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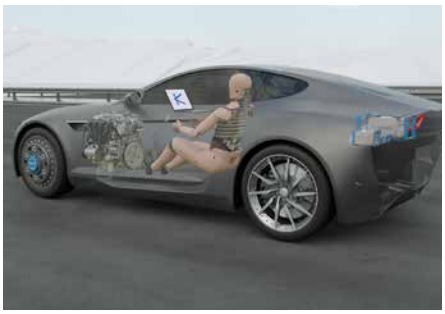
Statement of conformity in calibration certificates

www.kistler.com

Absolute Attention for tomorrow's world

Kistler develops solutions for challenges in measurement technology with a portfolio that comprises sensors, electronics, systems and services. We push the frontiers of physics in fields such as emission reduction, quality control, mobility and vehicle safety: our products deliver top performance to meet the standards of tomorrow's world, providing the ideal basis for Industry 4.0. This is how we pave the way for innovation and growth – for our customers, and with our customers.



Kistler: the byword for advances in engine monitoring, vehicle safety and vehicle dynamics. Our products deliver data that plays a key part in developing efficient vehicles for tomorrow's world.

Measurement technology from Kistler ensures top performance in sport diagnostics, traffic data acquisition, cutting force analysis and many other applications where absolutely reliable measurements are required despite extreme conditions.

By supporting all the stages in networked, digitalized production, Kistler's systems maximize process efficiency and cost-effectiveness in the smart factories of the next generation.

Content

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 DIN EN ISO/IEC 17025; onsite calibrations at our customers' premises; and in-situ calibrations, if it is impossible to disassemble the measurement setup.

Calibration certificates

Calibration certificates are the visible result of any calibration. They provide information about the unit under test and state the measurement results with the (extended) uncertainty.

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DAkkS Deutsche Akkreditierungsstelle D-K-17572-01-00

Kalibrierlaboratorium für die Messgröße Drehmoment und Drehwinkel
Calibration laboratory for the measurands torque and rotational angle

Kalibrierschein / Calibration Certificate
erstellt durch das Kalibrierlaboratorium
issued by the calibration laboratory

Kistler Remscheid GmbH
Kölner Strasse 71
DE - 42897 Remscheid

12345
D-K-17572-01-00
2019-04
Kalibrierzeichen
Calibration mark

Gegenstand: *Object* — **Drehmomentaufnehmer mit Messgerät** *torque transducer with measuring box*

Aufnehmer / *Transducer*:
Mod.Nr / *Mod.No.*:
Artikelnr. / *Art.No.*:
Serien-Nr. / *Serial number*:
Hersteller / *Manufacturer*: **Kistler Remscheid GmbH, 42897 Remscheid**

Messgerät / *Measuring box*:
Mod.Nr / *Mod.No.*:
Artikelnr. / *Art.No.*:
Serien-Nr. / *Serial number*:
Hersteller / *Manufacturer*: **Kistler Remscheid GmbH, 42897 Remscheid**

Auftraggeber: *Customer* — **Postfach/Po.** -

Auftragsnummer: *Order No.* — —

Anzahl der Seiten des Kalibrierscheines: *Number of pages of the certificate* — 5

Datum der Kalibrierung: *Date of calibration* — **2019-04-06**

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem internationalen Einheitensystem (SI).
Die DAkkS ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).
The DAkkS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.
The item user is responsible for recalibration at appropriate intervals.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Deutschen Akkreditierungsstelle GmbH als auch des ausstellenden Kalibrierlaboratoriums.
Dieser Kalibrierschein ist auch ohne Unterschrift gültig.
This calibration certificate may not be reproduced other than in full except with the permission of both the Deutsche Akkreditierungsstelle GmbH and the issuing laboratory. This calibration certificate is valid without a signature.
This calibration certificate is based on the German issue. In case of doubt only the German version is valid.

Datum der Ausstellung *Date of issue*	Freigabe des Kalibrierscheins durch Stellv. Leiter des Kalibrierlaboratoriums *Approval of the calibration certificate by Vice head of the calibration laboratory*	Bearbeiter *Person in charge*
2020-09-21	Michael Stader	0

Postanschrift / Mailing address
Kistler Remscheid GmbH
Kalibrierlaboratorium
Kölner Strasse 71
DE - 42897 Remscheid

Telefon / Telephone
++49 (0) 2191 698-0
E-Mail: info.KRE@Kistler.com

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; ...

This documentation requirement was adapted in DIN ISO/IEC 17025: 2017, the international standard for the accreditation of calibration laboratories.

As well as listing the requirements for laboratories, this standard provides valuable information about what customers can expect from the calibration service, and it also describes the related documentation that the customer is entitled to receive.

A calibration certificate corresponding to a traceable calibration must be compliant with DIN ISO/IEC 17025: 2017.

DIN EN 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;
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;
d) unique identification that all its components are recognized as a portion of a complete report and a clear identification of the end;
e) the name and contact information of the customer;
f) identification of the method used; a description, unambiguous identification, and, when necessary, the condition of the item;
g) 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;
h) the date(s) of performance of the laboratory activity;
i) the date of issue of the report;
j) 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;
k) a statement to the effect that the results relate only to the items tested, calibrated or sampled; the results with, where appropriate,
l) the units of measurement;
m) additions to, deviations, or exclusions from the method;
n) identification of the person(s) authorizing the report;
o) clear identification when results are from external providers.

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.

In addition to these basic requirements, DIN EN 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);

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;

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

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

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).

DIN EN ISO/IEC 17025:2017 goes on to cover requirements for statements of conformity in a specific section on this subject:

7.8.6 Reporting statements of conformity

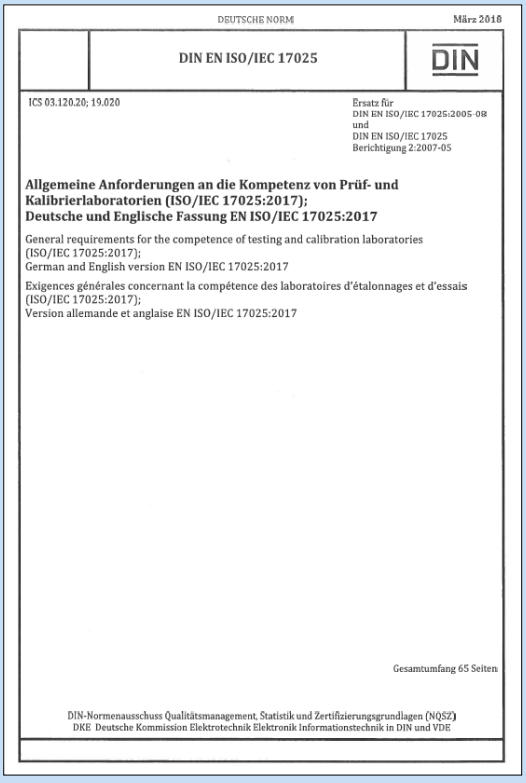
7.8.6.1 When a statement of conformity to a specification or standard is provided, the laboratory shall document the decision rule employed, taking into account the level of risk (such as false accept and false reject and statistical assumptions) associated with the decision rule employed, and apply the decision rule.

NOTE: Where the decision rule is prescribed by the customer, regulations or normative documents, a further consideration of the level of risk is not necessary.

7.8.6.2 The laboratory shall report on the statement of conformity, such that the statement clearly identifies:
a) to which results the statement of conformity applies;
b) which specifications, standards or parts thereof are met or not met;
c) the decision rule applied (unless it is inherent in the requested specification or standard).

NOTE: For further information see ISO/EC Guide 98-4.

5.1 Remarks:
According to the requirement stated in standard DIN EN ISO 6789-2: 2017, the calibration result is within ± 4%, traceable to national standards.



