

Calibrations and Calibration Certificates

Calibration - How do the various calibration certificates differ?

Calibrations: Accompanying to the measuring device, the basis for precise and safe measurements

Calibration certificates help to monitor and ensure the accuracy of high-quality measuring instruments and sensors. This is also why they are required by relevant standardized quality assurance processes on a regular basis. The accuracy thus proven is essential for permanently precise measurements, which are, for example, the basis for quality and safety in laboratories, manufacturing processes and environmental monitoring. In addition, reliable measurements are also the basis for economic operation and efficient processes.

Drift due to ageing and proper functioning of measuring devices are thus regularly monitored, expensive faulty measurements become less likely, monitoring and documentation by means of calibrated devices secure the user's decisions.

Many units offer a *test protocol ex works* - this is proof that the unit has been properly manufactured in accordance with Greisinger quality criteria.

For professional use beyond that and over the lifetime of the measuring equipment, there are two practice-relevant calibration levels: the simple *factory calibration*, and the traceable *DAkkS calibration*.

Factory Calibration

The documentation in a factory calibration certificate (not subject to any formal obligation) contains:

- Documentation according to country-specific requirements
- List of the individual measured values
- Specification of the test standard used
- All measurement results contain measurement uncertainty information with $k=2$ according to ISO 9001 requirements.

Our in-house factory calibrations offer:

- Proof of quality by our calibration laboratory
- All factory standards used refer to SI units
- We work with high-quality references and standards in all areas

The recognition of the factory calibration is the responsibility of the client. Factory calibration certificates do not contain an accreditation symbol.

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DAKKS-accredited-Calibration

The traceability to the national standard of the PTB is guaranteed.

The documentation contains:

- certificate with accreditation symbol as required by DIN EN ISO/IEC 17025
- List of the individual measured values
- Specification of the test standard used.
- Calculation of the expanded measurement uncertainty (as required by DIN EN ISO/IEC 17025)

DAKKS-accredited-calibrations offer:

- Proof of quality by an accredited laboratory
- The standards are regularly subjected to interim tests and externally DAkkS calibrated.
- worldwide acceptance: "The Deutsche Akkreditierungsstelle GmbH" is a signatory of the Multilateral Agreements of EA, ILAC and IAF for mutual recognition".
- DAkkS accreditation ensures that all calibrations are traceable to national and international standards.

Terms

Calibration means determining and documenting the deviation of the display of a measuring device from the correct values of the defined test points.

No intervention is made on the device, only correction values are determined. Calibration thus shows how far the displayed measured values correspond to the correct values.

Adjustment, on the other hand, represents an intervention in the measuring device to minimize a measurement deviation. This improves deviations for comfortable reading, but a statement about the overall measurement uncertainty of the measurement chain cannot be derived from this alone.

The **standard** represents a known value of a quantity, through comparative measurements measuring instruments are compared to it.

Reference standard: The standard with the highest available accuracy at a location (e.g. within a company site), from which the measurements made at this location are derived. The national standard is passed on by the PTB.

Working standard: Standard which is calibrated with a reference standard in conjunction with corresponding measuring instruments and is routinely used, e.g. to calibrate or test equipment.

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Traceability describes a process by which the measured value represented by a measuring instrument can be compared with the national standard for the measurands concerned via one or more steps.

The chain of individual steps must be unbroken. With each step, the measurement uncertainty increases.

Schematic representation of traceability with examples of applied standards:

