

## **IAS CALIBRATION and TESTING LABORATORY ACCREDITATION PROGRAMS DEFINITIONS**

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### **DEFINITIONS**

#### **ACCREDITATION:**

Third-party attestation related to a conformity assessment body, conveying formal demonstration of its competence, impartiality and consistent operation in performing specific conformity assessment activities. *(ISO/IEC 17000:2020)*

**ACCREDITATION BODY:** Authoritative body that performs accreditation *(ISO/IEC 17000:2020)*

**ACCREDITATION CRITERIA:** Set of requirements used by an accrediting body which a laboratory must meet in order to be accredited. *(ASQ The Measurement Quality Division (2012) The Metrology Handbook, Second Edition, (Jay L. Bucher Ed.), ASQ Quality Press)*

**APAC:** Asia Pacific Accreditation Cooperation.

**ASSESSMENT:** Process undertaken by an accreditation body to determine the competence of a conformity assessment body, based on standard(s) and/or other normative documents and for a defined scope of accreditation *(ISO/IEC 17011:2017)*

**AUTHORIZED REPRESENTATIVE:** Individual who is authorized by the laboratory or parent organization to sign the accreditation application and commit the laboratory to fulfill the accreditation criteria. *(Based on ISO/IEC 17011:2017)*

**BIPM:** International Bureau of Weights and Measures

**BASE QUANTITY:** Quantity in a conventionally chosen subset of a given system of quantities, where no subset quantity can be expressed in terms of the others. *(JCGM 200:2012)*

**CALIBRATION:** 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. (*JCGM 200:2012*)

**CALIBRATION ACTIVITY OR PROVIDER:** A laboratory or facility—including personnel—that perform calibrations in an established location or at customer location(s). It may be external or internal, including subsidiary operations of a larger entity. It may be called a calibration laboratory, shop, or department; a metrology laboratory or department; or an industry-specific name; or any combination or variation of these.

(*ASQ The Measurement Quality Division (2012) The Metrology Handbook, Second Edition, (Jay L. Bucher Ed.), ASQ Quality Press*)

**CALIBRATION AND MEASUREMENT CAPABILITY (CMC):** 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. (*ILAC-P14:09/2020*)

**CALIBRATION PROGRAM:** The set of interrelated or interacting elements necessary to maintain the measurement performance of measuring and test equipment to defined requirements. (*ANSI/NCSL Z540.3-2006 (R2013)*)

**CALIBRATION SEAL:** A calibration seal is a device, placard, or label that, when removed or tampered with, and by virtue of its design and material, clearly indicates tampering. The purpose of a calibration seal is to ensure the integrity of the calibration. A calibration seal is usually imprinted with a legend similar to "Calibration Void if Broken or Removed" or "Calibration Seal—Do Not Break or Remove." A calibration seal provides a means of deterring the user from tampering with any adjustment point that can affect the calibration of an instrument and detecting an attempt to access controls that can affect the calibration of an instrument. Note: A calibration seal may also be referred to as a tamper seal. (*ASQ The Measurement Quality Division (2012) The Metrology Handbook, Second Edition, (Jay L. Bucher Ed.), ASQ Quality Press*)

**CAR (Corrective Action Request):** IAS assessment finding that describes the failure to address, or failure to implement a mandatory requirement of the relevant standard, international requirement or IAS accreditation criteria. (*IAS/ADM/052 IAS Guidance on Classification of Findings*)

**CERTIFIED REFERENCE MATERIAL (CRM):** Reference material accompanied by documentation issued by an authoritative body and providing one or more specified property values with associated uncertainties and traceabilities, using valid procedures. (*JCGM 200:2012*)

**CERTIFICATE OF ACCREDITATION:** Document issued by IAS to a laboratory that has met the conditions and criteria for accreditation. A current Certificate of Accreditation, accompanied by a Scope of Accreditation, may be used as proof of accredited status.