DEUTSCHE NORM März 2018

DIN EN ISO/IEC 17025

DIN

ICS 03.120.20; 19.020

Ersatz für
DIN EN ISO/IEC 17025:2005-08
und
DIN EN ISO/IEC 17025
Berichtigung 2:2007-05

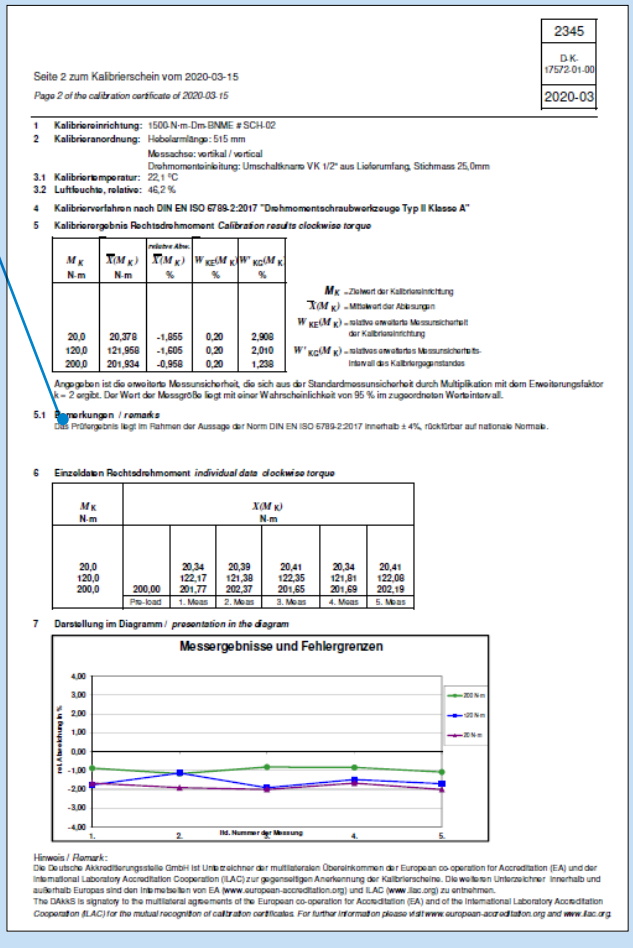
**Allgemeine Anforderungen an die Kompetenz von Prüf- und Kalibrierlaboratorien (ISO/IEC 17025:2017);
Deutsche und Englische Fassung EN ISO/IEC 17025:2017**

General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2017);
German and English version EN ISO/IEC 17025:2017

Exigences générales concernant la compétence des laboratoires d'étalonnages et d'essais (ISO/IEC 17025:2017);
Version allemande et anglaise EN ISO/IEC 17025:2017

Gesamtumfang 65 Seiten

DIN-Normenausschuss Qualitätsmanagement, Statistik und Zertifizierungsgrundlagen (NQSZ)
DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE



2345
D-K-17572-01-00
2020-03

Seite 2 zum Kalibrierschein vom 2020-03-15
Page 2 of the calibration certificate of 2020-03-15

1 **Kalibriereinrichtung:** 1500-N-m-Drm-BNME # SCH-02
2 **Kalibrieranordnung:** Hebelarmlänge: 515 mm
Messachse: vertikal / vertical
Drehmomenteinleitung: Umschaltknarre VK 1/2" aus Lieferumfang, Stichmass 25,0mm
3.1 **Kalibriertemperatur:** 22,1 °C
3.2 **Luftfeuchte, relative:** 46,2 %
4 **Kalibrierverfahren nach DIN EN ISO 6789-2:2017 "Drehmomentschraubwerkzeuge Typ II Klasse A"**
5 **Kalibrierergebnis Rechtsdrehmoment** *Calibration results clockwise torque*

M_K N·m	$\bar{X}(M_K)$ N·m	relative Abw. $\bar{X}(M_K)$ %	$W_{KE}(M_K)$ %	$W'_{KC}(M_K)$ %
20,0	20,378	-1,855	0,20	2,908
120,0	121,958	-1,605	0,20	2,010
200,0	201,934	-0,958	0,20	1,238

M_K = Sollwert der Kalibrierseinrichtung
$\bar{X}(M_K)$ = Mittelwert der Ablesungen
$W_{KE}(M_K)$ = relative erweiterte Messunsicherheit der Kalibrierseinrichtung
$W'_{KC}(M_K)$ = relatives erweitertes Messunsicherheits-Intervall des Kalibriergegenstandes

Angegeben ist die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor k = 2 ergibt. Der Wert der Messgröße liegt mit einer Wahrscheinlichkeit von 95 % im zugeordneten Wertintervall.

