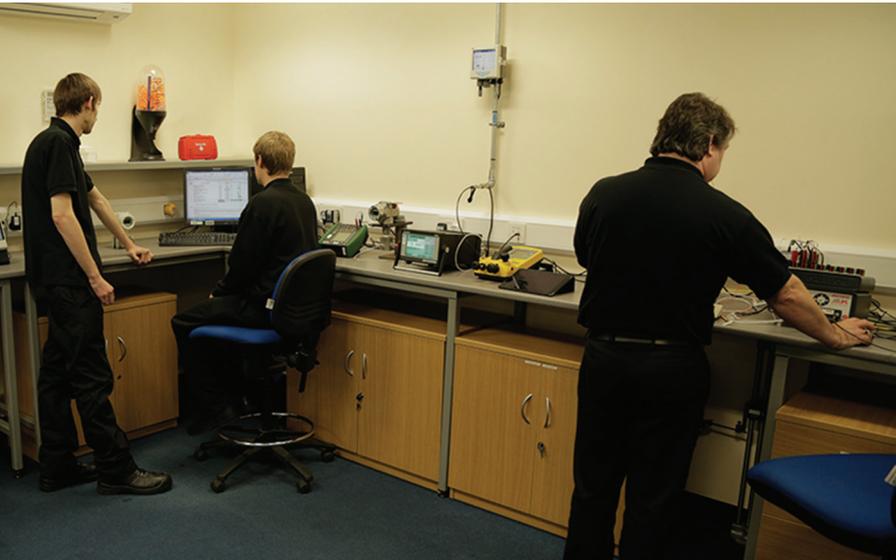


## Service

# ISO17025 explained



The ISO17025 standard covers any organization offering testing and calibration services

### Measurement made easy

Accredited laboratory for testing electrical signals, temperature and pressure

## Introduction

If every process is only as good as the devices used to measure it, then every one of those devices must be as accurate as possible. The ISO17025 standard has been created to help ensure consistency in the way that equipment, including measurement instruments, is tested and calibrated so its accuracy can be relied upon by end users. Dr Jonathan Farrington of ABB explains more about the standard and what it means both for end users and providers of testing / calibration services.

Despite the ISO17025 standard being around since 1999, there is still a lot of uncertainty around who it applies to, what it means and its benefits for both end users and testing / calibration laboratories alike. This publication attempts to cut through the confusion and explain the importance of the standard.

## What is ISO17025?

The main aim of calibration is to introduce a known standard against which the accuracy of a measurement can be compared. For providers of calibration and testing services, it is necessary to show how that known standard was itself arrived at, in order to provide the traceability needed between the end measurement and how it was arrived at.



Figure 1 One of our two accredited calibration laboratories at Stonehouse, UK

The purpose of ISO17025 is to introduce a recognized and verifiable level of best practice so that end users can be confident that a provider of calibration and testing services has undertaken the correct steps when calibrating their equipment. The standard requires providers to be able to prove:

- 1 That they operate and adhere to a clear set of management procedures that can subsequently be checked to ensure that a test or calibration was performed correctly. Specific areas covered under this category include:
  - Organization
  - Document control
  - Corrective and preventive actions
  - Management reviews
  - Internal audits
- 2 That they are technically competent to perform the tests and calibration they are offering. This category extends to:
  - Personnel, including their ability / experience in testing and calibrating specific equipment
  - Premises and environmental conditions
  - The test and calibration methods being employed
  - Equipment used to perform the tests / calibrations
  - The demonstration of measurement traceability
  - Sampling, handling and transportation of the equipment being tested and / or calibrated
  - Assuring the quality and consistency of test and calibration results
  - Reporting the results

## Who and what does ISO17025 apply to?

The ISO17025 standard applies to any organization offering testing and calibration services. Its purpose is to ensure that anyone purporting to calibrate a device is competent to do so, to ensure the accuracy of the resulting data from the calibration process. Recognizing that different laboratories often use different methods to test and calibrate a device, ISO17025 covers both standard and non-standard methods, as well as any procedures developed by the laboratories themselves.