**CGPM:** General Conference on Weights and Measures

**CIPM:** International Committee for Weights and Measures

**COMBINED STANDARD MEASUREMENT UNCERTAINTY:** Standard measurement uncertainty that is obtained using the individual standard measurement uncertainties associated with the input quantities in a measurement model. (*JCGM 200:2012*)

**COMPETENCE:** For a laboratory, the demonstrated ability to perform the tests or calibrations within the accreditation scope and to meet other criteria established by the accreditation body. For a person, the demonstrated ability to apply knowledge and skills. Note: The word qualification is sometimes used in the personal sense, since it is a synonym and has more accepted usage in the United States. (*ASQ The Measurement Quality Division (2012) The Metrology Handbook, Second Edition, (Jay L. Bucher Ed.), ASQ Quality Press*)

**CONCERN:** Minor nonconformity with the requirements of the relevant standard, international requirement or IAS accreditation criteria (*IAS/ADM/052*)

**CONFORMITY ASSESSMENT BODY:** Body that performs conformity assessment activities, excluding accreditation. (*ISO/IEC 17000:2020*)

**COVERAGE FACTOR:** Number larger than one by which a combined standard measurement uncertainty is multiplied to obtain an expanded measurement uncertainty. (*JCGM 200:2012*)

**COVERAGE INTERVAL:** Interval containing the set of true quantity values of a measurand with a stated probability, based on the information available (*JCGM 200:2012*)

**COVERAGE PROBABILITY:** Probability that the set of true quantity values of a measurand is contained within a specified coverage interval. (*JCGM 200:2012*)

**DECISION RULE:** rule that describes how measurement uncertainty is accounted for when stating conformity with a specified requirement. (*ISO/IEC 17025:2017*)

**DERIVED QUANTITY:** Quantity, in a system of quantities, defined in terms of the base quantities of that system. (*JCGM 200:2012*)

**EXPANDED MEASUREMENT UNCERTAINTY:** Product of a combined standard measurement uncertainty and a factor larger than the number one. (*JCGM 200:2012*)

**FLEXIBLE SCOPE OF ACCREDITATION:** Scope of accreditation expressed to allow laboratories to make changes in methodology and other parameters which fall within the competence of the laboratory as confirmed by the accreditation body (*based on ISO/IEC 17011:2017*)

**IAF:** International Accreditation Forum. The world association of Conformity Assessment Accreditation Bodies and other bodies interested in conformity assessment in the fields of management systems, products, services, personnel and other similar programmes of conformity assessment. (<https://www.iaf.nu>)

**ILAC:** International Laboratory Accreditation Cooperation. The international organization for accreditation bodies operating in accordance with ISO/IEC 17011 and involved in the accreditation of conformity assessment bodies including calibration laboratories (using ISO/IEC 17025), testing laboratories (using ISO/IEC 17025), medical testing laboratories (using ISO

15189), inspection bodies (using ISO/IEC 17020), proficiency testing providers (using ISO/IEC 17043) and reference material producers (using ISO 17034).

(<https://ilac.org/about-ilac/>)

**IMPARTIALITY:** Presence of objectivity. (ISO/IEC 17025:2017)

**INTERLABORATORY COMPARISON (ILC):** Organization, performance, and evaluation of tests or calibrations on the same or similar items or materials by two or more laboratories in accordance with predetermined conditions. (ISO/IEC 17025:2017)

**INTERNAL AUDIT:** systematic, independent and documented process conducted by, or on behalf of the organization itself, for obtaining *objective evidence* and evaluating it objectively to determine the extent to which the *audit criteria* are fulfilled. (ISO 19011:2018)

**INTERNATIONAL STANDARD:** (Standard that is adopted by an international standardizing/standards organization and made available to the public. (ISO/IEC Guide 2:2004)

**INTERNATIONAL SYSTEM OF QUANTITIES (ISQ):** System of quantities based on the seven base quantities: length, mass, time, electric current, thermodynamic temperature, amount of substance, and luminous intensity. (JCGM 200:2012)

**INTERNATIONAL SYSTEM OF UNITS (SI):** System of units, based on the International System of Quantities, their names and symbols, including a series of prefixes and their names and symbols, together with rules for their use, adopted by the General Conference of Weights and Measures (CGPM). (JCGM 200:2012)

**INTRALABORATORY COMPARISON:** organization, performance and evaluation of measurements or tests on the same or similar items within the same laboratory in accordance with predetermined conditions. (ISO/IEC 17025:2017) **LABORATORY:** Body that performs one or more of the following activities:

- testing;
- calibration;
- sampling, associated with subsequent testing or calibration.