5.1 **Bemerkungen** / *remarks*
Das Prüfergebnis liegt im Rahmen der Aussage der Norm DIN EN ISO 6789-2:2017 innerhalb ± 4%, rückführbar auf nationale Normale.

6 **Einzeldaten Rechtsdrehmoment** *individual data clockwise torque*

M_K N·m	$X(M_K)$ N·m					
20,0		20,34	20,39	20,41	20,34	20,41
120,0		122,17	121,38	122,35	121,81	122,08
200,0		201,77	202,37	201,65	201,69	202,19
	200,00	1. Meas	2. Meas	3. Meas	4. Meas	5. Meas
	Pre-load					

7 **Darstellung im Diagramm** / *presentation in the diagram*

Hinweis / *Remark:*
Die Deutsche Akkreditierungsstelle GmbH ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine. Die weiteren Unterzeichner innerhalb und außerhalb Europas sind den Internetseiten von EA (www.european-accreditation.org) und ILAC (www.ilac.org) zu entnehmen.
The DAkkS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates. For further information please visit www.european-accreditation.org and www.ilac.org.

A statement of conformity of this sort can be one short sentence in everyday language.

Statement of conformity in a calibration certificate

A statement of conformity is included in the certificate in response to requests from many holders of measuring equipment. It indicates whether or not a measuring device complies with specifications (e.g. the manufacturer's specifications) at the end of a calibration.

To make this decision, it is necessary to determine the "rule": the standard mentions a "decision rule". There is no binding requirement for a statement of conformity. This can be agreed between the calibration laboratory and the device holder/owner, so there are various models for agreements that can be reached.

Normative/specifications to be agreed for the statement of conformity:

- Statement of conformity according to 14253-1
- Statement of conformity according to ILAC G9 8-2009
- Statement of conformity according to DAkkS-DKD-5
- Statement of conformity disregarding the measurement uncertainty
- Statement of conformity according to individual customer requirements
  From them, statements about conformity/the decision rule can be derived according to customer requirements . For example:
  - disregarding the measurement uncertainty
  - "shared risk"
  - individual requirements

An agreement must be made with the calibration laboratory if a statement of conformity is requested in the calibration certificate.

Various practices are currently applied for the (legal) definition of this agreement:

- The calibration laboratory includes its own wording in the order confirmation; this can also take the form of a small footnote
- The calibration laboratory has a flyer/information letter stating the decision rule, unless agreed otherwise
- A wording is included in the calibration laboratory's General Terms and Conditions

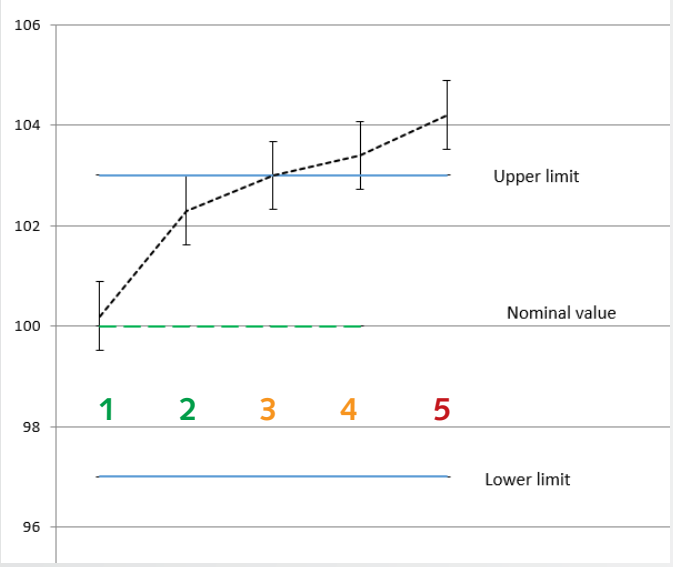
If the calibration laboratory is requested to include a statement of conformity in the calibration certificate, the decision rule should also be specified. Otherwise, the decision rule notified to the customer in one of the ways described above, or in a similar way, is regarded as an agreement! The most common models for a decision rule are presented and explained below.

