UKAS
A world of confidence

LAB 5

Edition 5 December 2024 – Draft for consultation

Reporting calibration results

Contents

Changes since last edition

Document references updated. Reference added to UKAS publication *LAB 48 Decision rules and statements of conformity* and *JCGM 100:2008, Evaluation of measurement data - Guide to the Expression of Uncertainty in Measurement ('The GUM')*. §3.3 expanded to add 'normal distribution' to the uncertainty statement. §3.7 added to clarify requirements regarding recommended calibration intervals.

1. Introduction

1.1 The general requirements that testing and calibration laboratories have to meet if they wish to demonstrate that they operate to a quality system, are technically competent and are able to generate technically valid results are contained within ISO/IEC 17025:2017 [B1]. This international standard forms the basis for international laboratory accreditation and in cases of differences in interpretation remains the authoritative document at all times. LAB 5 is not intended as a prescriptive document and does not set out to introduce additional requirements to those in ISO/IEC 17025:2017 but to provide amplification and guidance on the requirements within the international standard.

1.2 This publication provides guidance for the format, presentation and wording of calibration certificates and calibration labels covered by the scope of a laboratory's UKAS accreditation to ISO/IEC 17025:2017. Laboratories following this guidance will be able to produce documentation that is easily identified as produced by a UKAS accredited calibration laboratory and that minimizes the risk of customers and readers being misled.

2. UKAS calibration accreditation symbol

2.1 The conditions for reference to UKAS accreditation on certificates and reports, including the need for clarifying statements and disclaimers when the results of non-accredited calibrations and/or opinions are reported with accredited calibrations, are given in UKAS Publication GEN 6 [B2], *Reference to accreditation and multilateral recognition signatory status by UKAS accredited bodies*. Conditions specifically for use of the national accreditation symbols, including the UKAS calibration symbol, are given in OPSS Publication "ACCREDITATION LOGO & SYMBOLS" [B3].

2.2 A calibration certificate bearing the UKAS calibration accreditation symbol is sufficient evidence of the traceability of the calibration results reported.

2.3 The ILAC MRA Mark may also be used on calibration certificates. This Mark has been registered for use with the UK Intellectual Property Office. UKAS can sublicense the Mark to accredited laboratories. All UKAS accredited laboratories are entitled to use the ILAC MRA Mark provided they have signed the ILAC MRA License Agreement and use the Mark as prescribed. The ILAC MRA Mark can only be used in conjunction with the relevant laboratory accreditation symbol. Further details are available on the "How to use the ILAC MRA Mark" page of the UKAS web site.

3. General guidance for the presentation of calibration certificates

3.1 It is recommended that:

(a) The first page of a UKAS calibration certificate is in the format shown in Figure 1 and that any continuation pages have the format shown in Figure 2

(b) Calibration certificates are issued on A4 sized paper with the accreditation symbol at the top of the page on the left or right-hand side

(c) The date of issue appears on the certificate and that all dates are in the format *day/month/year*

3.2 It is necessary for the interpretation of calibration results for calibration certificates to include the measurement uncertainty and/or a statement of conformance with an identified metrological specification or clauses thereof.

3.3 In the normal case, where calibration certificates contain measurement results, there should be a statement regarding the basis on which the reported uncertainty has been evaluated. In order to meet the rules for international acceptance of certificates under the mutual recognition agreements of ILAC and EA this evaluation should be carried out according to the GUM [B8] (or where appropriate by UKAS publication M3003 [B4] or EA publication EA-4/02 M [B5]) and the statement should be in the form given therein, e.g.,

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

NOTE: There may be circumstances under which a coverage factor other than 2 is required and therefore this statement will have to be modified accordingly. There are also circumstances under which the effective degrees of freedom should be reported. Examples are presented in UKAS document M3003.

3.4 In the case where conformity with specification statements are made, the measurement uncertainty shall be taken into account. This is described in UKAS publications LAB 48 Decision rules and statements of conformity [B7] and M3003 [B4], and in ILAC G8 [B6]. If statements of conformity are made

but results and uncertainties are omitted, then there should be a statement that describes the calibration points for which conformity is ascribed.

NOTE: References to statements of conformity apply equally to statements of nonconformity.

3.5 Unless the decision rule is implicit in a specification quoted, the decision rule used to make statements of conformity shall be described in the certificate or report. This is required by clause 7.8.6.2 (c) in ISO/IEC 17025:2017.

3.6 A laboratory may include in its calibration certificates the following statement: “UKAS is one of the signatories to the Multilateral Agreement of the European co-operation for Accreditation (EA) for the mutual recognition of calibration certificates issued by accredited laboratories.”

3.7 Any recommendation on the calibration interval must have been agreed with the customer, therefore it shall be clear from the certificate that if a calibration due date is reported it is at the customer’s request, e.g. ‘Customer requested calibration due date’. This is in accordance with ISO/IEC 17025 requirements (refer to clauses 7.8.4.3 and 7.8.2.2).

Figure 1
Recommended format for the first page of a calibration certificate

CERTIFICATE OF CALIBRATION

ISSUED BY

DATE OF ISSUE CERTIFICATE NUMBER

UKAS CALIBRATION
0000

Laboratory name and address
(and company logo if desired)

Page of pages
Approved Signatory *Name* *Signature*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Figure 2
Recommended format for continuation pages of calibration certificates

CERTIFICATE OF CALIBRATION UKAS Accredited Calibration Laboratory No. 0000	Certificate Number Page of pages

4. Calibration labels

4.1 Laboratories should apply calibration labels to measuring instruments (or, if not practicable, to the container) that they have calibrated under their accredited scope.

4.2 It is important that the label is not misleading. Therefore, if the coverage of the calibration is such that not all major parts of a metrological specification are covered with sufficient detail to give confidence in the equipment performance, the words *Limited Calibration* should be used.

4.3 Superseded UKAS calibration labels should be removed or cancelled.

4.4 The following information should be indelibly inscribed on the label by the laboratory that has performed the calibration:

(a) UKAS accreditation symbol, including the accreditation number of the calibration laboratory

(b) Instrument identification

(c) Date of calibration (with the month stated as a word)

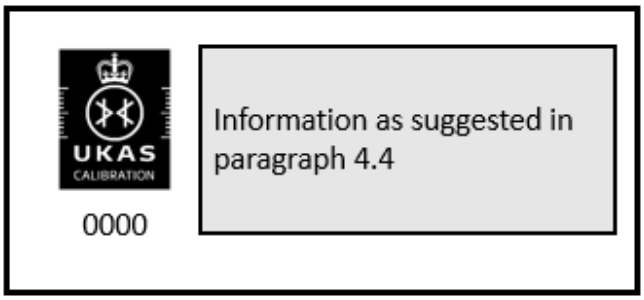
(d) Certificate number

(e) Space for the date when calibration is again due, e.g. *Recalibration due …* (date to be inserted by the customer unless the calibration laboratory has been instructed to insert this by the customer or if required by legal regulations)

(f) If desired, the name of the calibration laboratory

4.5 A suggested format and design for calibration labels is shown Figure 3.

Figure 3



Example design for calibration labels

5. Electronic reporting

5.1 ISO/IEC 17025:2017 acknowledges the increased use of electronic reporting. This may be in various forms, according to agreement with the customer and may include, but is not limited to:

(a) Reporting in a computer readable document, such as a pdf file, emailed or inserted into the customer web-based system

(b) The injection of results into the customer's computer system or web site in a data format prescribed by or agreed with the customer

(c) The provision of access for customers to their results or certificates on the laboratory's own website or other computerised arrangement for customers

5.2 There is no explicit requirement for a signature, but it is required to identify the person authorising the issuing of a report or certificate (ISO/IEC 17025:2017 7.8.2.1(o)) unless there are valid reasons for omission.