(ISO/IEC 17025:2017)

**LEVEL OF CONFIDENCE:** alternate expression used by the GUM for “coverage probability”.

**MANAGEMENT REVIEW:** Review by laboratory management of its management system at planned intervals, in order to ensure its continuing suitability, adequacy and effectiveness, including the stated policies and objectives related to the fulfilment of the ISO/IEC 17025 standard. (based on ISO/IEC 17025:2017)

**MANAGEMENT SYSTEM:** The way in which an organization manages the interrelated parts of its business in order to achieve its objectives. (<https://www.iso.org/management-system-standards.html>)

**MEASURAND:** Quantity intended to be measured (JCGM 200:2012)

**MEASUREMENT:** Process of experimentally obtaining one or more quantity values that can reasonably be attributed to a quantity (*JCGM 200:2012*)

**MEASUREMENT ACCURACY:** Closeness of agreement between a measured quantity value and a true quantity value of a measurand. (*JCGM 200:2012*)

**MEASUREMENT ERROR:** Measured quantity value minus a reference quantity value. (*JCGM 200:2012*)

**MEASUREMENT PRECISION:** closeness of agreement between indications or measured quantity values obtained by replicate measurements on the same or similar objects under specified conditions. (*JCGM 200:2012*)

**MEASUREMENT PROCEDURE:** Detailed description of a measurement according to one or more measurement principles and to a given measurement method, based on a measurement model and including any calculation to obtain a measurement result. (*JCGM 200:2012*)

**MEASUREMENT UNCERTAINTY** Non-negative parameter characterizing the dispersion of the quantity values being attributed to a measurand, based on the information used. (*JCGM 200:2012*)

**MEASURING INSTRUMENT:** Device used for making measurements, alone or in conjunction with supplementary devices. (*JCGM 200:2012*)

**METROLOGY:** Science of measurement and its application. (*JCGM 200:2012*)

**METROLOGICAL TRACEABILITY):** Property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty. (*JCGM 200:2012*)

**METROLOGICAL TRACEABILITY CHAIN:** Sequence of measurement standards and calibrations that is used to relate a measurement result to a reference. (*JCGM 200:2012*)

**MOBILE OPERATIONS:** Operations that are independent of an established calibration laboratory facility. Mobile operations may work from an office space, home, vehicle, or use a virtual office.

**MRA:** Mutual Recognition Arrangement. For example, through the ILAC MRA, ILAC aims to demonstrate the equivalence of the operation of its Member Accreditation Bodies. As a consequence, the competence (within the accredited scopes) of laboratories, inspection bodies, proficiency testing providers and reference material producers accredited by these accreditation bodies is demonstrated and recognized by all signatory accreditation bodies. (*based on ILAC-P4:05/2019*)

**NATIONAL METROLOGY INSTITUTE (NMI):** There is only one NMI in each country, and it maintains that country's national standards and provides traceability to the International System of Units (the SI) at stated levels of confidence – often called measurement uncertainty (<https://www.npl.co.uk/resources/q-a/what-is-a-national-metrology-institute>)

**NATURAL CONSTANT:** A natural (physical) constant is a fundamental value that is accepted by the scientific community as valid. Natural constants are used in the basic theoretical descriptions of the universe. Examples of natural physical constants important in metrology are the speed of light in a vacuum (c), the triple point of water (273.16 K), the quantum charge ratio (h/e), the gravitational constant (G), the ratio of a circle's circumference to its diameter ( $\pi$ ), and the base of natural logarithms (e). (*ASQ The Measurement Quality Division (2012) The Metrology Handbook, Second Edition, (Jay L. Bucher Ed.), ASQ Quality Press*)

**NONCONFORMITY:** non-fulfilment of a requirement (*ISO/IEC 17021-1:2015*)

**OFF-SITE TESTING/CALIBRATION:** Any testing or calibration conducted at a facility that is different than the permanent facility assessed and accredited by IAS. (*IAS/TL-CL/026*)

**PROFICIENCY TESTING (PT):** Evaluation of participant performance against pre-established criteria by means of interlaboratory comparisons. (*ISO/IEC 17025:2017*)

**QUANTITY VALUE:** Number and reference together expressing magnitude of a quantity (*JCGM 200:2012*)

**RANDOM MEASUREMENT ERROR:** Component of measurement error that in replicate measurements varies in an unpredictable manner. (*JCGM 200:2012*)

**REFERENCE MATERIAL:** Material, sufficiently homogeneous and stable with reference to specified properties, which has been established to be fit for its intended use in measurement or in examination of nominal properties. (*JCGM 200:2012*).

