

Calibration Certificates

What is a calibration certificate?

A calibration certificate is the output of a metrology lab, and the thing that ties the work in the laboratory to its customer's artifacts. Calibration certificates can be provided in paper or electronic versions, or both.

[NISTIR 6969](#) SOP 1 Appendix A provides an example calibration certificate for a mass calibration.

What are the necessary components of a calibration certificate?

Calibration certificates must contain all the information require in section 7.8 of [ISO/IEC 17025:2017](#), section 2 of [NISTIR 6969](#) SOP 1, and any additional requirement specific to the standard operating procedure (SOP) followed (this is typically section 6 for NIST SOPs).

Aside from logistical components for the calibration certificate such as the description of the artifact(s), date, and environmental conditions; calibration certificates must contain three principal statements. These statements need to contain information about the conformity of the artifact(s), the traceability of the measurement to the SI, and the uncertainty of the measurement results. These statements can be independent sections of the report, each with their own title or they can be presented together as one single body of text. As long as the required information is clearly present to the customer, it can meet the [ISO/IEC 17025:2017](#) standards.

What is an uncertainty statement?

An uncertainty statement must convey to the reader the general methodology used to develop the expanded uncertainty and the estimated expanded uncertainty and coverage factor for each measurement result in the calibration certificate. [NISTIR 6969](#) SOP 1 and [Guide to the Expression of Uncertainty in Measurement \(GUM\)](#) provide guidance for developing estimates of uncertainty.

What is a traceability statement?

A statement of traceability informs readers of how the measurement results in the certificate are metrologically traceable to the SI or other specific standard. [ISO/IEC 17025:2017](#) Annex A and [International Vocabulary of Metrology 2012 edition \(VIM\)](#) provide additional guidance around the elements of traceability and how metrological traceability must be established.

What is a conformity statement?

A conformity statement is required whenever an artifact is being compared to all or part of a documentary standard, such as [NIST Handbook 105 Series](#), [ASTM E617](#), or [OIML R111](#). See Section 2.15 of [NISTIR 6969](#) SOP 1 for additional guidance.

What is a certificate review and how to conduct and document the review?

A certificate review is an activity to see if a certificate complies with [ISO/IEC 17025:2017](#) and [NISTIR 6969](#) SOP 1. Typically, these reviews are completed internally by a metrologist or technician in the laboratory, but they are also sometimes completed externally as part of a regional proficiency test (PT). To complete a certificate review, the reviewer will need a

list of required components (these come from [ISO/IEC 17025:2017](#), [NISTIR 6969](#) SOP 1 and the specific SOP used and a finalized certificate).

[NISTIR 6969](#) SOP 1 Appendix B provides a checklist of requirements from [ISO/IEC 17025:2017](#). [NIST Special Publication 811](#) provides guidance to the expression of numerical values and their associated units and has a checklist to assist in a document review. These checklists should be completed and a certificate marked up like the example certificate review that has been provided.

Tips from metrologists around the country

- Calibration certificates should not be bespoke, as much as possible make all the laboratory certificates the same. This not only makes creating them easier, but it also makes the information easier for your customers to find on each certificate.

How to issue a calibration certificate?

Once a template certificate has been created, it can be filled out by any designated member of staff, but a metrologist must review the results and the certificate before authorizing its release with their signature.

What should not be on a calibration certificate?

Avoiding subjective opinions is crucial to the integrity of the document. It is inevitable that a metrologist will have to make a somewhat subjective decision about the compliance of an artifact. For example, if a cast weight hasn't been painted recently and rust has begun to accumulate on the standard, at what point has sufficient rust accumulated to judge the standard as noncompliant? In these cases, the metrologist must include their decision criteria for the rejection, and the metrologist should dialogue separately with the customer about the noncompliance. It is also admissible to reject an artifact without issuing a calibration certificate.

How to amend a calibration certificate?

After a certificate has been issued any changes need to be documented with official amendments. These amendments are usually documented with a different certificate number (which references the original certificate), a title change from "Calibration Certificate" to "Amended Calibration Certificate", and the reason for the amendment added to the text in the amended certificate.

Additional Resources

[ISO/IEC 17025:2017](#) Section 7.8

[NISTIR 6969](#) SOP 1 (2019)

NIST Procedure SOP Section 6 Certificate

[NIST Special Publication 811](#) (SP811) (2008)

NIST Webinar: Calibration Certificate Review