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**Confidence
in measurement**



**Calibration certificates:
2021 update**



Kistler calibration services



Kistler is the world market leader in the field of dynamic measurement technology. Uncompromising quality and maximum precision are our daily goals. This applies both to the products we manufacture and the services we provide. Our comprehensive range of services features several types of calibration: service calibrations, available worldwide at Kistler sites; traceable calibrations, performed by laboratories accredited to ISO/IEC 17025; onsite calibrations at our customers' premises; and in-situ calibrations, if it is impossible to disassemble the measurement setup.

The updated version of ISO/IEC 17025: 2017 for traceable calibrations introduces some changes. This brochure describes the most important changes and fundamental contents of this norm.

The general requirements are defined by ISO 9001:2015, which states (in section 7.1.5.2, Measurement traceability, extract):

When measurement traceability is a requirement, or is considered by the organization to be an essential part of providing confidence in the validity of measurement results, measuring equipment shall be:

- a) calibrated or verified, or both, at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards; when no such standards exist, the basis used for calibration or verification shall be retained as documented information;
- ...

Calibration certificates



When performing a calibration, the calibration technician must follow specified rules and instructions; in particular, only validated calibration procedures are used.

The result of a calibration is shown in a calibration certificate. There are normative specifications for the contents and form

of the calibration certificates for traceable calibrations only, while the presentation of the results from end-of-line or Service calibrations are not subject to any standards.

A report is included in the scope of each calibration – this is the calibration certificate. ISO/IEC 17025:2017 defines the data that must be covered by a calibration certificate.

ISO/IEC 17025:2017, 7.8.2 states that a calibration certificate must always include:

- a) a title (e.g. "Test Report", "Calibration Certificate" or "Report of Sampling");
- b) the name and address of the laboratory;

No changes.

- c) the location of performance of the laboratory activities, including when performed at a customer facility or at sites away from the laboratory's permanent facilities, or in associated temporary or mobile facilities;

Check valid entries!

- d) unique identification that all its components are recognized as a portion of a complete report and a clear identification of the end;

New: a clear identification of the end is requested. "Page 3 of 3" or similar is not sufficient – the end shall be marked with a horizontal line and/or "end of certificate" entry to prevent that data can be added.

- e) the name and contact information of the customer;

Check: customer names and/or company structure and names change quite often. Laboratories often work with copy and paste and former names appear! An auditor will not accept that. The name the company had at the time of calibration is requested.

- f) identification of the method used;
- g) a description, unambiguous identification, and, when necessary, the condition of the item;

No changes.

- h) the date of receipt of the test or calibration item(s), and the date of sampling, where this is critical to the validity and application of the results;

Certificates are issued for sampling (chemicals, materials), too. In those cases it can make sense to record the date of the receipt of the item. For standard calibration items the date of calibration is crucial.

- i) the date(s) of performance of the laboratory activity;

See above.

- j) the date of issue of the report;
- k) reference to the sampling plan and sampling method used by the laboratory or other bodies where these are relevant to the validity or application of the results;
- l) a statement to the effect that the results relate only to the items tested, calibrated or sampled;

No changes.

"Old" version of a DAkkS certificate

Major differences

"New" and current version of a DAkkS-certificate

1 Header of certificate:
For the purposes of this statement, the (German) accreditation body is no longer responsible – the focus is on the laboratory that performs the calibration.

2 Copyright text:
For the purposes of this statement, the (German) accreditation body is no longer responsible – the focus is on the laboratory that performs the calibration.

3 "Signature" line:
No signature is needed – only the name of the responsible/releasing individuals. These are usually the head of the laboratory performing the calibration and the deputy.

m) the results with, where appropriate, the units of measurement;

Mandatory, no changes.

n) additions to, deviations, or exclusions from the method;

No changes.

o) identification of the person(s) authorizing the report;

No signature needed – just the name of the responsible/releasing persons. Those are usually the head of the performing calibration laboratory and the deputy.

p) clear identification when results are from external providers.

No explanation necessary.

NOTE: Including a statement specifying that the report shall not be reproduced except in full without approval of the laboratory can provide assurance that parts of a report are not taken out of context.

The (German) accreditation body does no longer appear in this statement as responsible – the performing laboratory is set in focus.



In addition to these basic requirements, ISO/IEC 17025:2017 specifies further requirements and devotes a separate chapter to them in section 7.8.4, Specific Requirements for Calibration Certificates:

7.8.4.1 In addition to the requirements listed in 7.8.2, calibration certificates shall include the following:

a) the measurement uncertainty of the measurement result presented in the same unit as that of the measurand or in a term relative to the measurand (e.g. percent);

No explanation is necessary.

NOTE: According to ISO/IEC Guide 99, a measurement result is generally expressed as a single measured quantity value including unit of measurement and a measurement uncertainty.

b) the conditions (e.g. environmental) under which the calibrations were made that have an influence on the measurement results;

No changes.

c) a statement identifying how the measurements are metrologically traceable (see Annex A);

No changes – very important: check!

d) the results before and after any adjustment or repair, if available;

This depends on what the customer requests. The customer may request "as found – as left" calibrations. These are two separate calibrations on the incoming item: "check/repair/adjust", and a second calibration of the repaired/adjusted item. This usually causes extra costs. A statement of conformity must be based on a decision rule that is communicated to the customer. See the Kistler flyer: "Statement of conformity in calibration certificates".

e) where relevant, a statement of conformity with requirements or specifications (see 7.8.6);

f) where appropriate, opinions and interpretations (see 7.8.7).



Intervals on calibration certificates

Measuring device holders often require specification of a calibration interval or the time of the next calibration on a calibration certificate.