Such authorisation for issue shall be made by a person empowered by the laboratory and may involve electronic or computer mechanisms such as the use of an algorithm or filters/checks applied by the laboratory to validate the work.

5.3 It is important that all information required by the client or by the calibration method is included. ISO/IEC 17025:2017 clause 7.8.1.2 refers to this and in 7.8.1.3 there is reference to reporting in a simplified way provided that all other information is retained and available. The list of report features traditionally applied on paper reports and certificates are detailed in the standard (7.8.2.1 and 7.8.4.1) and it should be noted that these shall be included unless the laboratory has valid reasons for not doing so. Electronic reporting by injection of results into a computer system under a known, controlled and agreed procedure may satisfy that requirement.

APPENDIX A - Reference standards on UKAS accredited calibration certificates

A1 The purpose of this Appendix is to assist accredited laboratories, or their customers, with the discussions they may have with auditors from certification bodies and others about the content of calibration certificates.

A2 Difficulties may occur because auditors sometimes wish to see details of the reference standards used for calibration included on UKAS accredited calibration certificates (i.e. those bearing the UKAS calibration symbol).

A3 Any calibration laboratory that holds UKAS accreditation has to operate in accordance with ISO/IEC 17025:2017 and UKAS requirements. These requirements apply not only to the calibrations for which the laboratory offers a service, but also to all subsidiary measurements (for example, of environmental conditions) whose accuracy may significantly affect the accuracy or validity of such calibrations.

A4 The laboratory is required to have procedures for carrying out the calibrations and for the management and calibration of its reference standards of measurement and other measuring equipment. To satisfy these requirements, laboratories must hold all of the appropriate reference standards of measurement that they need and maintain them in an appropriate state of calibration to ensure traceability of measurement results.

A5 Furthermore, accredited laboratories are required to comply with other technical requirements, such as the effective training of staff, the need for a suitable environment, the adherence to technically valid procedures, the requirements for quality control, record keeping, interlaboratory comparisons and the like. A list of equipment in a calibration certificate does not demonstrate that such requirements are sufficiently addressed.

A6 UKAS assessment visits do confirm that the above requirements are being satisfied. There is therefore no need for accredited calibration certificates to provide details of the equipment used, since UKAS calibration laboratory accreditation provides all the assurances that the user needs.

A7 There may, however, be technical reasons when it might be necessary to include information about the equipment used within a calibration certificate. These may include:

(a) Circumstances when the calibration data are entered directly into the certificates, either manually or automatically, and the certificate becomes the only record of the calibration

(b) Situations when the nature of the equipment used has direct relevance to the results and a description is needed to properly interpret those results

APPENDIX B - References

B1 ISO/IEC 17025:2017, *General requirements for the competence of testing and calibration laboratories*

B2 United Kingdom Accreditation Service, GEN 6, *Reference to accreditation and multilateral recognition signatory status by UKAS accredited bodies*

B3 Office for Product Safety and Standards (Department for Business and Trade) document *ACCREDITATION LOGO & SYMBOLS - The National Accreditation Logo & Symbols: Conditions for use by UKAS and UKAS accredited organisations*

B4 United Kingdom Accreditation Service, M3003, *The Expression of Uncertainty and Confidence in Measurement*

B5 European cooperation for Accreditation, EA-4/02 M:2022 *Evaluation of the Uncertainty of Measurement in Calibration*

B6 International Laboratory Accreditation Cooperation (ILAC) Document G8:09/2019 *Guidelines on Decision Rules and Statements of Conformity*

B7 United Kingdom Accreditation Service. LAB 48, *Decision rules and statements of conformity*

B8 JCGM 100:2008, *Evaluation of measurement data - Guide to the Expression of Uncertainty in Measurement*. Known as '*The GUM*'.