**REFERENCE MEASUREMENT STANDARD:** Measurement standard designated for the calibration of other measurement standards for quantities of a given kind in a given organization or at a given location. (*JCGM 200:2012*)

**RISK:** Effect of uncertainty on objectives (*ISO 31000:2018*)

**REQUIREMENT:** Provision that conveys criteria to be fulfilled.

**SCOPE OF ACCREDITATION:** Specific laboratory activities for which accreditation is sought or has been granted (*based on ISO/IEC 17011:2017*)

**STANDARD, PRIMARY:** Measurement standard established using a primary reference measurement procedure, or created as an artifact, chosen by convention. (*JCGM 200:2012*)

**STANDARD, SECONDARY:** Measurement standard established through calibration with respect to a primary measurement standard for a quantity of the same kind. (*JCGM 200:2012*)

**STANDARD, WORKING:** Measurement standard that is used routinely to calibrate or verify measuring instruments or measuring systems. (*JCGM 200:2012*)

**STANDARD MEASUREMENT UNCERTAINTY:** Measurement uncertainty expressed as a standard deviation. (*JCGM 200:2012*)

**STATEMENT OF UNCERTAINTY:** Statement on the calibration certificate or test report of the value of measurement uncertainty for any specific test or calibration.

**SYSTEM OF QUANTITIES:** Set of quantities together with a set of noncontradictory equations relating those quantities. (*JCGM 200:2012*)

**SYSTEMATIC MEASUREMENT ERROR:** Component of measurement error that in replicate measurements remains constant or varies in a predictable manner. (*JCGM 200:2012*)

**TEST UNCERTAINTY RATIO:** The ratio of the span of the tolerance of a measurement quantity subject to calibration, to twice the 95% expanded uncertainty of the measurement process used for calibration. (*ANSI/NCSL Z540.3-2006 (R2013)*)

**TRACEABILITY:** see Metrological Traceability definition

**TYPE A EVALUATION OF MEASUREMENT UNCERTAINTY:** Evaluation of a component of measurement uncertainty by a statistical analysis of measured quantity values obtained under defined measurement conditions. (*JCGM 200:2012*)

**TYPE B EVALUATION OF MEASUREMENT UNCERTAINTY:** Evaluation of a component of measurement uncertainty determined by means other than a Type A evaluation of measurement uncertainty. (*JCGM 200:2012*)

**UNCERTAINTY BUDGET:** Statement of a measurement uncertainty, of the components of that measurement uncertainty, and of their calculation and combination. (*JCGM 200:2012*)

**UNCERTAINTY OF MEASUREMENT:** see measurement uncertainty

**VALIDATION:** Confirmation of plausibility for a specific intended use or application through the provision of objective evidence that specified requirements have been fulfilled. (*ISO/IEC 17000:2020*)

**VERIFICATION:** Confirmation of truthfulness through the provision of objective evidence that specified requirements have been fulfilled. (*ISO/IEC 17000:2020*)

## **REFERENCES**

ANSI/NCSL Z540.3-2006(R2013) American National Standard for Calibration—Requirements for the Calibration of Measuring and Test Equipment (withdrawn October 2020)

ASQ The Measurement Quality Division (2012) The Metrology Handbook, Second Edition, (Jay L. Bucher Ed.), ASQ Quality Press

IAS/ADM/052 IAS Guidance on Classification of Findings

IAS/TL-CL/026 IAS Policy on Off-Site Testing/Calibration

ILAC-P14:09/2020 ILAC Policy for Measurement Uncertainty in Calibration

ISO 19011:2018 Guidelines for auditing management systems

ISO 31000:2018 Risk Management - Guidelines

ISO/IEC Guide 2:2004 Standardization and Related Activities – General Vocabulary

ISO/IEC 17000:2020 Conformity assessment – Vocabulary and general principles

ISO/IEC 17011:2017 Conformity assessment – Requirements for accreditation bodies accrediting conformity assessment bodies

ISO/IEC 17021-1:2015 Conformity assessment — Requirements for bodies providing audit and certification of management systems

ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories

JCGM 100:2008 Evaluation of Measurement Data – Guide to the expression of uncertainty in measurement (GUM)

JCGM 200:2012 International Vocabulary of metrology – Basic and general concepts and associated terms (VIM)