For end users this means that, as long as an organization and its procedures have been accredited to ISO17025, they can rely on the credibility of the calibration and the conditions it was performed under.

### When was it introduced?

The current iteration of ISO17025 was introduced in 2005 to bring it up to date following the launch of the ISO90001:2000 quality standard. The original version was published in 1999 and replaced the ISO/IEC Guide 25 and EN 45001 standards that had applied previously to calibration and testing services to create a single standard setting down universal requirements for both management and technical competence.

### Who does it apply to?

As mentioned above, the ISO17025 standard applies to anyone providing testing and calibration services, regardless of the number of people involved or the scale of the activities being undertaken.

### Why was it introduced?

Although there are recognized standard methods for testing and calibrating equipment, there is no single set that applies universally to everything. Manufacturers who calibrate their own equipment, for example, will almost certainly employ methods that may differ both from the standard approach and those operated by other manufacturers.

For this purpose, ISO17025 establishes the required management and technical competence needed to ensure that a test or calibration result is consistent irrespective of the method used. A key part of this includes the ability to demonstrate to an end customer how their equipment was calibrated and how that calibration was arrived at.

### What does it mean for providers of calibration services?

ISO17025 is not a mandatory requirement but it endeavors to introduce best practice into testing and calibration services.

Although it is not a mandatory requirement, ISO17025 is like any best practice standard, in that it will be used as the benchmark that a provider of calibration is compared to in the event of any consequences arising from an incorrectly calibrated product. Potentially, this may include liability for personal injury and / or the destruction of plant leading to public injury or loss of life, the financial and reputational benefits of being accredited to the standard soon become clear.

To become accredited, an organization must have their procedures and competence inspected and ratified by a recognized accreditation body, that has itself been accredited to international standards.

This last requirement, regarding accreditation to international standards, helps to ensure that an accreditation awarded in any particular country is recognized globally as long as the organization that awarded it was itself an accredited body. In the UK, all accreditations for testing and calibration are managed by the United Kingdom Accreditation Service (UKAS), that operates in accordance with ISO17011:2004, a global standard governing the general requirements for accreditation bodies.



Figure 3 In the UK, all accreditations for testing and calibration are managed by the United Kingdom Accreditation Service (UKAS)

### What does ISO17025 mean for end users?

The efficiency of any industrial or utility process ultimately relies on accurate measurement. Whether the data from an instrument is used to help maximize product quality or as part of a critical safety system, it is vital that a plant operator can rely on the accuracy of that device.

For end users, the ISO17025 standard provides a basic level of confidence that a provider of testing and calibration services is capable of calibrating their device.

The role of ISO17025 in ensuring that testing and calibration service providers are accredited to a single recognized standard offers two major benefits:

- Firstly, in the event of a problem, the ability to demonstrate that they used an accredited provider enables end users to show that they took every possible measure to ensure the accuracy of their measurement instruments.
- Secondly, it effectively enables end users to shop around between providers rather than being tied to a single provider, enabling them to explore different solutions for their calibration requirements.

### How can I check whether a calibration and testing provider is accredited to ISO17025?

Organizations offering test and calibration services in the UK that have been accredited by the United Kingdom Accreditation Service (UKAS) are able to demonstrate a Schedule of Accreditation. The schedule features details including their UKAS laboratory number, the address of the accredited facility, the date it was issued and the types of testing / calibration that it has been accredited for.