ISO/IEC 17025: 2017 states:

7.8.4.3 A calibration certificate or calibration label shall not contain any recommendation on the calibration interval, except where this has been agreed with the customer.

Only the measuring device holder (or their QM system) knows how the measuring device is used (single-shift or “round the clock” operation, laboratory conditions or on-site use), and these influencing factors must be considered when assigning the calibration interval.

Specification of a calibration interval on a calibration certificate without the customer's consent would amount to inadmissible interference by the calibration center in the device holder's QM system. It could even constitute an attempt to ensure customer loyalty, which would not be permitted.

For these reasons, it is the measuring device holder who must specify the interval; by providing this information, which should preferably be communicated to the calibration laboratory in writing, the device holder gives their consent.

DAkkS calibration marks never state an interval or the next calibration.

DAkkS calibration marks have a standardized form:
 They are 18x28 mm in size and blue in color.
Line 1: count number
Line 2: DAkkS registration number of the calibration center
Line 3: year and month of calibration



In addition to the DAkkS sticker, it is permissible for customers to affix their (own) factory sticker with information about the interval or, even better, the date of the calibration/the date of the next calibration of the measuring equipment.

Company logo
Calibrated by:
Order no.:
Calibrated on/next calibration:

Example



General information about calibrations

- During calibrations, around 8% of all test and measurement devices are found to need adjustments or repairs.

This figure of 8% does not include:

- Devices identified as "defective" when presented to the manufacturer or calibration service (these are often identical).
- Cases where the operator knew that there was a failure (malfunction or breakage). The 8% figure refers to devices presented for "calibration only", which users did not suspect of measuring incorrectly or inaccurately.
- This number involves a degree of uncertainty, but it is based on evaluation of a large device pool (> 250,000 devices including over 10,000 different device types, ranging from simple multimeters to spectrum analyzers and high-end equipment).

Training by Kistler



This brochure is a brief summary of some of the information provided in a full-day seminar offered by Kistler.

Our seminar offers full insights into standards and references; terms such as accreditation, traceability and measurement uncertainty are explained in detail; and one complete section of the seminar focuses on calibration intervals and interval calculations.

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Test and Measurement equipment management and calibration

Description Target Dates Content

Course code: 9966B28-13 MMK01

The monitoring and calibration of measuring and inspection instruments are defined in various standards. Specifications governing calibration laboratories have also been defined. This seminar will provide an introduction to the proper, specific ways to work with measuring instruments from a technical and organizational perspective. Participants will learn how to properly communicate with the calibration device and define calibration intervals. The most important metrology terms will also be explained, using the implementation of requirements in the DIN ISO9000 series and EN ISO 17025 as the basis. Fundamental principles for a process-oriented, certifiable measuring instrument management and tips on how to successfully pass an audit complete the seminar content.

Content

- General measurement technology
- The SI international system of units
- Measuring instrument management and ISO 9000
- Gauging and calibration
- Traceability
- Uncertainty of measurement or tolerance indication
- Calibration certificate content
- DKD/DakS
- Accreditation/calibration laboratory with accreditation
- Setup of a measuring instrument management system
- Calibration planning
- Testing for electrical safety DGUV A3
- Analysis of machine capability MCA

Measurement instrument capability

Check out the online version of our training specification:

<https://www.kistler.com/en/services/training/type-9966b28-13-mmk01/>

Measuring instrument management and calibration

Seminar description

The monitoring and calibration of measuring and inspection instruments are defined in various standards. Specifications governing calibration laboratories have also been defined. This seminar will provide an introduction to the proper, specific ways to work with measuring instruments from a technical and organizational perspective. Participants will learn how to properly communicate with the calibration device and define calibration intervals. The most important metrology terms will also be explained, using the implementation of requirements in the DIN ISO9000 series and EN ISO 17025 as the basis. Fundamental principles for a process-oriented, certifiable measuring instrument management and tips on how to successfully pass an audit complete the seminar content.

Seminar content

- General measurement technology
- The SI international system of units
- Measuring instrument management and ISO 9000
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- Testing for electrical safety DGUV A3
- Analysis of machine capability MCA
- Measuring instrument capability

Goal

Application of measuring technology fundamentals in daily work.

Trainer/Lecturer

- Peter Jäger, Metrologist

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Target group

Persons in charge of measuring equipment, measuring instrument owners

Prerequisite for participation

None

Duration

1 day

8:30 a.m.–5:30 p.m.

Seminar number

9966B28-13 MMK01 (at Kistler Remscheid GmbH)

Seminar fee

450 €

This seminar can also be held on-site at your company upon request. Please inquire about dates and cost.

Register at:

training.de@kistler.com

Downloaded pdf list of training specifications

Standards, norms and references

The following documents are the basis and normative reference for this guideline. There are several subordinate documents that may have to be applied.

- International Vocabulary of Metrology. Basic and general concepts and associated terms (VIM), August 2012; DIN e.V. (publisher), Burghart Brinkmann (author)
- DIN EN ISO 17025:2017: General requirements for the competence of testing and calibration laboratories
- DIN EN ISO 10012:2003: Measurement management systems. Requirements for measurement processes and measuring equipment
- ILAC-G8:03/2009: Guidelines on the Reporting of Compliance with Specification
- IATF 16949: Quality management system requirements for automotive production and relevant service parts organizations
- DIN EN ISO 9001:2015: Quality management systems – Requirements
- UKAS M3003: The Expression of Uncertainty and Confidence in Measurement (Edition 4, 2019)
- Jäger, Peter: Calibration compendium, ISBN 9783750436039
- Jäger, Peter: Anwenderwissen Kalibrierschein und Kalibriermarke, ISBN 9783751995061

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