimating uncertainty of measurement. This procedure shall include an attempt to identify all the components of uncertainty, make a reasonable estimation of the uncertainty and define the method by which it determines the statistical significance of said influences to the validity of a reported testing/calibration result. ISO/IEC 17025:2005, Section 5.4.6.2

In those cases where a well recognized test method specifies limits to the values of the major sources of uncertainty of measurement and specifies the form of presentation of calculated results, the laboratory is considered to have satisfied ISO/IEC 17025:2005 clause 5.4.6.2 by following the test method and reporting the instructions.

The laboratory shall classify the sources of uncertainty to the evaluation method and must prepare an uncertainty budget enumerating all components (significant influences) contributing to the variability of a particular result. ISO/IEC 17025:2005, Section 5.4.6.3

Sources of uncertainties must be established for each item listed in the scope from the type “B” evaluations as described in the Guide to the Expression of Uncertainty in Measurement. Laboratories may use the uncertainty associated with reference standards/materials, which is the reported uncertainty from the external laboratory that calibrated the reference standard (providing NIST traceability has been maintained by said laboratory), environmental conditions, properties of the item and the operator when beginning to identify significant influences.



Prior to Accreditation

Before accreditation to ISO/IEC 17025:2005 may be granted, the applicant laboratory, through the use of its aforementioned procedure, must provide estimated uncertainties for every measured quantity, instrument or gauge listed in its desired scope of accreditation. Evidence of the calculation of these estimated uncertainties as well as all associated documentation shall be examined and verified by PJLA during the accreditation assessment.

Maintaining Compliance

Upon achieving accreditation, the stated uncertainties shall be periodically reviewed and updated by the laboratory to evaluate changes to be made to any influence listed in the laboratory's uncertainty budget. These changes shall be documented and the related uncertainties shall be recalculated. This information must be provided to the PJLA assessor during subsequent surveillance assessments. A system should be established that takes into account the data used for the type "A" evaluations from repetitive measurements of the work, measurements made of check standards, customer calibration results or a combination of these as a minimum.

Accredited laboratories must include a metrological statement or reference estimated uncertainties on calibration/test reports provided to clients for all elements included in their scopes of accreditation. Supplemental information including procedures and calculations may be made available to clients upon their request. All calculations shall be maintained by the laboratory and made available to PJLA upon request.

Any additions to an existing Scope of Accreditation will be not made unless the measurement of uncertainty for the added item has been calculated and is made available to the PJLA assessor.

Although PJLA assessors cannot perform the calculations for the estimation of measurement uncertainty, several resources are available to assist laboratories in satisfying the measurement uncertainty requirements of ISO/IEC 17025:2005. Excellent resources to reference include:

NIST Technical Note 1297, 1994 Edition: Guidelines for Evaluating and Expressing Uncertainty of NIST Measurement Results

ANSI/NCSL Z540-2-1997: U.S. Guide to the Expression of Uncertainty in Measurement

Journal of Research of National Institute of Standards and Technology Volume 102, Number 6, November- December 1997 (647) Uncertainty and Dimensional Calibrations

NISTIR 6919 Recommended Guide for Determining and Reporting Uncertainties for Balances and Scales

The combined and expanded uncertainties must be meaningful for the item that the laboratory intends to list on the scope of accreditation.