1 The instrument complies with the specifications, taking the measurement uncertainty into account.

2 The measurement is within the error limits. Even if the measurement uncertainty is taken into account, the result will meet – but will not exceed – the specification limits.

3 The measurement is within the error limits. Taking the measurement uncertainty into account, no statement can be made about compliance with the specification. Compliance is more likely than failure.

4 The measurement is outside the error limits. Taking the measurement uncertainty into account, no statement can be made about compliance with the specification. Compliance is less likely than non-compliance.



5 When the measurement uncertainty is taken into account, the measurement result is above the upper error limit. The instrument does not meet the specifications.

Decision rule – what does it mean?

The diagram shows possible cases that can occur when a measurement is recorded. In each case, the measured value is on the dashed line, and the double T represents the measurement uncertainty that applies to the measurement.

For the first two measuring points, the measured value – including the assigned measurement uncertainty – is clearly within the specification limit.

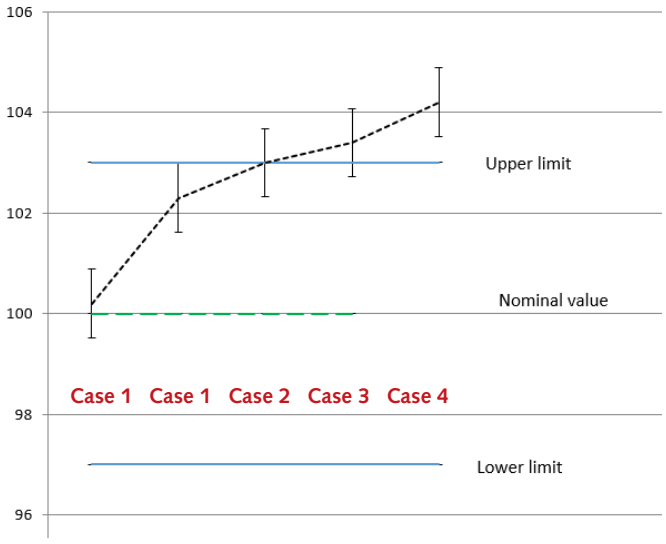
The second measurement is also within the limits. The uncertainty hits the upper limit. This is still assessed as "Case 1".

In "Case 2", it can be seen that the measured value coincides exactly with the specification limit – but due to the measurement uncertainty involved, the value could also lie outside the specification limit.

In "Case 3", it can be seen that the measured value is clearly outside the specification limit – but due to the measurement uncertainty involved, the value could also be within the specification limit.

In "Case 4", when the measurement uncertainty is included, the value is out of specification.

ILAC Guideline G8 (ILAC: International Laboratory Accreditation Cooperation) defines these situations as "Cases":



a clear statement on conformity or non-conformity can only be made for Case 1 and Case 4.

Summary: There is no binding requirement for a statement of conformity. This can/must be agreed between the calibration laboratory and the device holder/owner if a statement of conformity is requested.

Must a device be “compliant”?

The purpose of a calibration is to determine a measurement deviation. Ideally, a measuring device would always display exactly the value that it is measuring.

In practice, this is never the case.
But when is the device “OK” – and when is it not “OK”?

All measuring devices have three basic characteristics:
- Precision
- Repeatability
- Linearity

If a measuring device always measures “wrongly” at the same point in its characteristic curve, this is not a problem: the correct value can be determined with the help of a correction table. In modern devices, the table can be stored in a memory block with automatic correction of the display.

Calibration certificates indicate the values determined over the measuring range – the user can correct the measurement results.

But many users find that this involves too much expense or effort, so the Standards Committee was asked to devise an easy way of evaluating the calibration result. Users want to be able to see quickly whether their device is as precise as it was when they bought it. To achieve this, the statement of conformity was introduced.

However, there is still no reason not to work with the measured values determined during calibration – the device is not defective.