Schedule of Accreditation			
issued by			
United Kingdom Accreditation Service			
21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK			
 <p>8809 Accredited to ISO/IEC 17025:2005</p>	<p><b>ABB Ltd</b></p> <p>Issue No: 001 Issue date: 09 October 2015</p>		
	<p>Oldends Lane Stonehouse Gloucester GL10 3TA</p>	<p>Contact: Dr. Jonathan Farrington Tel: 01453 853449 Fax: 01453 821382 E-Mail: instrument.support@gb.abb.com Website: www.abb.com/measurement</p>	
Calibration at the above address only			
DETAIL OF ACCREDITATION			
Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks
<b>ELECTRICAL</b>			
<b>DC Voltage</b>			
Measurement	0 mV to 100 mV 100 mV to 50 V	0.027 mV 4.2 mV	
Generation	0 mV to 100 mV 100 mV to 12 V	0.013 mV 1.4 mV	
<b>DC Current</b>			
Measurement	0 mA to 100 mA	0.013 mA	
Generation	0 mA to 25 mA	0.0058 mA	
<b>DC Resistance</b>			
Measurement	1 Ω to 400 Ω 400 Ω to 4 kΩ	0.035 Ω 0.55 Ω	
Generation	1 Ω to 400 Ω 400 Ω to 4 kΩ	0.037 Ω 0.35 Ω	
Electrical calibration of temperature indicators, controllers and recorders for the following sensors:			
Noble metal thermocouples Type R & S	0 °C to 1768 °C	1.0 °C	with cold junction compensation
Base metal thermocouples Type K, T and J	-200 °C to 0 °C 0 °C to 1370 °C	0.56 °C 0.23 °C	with cold junction compensation
Pt100	-200 °C to 850 °C	0.092 °C	
<b>PRESSURE</b>			
Gas Pressure (gauge)			
Calibration of pressure indicating instruments and gauges	-85 kPa to 100 kPa 100 kPa to 2 MPa	0.15 kPa 0.026 % + 0.12 kPa	

Figure 2 Typical UKAS Schedule of Accreditation certificate

## What happens if the organization that calibrated/tested my product was not ISO17025 accredited?

As mentioned previously, there is no legal requirement for testing and calibration laboratories to adopt the ISO17025 standard or to be accredited. The standard exists as a benchmark of best practice for the testing and calibration of equipment.

It is not illegal to have a device calibrated or tested by a non-accredited organization or to use it in your process. However, in the event of problems such as impaired product quality, injury or loss of life caused by a faulty instrument, it is highly likely that blame will be apportioned according to whether the parties involved took every reasonable step to avoid the situation from occurring. While a faulty or poorly calibrated instrument may not be the direct cause of the problem, its contribution to the chain of causation will almost certainly be considered.

In such instances, courts and other regulatory bodies have a tendency to look towards recognized best practices as the minimum standard. This has an implication on both end users and testing and calibration organizations. For end users, there is the need to demonstrate that they did everything possible to ensure that their device was fit for purpose. Where testing and calibration organizations are concerned, there is the requirement to demonstrate their competence.

## How can ABB help?

ABB operates two accredited calibration laboratories in the UK, both located at its manufacturing facility in Stonehouse, Gloucestershire.

One facility is for the calibration of flowmeters sized from 1 mm to 2.4 metres at accuracies down to  $\pm 0.1\%$ . Incorporating both small- and large-scale rigs, this facility enables a wide variety of flowmeter types to be calibrated to the leading international standards. All calibrations are performed to ISO9000, with the option of a UKAS accredited calibration where the certificate carries the ILAC and UKAS Calibration Laboratory 0255 logo.

The facility can also be used to test control valves from 25 up to 600 mm and weighing up to 10 tonnes in accordance with the EN ISO60534-2-3 standard for control valve testing.

The other facility is for the calibration of temperature, electrical and pressure instruments. For temperature, the facility can be used for the calibration of indicators and recorders for noble- / base-metal thermocouples and Pt100 sensors. The laboratory can be used to conduct both physical and simulated calibrations, with ranges from  $-35$  to  $1,200$  °C and  $-200$  to  $1,768$  °C, respectively.

For pressure, gas pressure calibrations can be performed in ranges from  $-85$  to  $100$  kPa and  $100$  kPa to  $2$  MPa.

Electrical calibrations can be performed for the measurement and generation of voltage, current and resistance.

Both facilities are available for use by third parties. For more information, email [instrument.support@gb.abb.com](mailto:instrument.support@gb.abb.com) or call 03339 997996 and quote 'Calibration'.

## Notes

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