# Quality and Know-how – IEC Standard 17025:2005

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ENGLISH

DEWI is accredited according to ISO/IEC 17025:2005. The relevance of this may be vague to people who are not directly involved in quality issues. The following article tries to better illustrate a few basic intentions of this standard and how its role in wind energy has evolved over time.

Compared to the large projects of today, wind energy was of minor commercial relevance until the mid-nineties. Core activity of wind energy institutes at that time was research, in order to share and finally overcome the technological headaches of an engineering-driven industry that grew much faster than standards and regulations could sometimes follow. ISO 45001 was a first step to ensure customers also of the quality of services. This standard was replaced by the ISO/IEC 17025:2000, which was revised in 2005 and is now in force as ISO/IEC 17025:2005.

Today the industry has progressed on that previously very steep learning curve and professional and standardised services have grown in demand. Trial and error approaches are no longer acceptable, in particular when it comes to wind power site assessment. As wind power profitability is highly sensitive to small variances of the predicted local wind speed, manufacturers, site developers and investors demand ever more reliable data to achieve sound design and investment decisions. ISO/IEC 17025 delivers the necessary standards with respect to precision, neutrality and approval.

**Special requirements of ISO/IEC 17025:2005**

The scope of the ISO/IEC 17025 is beyond the requirements of the more prevalent ISO 9001, which is focussed on quality management only.[1]

**Neutrality**

All organisations accredited to ISO/IEC 17025 have to be independent bodies. DEWI as a third party laboratory is free of any corporate affiliation to any player in the wind energy business. Above that, under ISO/IEC 17025 no internal pressure is permitted to make the testing more economical by omitting steps or reducing the effort. Each step is performed according to “good professional practice”. Personnel is committed to keep all the information confidentially.

[1] The fundamental requirements of ISO 9001:2000 are covered by ISO/IEC 17025:2005.

**DEWI offers a broad range of services. In Germany the assessment cannot be performed by a single accreditation body. To achieve accreditation a co-operation of different partners under the management of the DAP German Accreditation System for Testing is required. Below some of our core activities with the dedicated accreditation bodies and experts.**

| Service | Assessed by |
|---|---|
| Site related wind potential and energy yield assessment | DAP (Deutsches Akkreditierungssystem Prüfwesen GmbH) |
| Power performance measurements of wind turbines | |
| Measurement of Mechanical Loads on Wind Turbines | |
| Anemometer calibration for wind energy applications | DKD (Deutscher Kalibrierdienst) |
| Acoustic noise measurements | DAP + Acoustic Expert of TÜV Süd |
| Measurements of the power quality of wind turbines | DATECH (Deutsche Akkreditierungsstelle Technik) |
| Due Diligence | (non-accreditable service) |

DPT-PL-2394.99

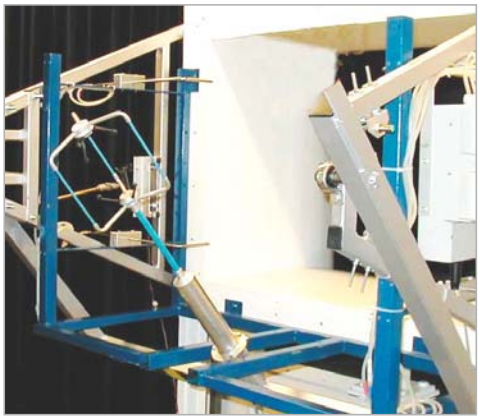
DKD-K-28901

**Competence**

The ISO/IEC 17025 specifies the competence of the laboratory. Services have to be performed by highly qualified personnel. An accreditation body checks the compliance of the whole management system at regular intervals. Every 5 years the complete management system is subjected to a detailed investigation for the complete re-accreditation. In alternating turns every year DEWI Wilhelmshaven and DEWI Sucursal in Spain are assessed during a surveillance visit. All employees are subjected to the scrutiny of the respective audits, which include on-site inspections by the auditors and question-and-answer sessions with all staff involved.

Auditors also make sure that existing skills are kept up to date by regular training.

Even services outside of the accredited scope have to be in compliance with "good professional practice". Accordingly, clients may trust that the laboratory will not perform any services in which basic conditions are not in compliance with the requirements. Finally, interlaboratory comparisons are performed to ensure comparable results.



3D Calibration of sonic anemometers

**Traceability**

The ISO/IEC 17025 focusses on traceability to the International System of Units (IS). This implies an elaborated management of all the test equipment. The calibration status of each component in a measurement chain has to be checked and documented. All the equipment is carefully maintained to ensure reliable operation. Calibrations have to be performed by accredited laboratories to ensure traceability to national standards. The uncertainties of the results have to be calculated in detail.

Though it may not be immediately evident, these requirements for traceability may sometimes conflict with the customer's demand. This arises as the potentials of emerging new techniques simply outgrow the more conservative approach of the accreditation bodies who have to ensure the conformity to basic physical units, tied to their specific obligation to provide traceability according to national standards. Anemometer calibration is a good example for this conflict.

With today's equipment a reproducibility of 0,2% is achievable for quite a few types of sensors.

The traceability to the national standard units [m/s] however is 5 times lower at 10 m/s wind speed.

The calibration certificate of DEWI according to DKD states an uncertainty of 0,1 m/s. This uncertainty arises mostly from the sensor itself, as any physical object will slightly distort the laminar flow in the wind tunnel. Though the undistorted flow speed can be measured at rather high precision with flowmeters, once the anemometers are in place, these values will start to deviate, though maybe only lightly. This "blockage effect" depends of the shape and size of the object. Another uncertainty arises from the different flow patterns inside a wind tunnel and an outdoor test field, due to slant wind speed components

**ISO/IEC 17025**

The International Standard ISO/IEC 17025 specifies the general requirements for the competence to carry out tests and/or calibrations. Test and calibration laboratories that comply with this International Standard will also operate in accordance to ISO 9001. The ISO 17025 was first published in 1999. It replaces the DIN EN 45001. ISO 17025 was revised and reissued in May 2005. This International Standard is for use by laboratories in developing their management system for quality, administrative and technical operations.


Accreditation certificates of DEWI

arising from complex terrain. Last but not least there is an impact from the dynamic behaviour of cup-type anemometers with their rotating masses, the so-called overspeeding. This plays no role in standard calibration procedures, as they as a rule do not take dynamic input into account.

All these factors on influence have been and are still subject to research and studies worldwide.

**Reproducibility**

The wind energy business is interested in reliable and reproducible information in the first place. Measurements for a site assessment should fit to subsequent power curve measurements even if performed by different companies. Though the ISO/IEC 17025 addresses this reproducibility, the process is a little bit tardy as the validation of new test methods encompasses all the aspects of traceability primarily. To meet the demand of the wind energy business MEASNET was created (see next article). MEASNET focusses on the more pragmatic needs of the emerging wind business to apply the best available technology while ISO/IEC 17025 provides the long term traceability to national standards.

The targets of IEC/ISO 17025 and MEASNET complement each other and even may converge in the future as the wind energy business matures into an industry as any other, and the standards are getting more adapted to customer's needs.

So the race is not over yet, technology and public oversight and consumer protection are only competing on higher level. IEC standards have raised the bar for the basic requirements.

Departing from here, it still makes much sense to look into technical details to exploit data and results to their optimum profit potential.