

## Policy on in-house calibration

### 1. Scope:

This document covers SLAB's Guideline on in-house and internal calibrations performed by the testing and/or calibration laboratories. This document shall be read in conjunction with the SLAB traceability policy and measurement uncertainty.

### 2. Reference:

ISO/IEC 17025: 2017- General Requirements for the Competence of Testing and Calibration Laboratories, Clause 6.5 and Annex A

ILAC- P10: 01/2013 – ILAC Policy on the Traceability of Measurement Results

ILAC- P14: 01/2013 - ILAC Policy for Uncertainty in Calibration

AC-RG (P)-04 - SLAB Policy on the traceability of measurement results

AC-RG (P)-06 - SLAB Policy on Measurement Uncertainty

JCGM 200:2012: International Vocabulary of Metrology (VIM) – Basic and General Concepts and Associated Terms (VIM 3rd edition)

CIPM MRA -D-04- Version 5:2017 - Calibration and Measurement Capabilities in the context of the CIPM MRA -D-04

### 3. Responsibility:

Conformity Assessment Bodies (CABs)

Authorized Officers

Technical Managers

Committee Members

Team Leaders/ Technical Assessors/ Technical Experts/Assessors

### 4. Definitions:

All terms & definitions given in the SLAB traceability policy and measurement uncertainty are applied.

#### 4.1 Calibration (VIM3 clause 2.39):

Operation that, under specified conditions, in a first step, establishes a relation between the quantity values with measurement uncertainties provided by measurement standards and corresponding indications with associated measurement uncertainties and, in a second step, uses this information to establish a relation for obtaining a measurement result from an indication.

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VIM NOTE 1 A calibration may be expressed by a statement, calibration function, calibration diagram, calibration curve, or calibration table. In some cases, it may consist of an additive or multiplicative correction of the indication with associated measurement uncertainty.

VIM NOTE 2 Calibration should not be confused with adjustment of a measuring system, often mistakenly called “self-calibration”, nor with verification of calibration.

VIM NOTE 3: Often, the first step alone in the above definition is perceived as being calibration.

#### 4.2 Calibration and Measurement Capability (CMC):

In the context of the CIPM MRA and ILAC Arrangement, and in relation to the CIPM-ILAC Common Statement, the following shared definition was agreed upon:

“A CMC is a calibration and measurement capability available to customers under normal conditions:

- (a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA; or
- (b) as described in the laboratory’s scope of accreditation granted by a signatory to the ILAC Arrangement. ”

Where the term NMI is used it is intended to include Designated Institutes (DIs) within the framework of the CIPM MRA.”

**Source:** <https://www.bipm.org/utis/common/documents/CIPM-MRA/CIPM-MRA-D-04.pdf>

**4.3 Measurement Uncertainty (VIM3 clause 2.26):** Non-negative parameter characterizing the dispersion of the quantity values being attributed to a measurand, based on the information used.

#### 4.4 In-house Calibration (SLAB) for Testing Laboratories:

The calibration of a SLAB-Accredited CAB’s own reference standards or measuring and test equipment by the laboratory’s own staff for which the calibration measurement parameters **ARE NOT** included on their scope of accreditation.

Note 1: In-house calibration can be performed by testing and/or calibration laboratories

Note 2: For these measurements, SLAB traceability policy describes in (AC-RG(P)-04) applies.

Note 3: For These measurements, policy of uncertainty of measurements (AC-RG(P)-06) applies

#### 4.5 Internal Calibration (SLAB) for Calibration Laboratories:

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The calibration of a SLAB-Accredited Laboratory's own reference standards or measuring and test equipment by the laboratory's own staff for which the calibration measurement parameters **ARE** included on their scope of accreditation.

Note 1: For these measurements, Traceability Policy describes in (AC-RG(P)-04) document applies

Note 2: For these measurements, Policy of Uncertainty of Measurements (AC-RG(P)-06) applies

## 5. SLAB policy on In-house calibration

5.1 An in-house calibration is the calibration of a SLAB accredited Laboratory's own reference standards or measuring and test equipment by the laboratory's own staff for which the calibration measurement parameters **ARE NOT** included on their Scope of Accreditation.

Note: For all in-house calibrations having a significant effect on the accuracy or validity of the result of the accredited test, calibration or sampling on the CAB's SLAB Scope of Accreditation: This does not cover the internal calibration which is included in the scope of accreditation.

5.2 The CAB shall maintain documented procedures for the in-house calibrations;

5.3 The in-house calibrations shall be evidenced by a calibration report, certificate, or sticker, or other suitable method which includes details of reference used with its traceability information and validity period of calibration, calibration method, environmental conditions, uncertainty, correction factors, calibration results and person who authorized the calibration certificate etc.

5.4 Calibration records shall be retained minimally for the one accreditation cycle;

5.5 The CAB shall maintain authorization and training records for calibration personnel and these records shall demonstrate the technical competence of the personnel performing the calibrations: evidence of competence includes, for example, documented training and the results of measurement audits;

Note: It is required laboratory to comply with ISO/IEC 17025, clause 6.2 for the requirements in relation to personnel involved in in-house calibrations.

5.6 The CAB shall be able to demonstrate that reference standards used for the in-house calibrations have been calibrated and such calibrations are meeting the requirements of SLAB Traceability Policy (AC-RG(P)-04);

5.7 Where available, the CAB shall use reference materials from accredited reference material producers or an NMI;

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## 6. Measurement uncertainty:

6.1 Testing/Calibration laboratories are required to provide a description of the level of the required accuracy, uncertainty and range of the in-house calibration, which may be required to determine adequacy and to review in-house calibrations by technical assessor.

Note: Calculation of CMC for in-house calibration may provide additional information for the assessment of in-house calibrations.

6.2 Measurement uncertainty shall be calculated in accordance with the SLAB Policy for Measurement uncertainty for each type of calibration. The data from which the origin of the uncertainty was determined shall be documented and the assumptions made for the determination of the uncertainty shall be specified and documented.

6.3 Measurement uncertainty shall be taken into account when statements of compliance with specifications are made;

6.4 At a minimum, all uncertainty analysis shall take into consideration the following contributors and documentation of the consideration shall be made.

- a) Repeatability;
- b) Resolution;

Note: It shall be noted that uncertainty components, such as resolution, may also contribute to other components such as repeatability. Therefore, simply combining all components on an equal basis could result in an overstatement of the measurement uncertainty.

- Reference standard uncertainty;
- Reference standard stability;
- Environmental factors

6.5 Reference standards shall be recalibrated at appropriate intervals to ensure that the reference value is reliable.

6.6 The laboratory shall have a policy or procedure for establishing and changing calibration intervals which shall be based on the historical behavior of the reference standard.

6.7 SLAB shall assess the competence of the laboratory to conduct in-house calibrations including, but not limited to:

- a) competence of personnel conducting the calibrations;
- b) traceability of standards;
- c) records of measurements and environmental conditions;
- d) procedures for evaluating measurement uncertainty/ CMCs.

Note: Technical Assessors may use Annex A as guideline for conducting assessments on in-house calibrations and laboratories may use for the preparation of accreditation.

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6.8 For assessments conducted in testing laboratories, SLAB may include, as needed, additional team member(s) to verify competence of the laboratory to conduct in-house calibrations before granting accreditation and thereafter during on –site assessments. Therefore, additional costs may apply.

## **7. SLAB Policy on internal calibration**

7.1 The calibration of a SLAB-Accredited Laboratory’s own reference standards or measuring and test equipment by the laboratory’s own staff for which the calibration measurement parameters **ARE** included on their scope of accreditation and comply with the SLAB policy on Traceability and measurement uncertainty.

7.2 Calibration laboratories perform internal calibrations shall issue an accredited calibration certificate for the internal reference standards as it practices for external calibration services.

7.3 The scope of accreditation of calibration laboratories shall contain the calibrations perform within the laboratory to establish or transfer traceability from a reference standards which calibrated from external laboratories to internal reference standards which used for calibrations in accordance with documented procedure and in line with SLAB traceability and measurement policies. SLAB will review internal calibrations given in the scope and CMC calculations and publish the scope of calibration laboratory with internal calibrations as agreed and assessed at the assessments.

### **Annex 01 Checklist for the Assessment of In-house & Internal Calibration**

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(Informative)

Note: Technical Assessors shall provide descriptive answers for all questions and laboratories shall maintain detail documentary evidence make available for the SLAB assessments.

## 1. Calibration Provider for Reference Equipment

1.1 Is the calibration carried out by a recognized external body generally responsible for calibrations or by a body accredited for that purpose?

1.1.1 By a National Metrology Institute which is a member of CIPM MRA?

1.1.2 By a recognized accredited calibration provider?

If the answer for sections 1.1.1 & 1.1.2 is yes, then all the requirements of SLAB Traceability Policy apply and no further action is required.

If the answer is No, What is the mechanism adopted to determine the competence of calibration provider and compliance with ISO/IEC 17025 requirements?

1.2.4 By the user of the measuring equipment himself?

- Are there regulations concerning the responsibility for the reliability of calibration software?
- Are there evidence for the traceability of reference standards used for the calibration of laboratory's reference standards which are used for in-house calibration?

## 2 Testing / Calibration Facilities

2.1 Are internal certified reference standards, reference standards and, if appropriate, working standards, available for all measuring and test instruments and measurand (s) and range(s) which are relevant for the measurement and test results?

2.2 Are the standards, directly or indirectly, in any case by an unbroken chain and documented by certificates, linked to national standards and labelled accordingly for each measurand and range by a calibration label?

2.3 Are all instruments being part of the calibration equipment properly identified?

2.4 Is each calibration described in a calibration method or procedure, (e.g. by switching diagrams or flow charts)?

2.5 Is the calibration procedure described step by step?

2.6 Are defined environmental conditions ensured during calibrations?

2.7 Are there adequate environmental conditions for the calibrations?

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2.8 Are relevant environmental conditions recorded during calibrations?

2.9 Are procedures for the calculation of the measurement uncertainty of the calibration equipment specified and are they followed?

2.10 Are there procedures for the calculation of uncertainty of measurement /CMC of the internal calibrations and are they in accordance with ISO GUM document?

2.11 Are re-calibration intervals fixed in accordance with the intended use and the properties of the equipment and are there programmes for regular recalibrations?

### 3 Documentation

3.1 Are the demonstrated technical competencies of laboratory personnel conducting in-house calibrations documented? Are they appropriate?

3.2 Are the calibration methods / measurement procedures verified, validated and documented? Are they appropriate?

3.3 Are non-standard/modified calibration methods documented and validated? Are they appropriate?

3.4 Is there documentation for the adequacy of the environmental conditions? Are they appropriate?

3.5 Is there documentation for the metrological traceability of all standards? Is the stated traceability appropriate and complies with SLAB traceability policy?

3.6 Is there documentation for metrological traceability for the measurand (s) and range(s)?

3.7 Is the responsible person for the supervision of recalibration intervals and regular re calibrations?

3.8 In the case where calibrations have to be performed before each measurement, are these cases clearly identified?

Are the measuring instruments labeled accordingly?

3.9 Are the results of calibrations – including environmental conditions, if applicable- documented and filed?

Are they available to the user of the measuring instrument?

3.10 Is a calibration label used as a visible indication of an established confirmation system for the measuring equipment?

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- 3.11 Are controls for calibration and adjustment sealed which should not be affected by the user?
- 3.12 Are there procedures for the evaluation and determination of measurement uncertainty? Does it meet the requirements required in section 5.4?
- 3.13 Are there procedures for determination of CMCs of internal calibrations? Does it meet SLAB policy on uncertainty of measurements?
- 3.14 Is there documentation for the validation of the measurement uncertainty values/ CMCs obtained? Are the stated measurement uncertainty values /CMCs appropriate?
- 3.15 Are the calibration results and the associated measurement uncertainties documented?
- 3.16 Are there proficiency testing participation records, where applicable, to support the uncertainty provided?

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