General information about calibrations

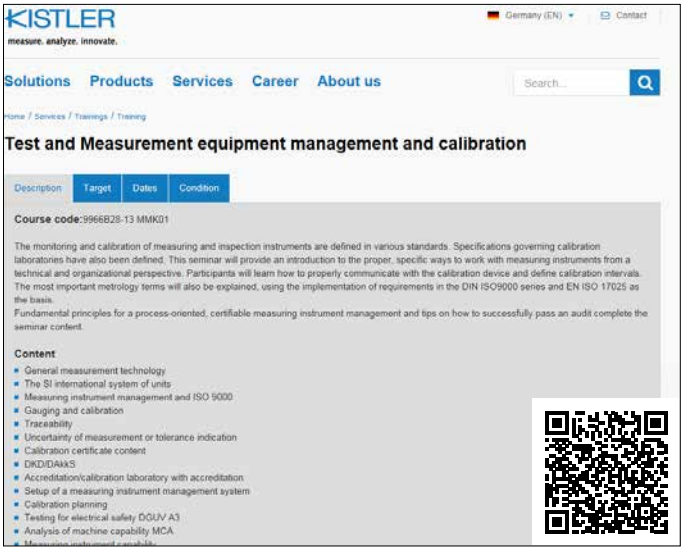
- During calibrations, around 8% of all test and measurement devices are found to need adjustments or repairs.

This figure of 8% does not include:

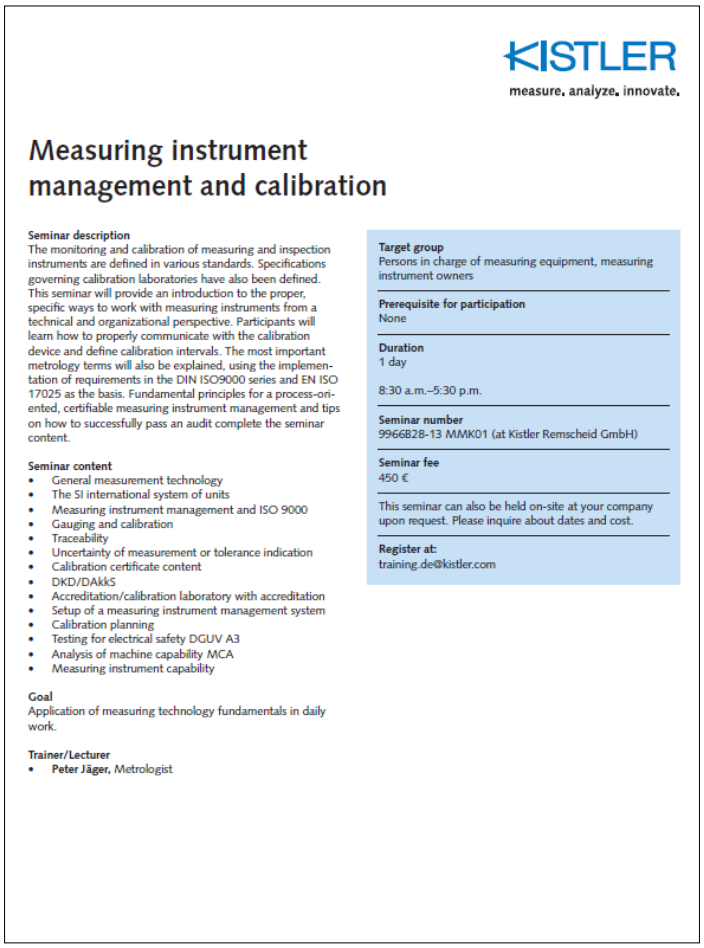
- Devices identified as "defective" when presented to the manufacturer or calibration service (these are often identical).
- Cases where the operator knew that there was a failure (malfunction or breakage). The 8% figure refers to devices presented for "calibration only", which users did not suspect 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.



Check out the online version of our training specification:
https://www.kistler.com/en/services/training/type-9966b28-13-mmk01/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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
- Gauging and calibration
- Traceability
- Uncertainty of measurement or tolerance indication
- Calibration certificate content
- DKD/DAkkS
- 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
- Measuring instrument capability

Goal
Application of measuring technology fundamentals in daily work.

Trainer/Lecturer
- **Peter Jäger,** Metrologist

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

Find out more about our applications:
www.kistler.com/solutions

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The Kistler Group includes Kistler Holding AG and all its subsidiaries in Europe, Asia, the Americas and Australia.

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