ACCREDITATION CORNER ASK TREVOR

What is "traceability", why do I need it?

In order to tackle this question, we need to consider three terms encountered in measurement work.

To achieve a valid measurement result, you need Competence, Calibration and Traceability:

Competence

To be competent in measurement work one needs to have been trained, supervised, and deemed competent by practical demonstration. We use the term "demonstrable competence". The person deeming one competent has themselves to also hold that competency and to have seen valid work performed by the person they are approving as competent. That is often achieved by intercomparisons with others or other practical proficiency testing. This applies to the measurement work you undertake and to all the calibrations of equipment that enable you to do that.

Calibration

For your work to be competent you need to be assured that your measuring equipment is giving valid results by having it calibrated. Calibration is the act of comparing a measuring equipment with another equipment of known performance. That reference instrument is usually a "better" or more accurate and precise device. That calibration needs to be performed with competence.

Calibration is sometimes confused with adjustment. Calibration of a piece of equipment is achieved by noting its performance when compared with higher order equipment. This results in correction figures to apply when using your equipment and may, in some cases, lead to your equipment being adjusted to read correctly within a specification limit if you wish to avoid making corrections when using it. Therefore you choose a competent supplier to obtain your calibrations. Most users would not have the competence to establish the competence of their calibration supplier so would need to use an accredited or otherwise demonstrably competent supplier.

Metrological traceability

This is about the traceability of your measurement to connect with, ultimately, the national or international standard for the measurement parameter involved. This ensures that your measurements are compatible with other people's measurements and that everything fits together properly. Traceability of measurement is an important concept. Achieved properly it ensures that you may make valid measurements fit for your purpose, but there are pitfalls to overcome and common misunderstandings to avoid.

The official definition is to be found in the International Vocabulary of Metrology (VIM) that states

2.41 metrological traceability property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty

This means that you need to competently use suitable equipment that has been competently calibrated against higher order suitable equipment. The data from that calibration enables you to make valid traceable measurements.

> True traceability is only obtained with competence and so just having your equipment calibrated by someone who claims that their equipment is traceable to NIST, for example, is often not an indication of their competence to use it properly and obtain valid results.

Often there is more than one stage to this realisation. See Figure 1. The important point is that the chain of calibrations is competent and documented such that you may have confidence in the results of your work.

So, you obtain a calibration for your piece of equipment. That calibration needs to be competent and properly documented. A good example would be to obtain a suitable certificate from a laboratory accredited for that work. It would be more problematic if you choose a supplier who asserts that they have traceable equipment themselves but who holds no third-party approval. That laboratory may be competent and may have properly traceable equipment, but one cannot know that for sure. The word traceable is often used not to describe the competent unbroken chain but just because a supplier uses a measuring instrument that has been calibrated.

> A valid measurement is made by demonstrably competent persons using traceable calibrated equipment.

The terms "traceable to NIST" or "traceable to NPL" are often seen. True traceability is only obtained with competence and so just having your equipment calibrated by someone who claims that their equipment is traceable to NIST, for example, is often not an indication of their competence to use it properly and obtain valid results.

To summarise the importance of the three terms we have considered in this issue: A valid measurement is made by demonstrably competent persons using traceable calibrated equipment. Of course other considerations also pertain, such as the suitability of the environment and adequate measurement uncertainty in the work – topics for another day.

A webinar was recently held by NPL with BMTA, containing contributions from NPL, Trescal and Trevor on the topic How to specify your calibration requirements" which may be viewed at https://www.bmta.co.uk/news-events/news/437-how-to-specify-your-calibration-requirements-npl-webinar.html

Trevor Thompson retired from The United Kingdom Accreditation Service after many years assessing and accrediting measurement laboratories. He was the British member for BSI on the ISO/CASCO working group for the writing of the standard ISO 17025:2017 and now operates independently. www.bestmeasurement.com

Ever wondered what the difference is between precision and accuracy? Assessing and auditing? Is calibration the same as testing? Why do the terms accreditation and certification often get muddled up?

Trevor is here to offer some expert advice! If you have a burning question on measurement, traceability and laboratory accreditation, particularly around ISO 17025, he will be happy to answer it.

Please email Trevor directly at questions@bestmeasurement.com and we will feature your question in a future edition of the magazine.

A Typical Traceability Pyramid

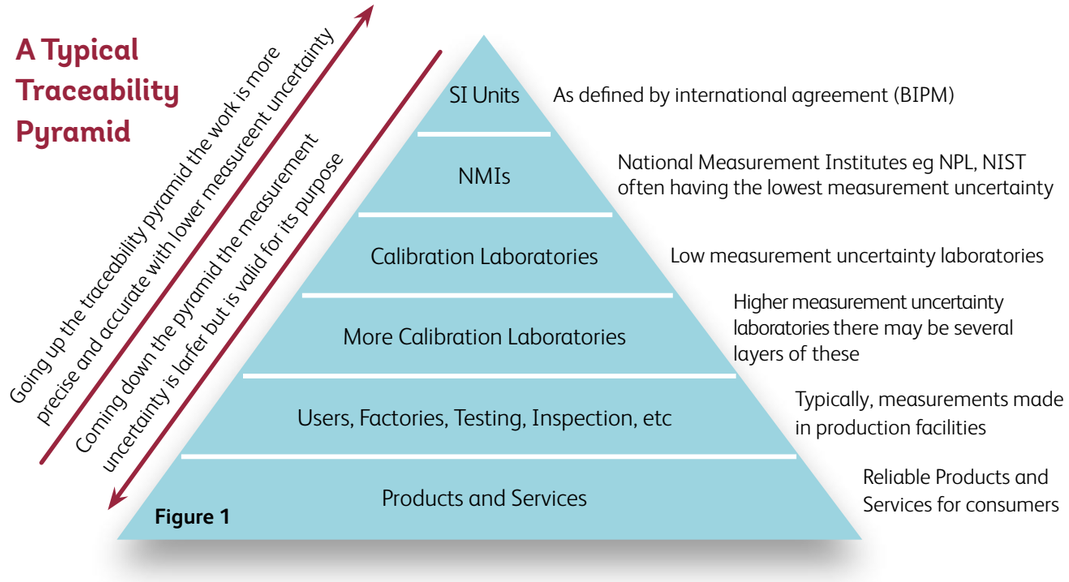

Figure 1