

Annex B: Dimensional measurements (normative)

B.1 General

This annex contains specific technical requirements not covered in ISO/IEC 17025 that are applicable to a laboratory recognized as competent to carry out dimensional calibrations.

B.2 Accommodation and environmental conditions

B.2.1 Thermal conditions affecting artifacts

- a) Measurement results are generally reported as the length at 20 °C. If measurements are made at temperatures other than 20 °C, the uncertainties of the appropriate thermal corrections for the artifacts shall be included in the total uncertainty.
- b) For comparison measurements, the uncertainty component shall reflect the uncertainty in the thermal corrections of both the master and unknown artifacts, as well as the temperature difference between them, and the uncertainty of the temperature sensor used.

B.2.2 Ambient temperature considerations

- a) The temperature stability of the environment shall be sufficient for the gage and measurement system to be in thermal equilibrium.
- b) If measurements are made in slowly changing environments, a suitable measurement model, which includes the effects of the drift, shall be used. Theoretical and experimental verification of the model should be available.

B.2.3 For typical gages made of well-characterized materials (steel, carbide, or ceramic), $\pm 10\%$ shall be used as the standard uncertainty of the thermal expansion coefficient unless there is documentation of a lower value.

B.2.4 The laboratory shall have a documented policy regarding responses to environmental conditions outside of specified range.

B.3 Equipment

B.3.1 The laboratory shall have temperature-measuring capabilities suitable for the calibration procedure and the desired measurement uncertainty.

NOTE Calibrations involving direct comparisons of artifacts of similar size and materials will, in general, have modest requirements. Absolute calibrations or comparisons between artifacts of different sizes and/or materials will require more accurate temperature measurement or adjustment of the measurement uncertainty.

B.3.2 A laboratory that makes mechanical comparisons of masters and test pieces of dissimilar materials shall have force measuring equipment to determine the force on the probe or probes. A correction for differential probe penetration should be applied as long as the probe has maintained its desired geometry.