



TPS 38

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The Implementation of EURAMET/cg-13 *Calibration of Temperature Block Calibrators*

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CHANGES SINCE LAST EDITION

A number of editorial changes have been made to add clarity, including additional information in sections 2.4 and 2.5. References to document EA 10/13 have been changed throughout to EURAMET/cg-13.

1 PURPOSE AND DURATION

- 1.1 This Statement sets out UKAS policy on the implementation of the recommendations in the EURAMET Guidance document EURAMET/cg-13 (formerly EA 10/13).
- 1.2 EURAMET/cg-13 was produced to improve harmonisation in the calibration of temperature block calibrators. It provides guidance to national accreditation bodies for setting minimum requirements for calibration and gives advice to calibration laboratories for establishing practical procedures and for evaluation of uncertainties, consistent with EA document EA-04/02 (*Expression of the Uncertainty of Measurement in Calibration*).

2 STATEMENT

- 2.1 EURAMET/cg-13 is a guidance document which means that the recommendations are not mandatory. UKAS supports the guidance and recommendations contained within the document and where laboratories do not follow the guidance they will need to provide justification for any deviations.
- 2.2 EURAMET/cg-13 applies only to the calibration of temperature block calibrators, not to their use as a thermal source. Annex C of EURAMET/cg-13 does give some recommendations on their use in this respect.
- 2.3 The document is only applicable to block calibrators meeting the requirements stated in Section 2 of EURAMET/cg-13, Calibration Capability. This does not mean that laboratories cannot issue UKAS certificates of calibration for blocks not meeting these requirements, but laboratories shall demonstrate that the blocks are suitable for use, particularly in respect of homogeneity, loading effects and the stated uncertainty of measurement.
- 2.4 The main requirements for the calibration will be agreed with the laboratory's customer as part of contract review. Sufficient measurements and evaluations, as recommended in Section 3 of EURAMET/cg-13 (Calibration), should be undertaken to justify the uncertainties stated in the certificate of calibration. These will include, but not be limited to:
 - (a) Establishing the axial temperature homogeneity along the boring in the measurement zone;
 - (b) Establishing the temperature differences between the borings that are to be used (as specified by the customer);
 - (c) Establishing the influence upon the temperature, in the measurement zone, due to different loadings. If the manufacturer's specification for this effect is known this should be included in the certificate of calibration. If this information is not available, measurements should be made to determine these effects, preferably with loads specified by the customer;
 - (d) Establishing the stability of the temperature, with time, in the measurement zone, over at least a 30-minute period;

- If the contract review determines that any of the above measurements are not to be carried out, then the certificate must include a clear statement of the limitation of the applicability of the reported results.
- 2.5 The thermometer(s) used for the calibration should meet the specifications stated in the document. If other types are used the laboratory shall demonstrate that they are 'fit for purpose'. ANNEX B of EURAMET/cg-13 suggests the use of a temperature probe with a 5 mm sensor length for determination of axial temperature distribution. In practice, most thermometers used for calibration of block calibrators do not meet this specification, therefore an estimate must be made of the temperature distribution along the length of the sensor in the thermometer used for the calibration. This can be estimated by raising the thermometer by a distance of approximately half of the sensor length. The measured difference in reading should be included as a component of the uncertainty of measurement.
- 2.6 The laboratory's procedures and uncertainty budgets should take into account all the relevant parts of EURAMET/cg-13 to ensure consistency of application from one occasion to another.
- 2.7 The certificate of calibration should be consistent with the recommendations in respect of the reporting of results as stated in UKAS Publication LAB 5.
- 2.8 In order to ensure that the results are reported clearly and unambiguously, and to avoid the possibility of misuse or misunderstanding by the laboratory's customer, the certificate of calibration should:
- (a) take account of all items agreed at the contract review;
 - (b) state the type of thermometer used, its nominal dimensions and sheath material;
 - (c) (if resistance thermometers are used) state the nominal length of the measuring sensor.
- 2.9 The certificate should also include at least a summary, as applicable, of the results obtained from axial temperature distribution measurements, temperature differences between borings, loading effects, and temperature stability.

Contact

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