

# TWO ROUTES TO TRACEABLE CALIBRATION

**Measuring a temperature without knowing what measurement uncertainty you have is basically worthless. The technique of linking the measurement uncertainty of an individual sensor to ITS-90 (the international temperature scale) is called traceable calibration. So how can you ensure that each individual sensor is traceably calibrated?**

**THERE ARE TWO ALTERNATIVES:** Do the job yourself with some support from an accredited laboratory or use Pentronic's accredited calibration laboratories to supply the entire traceability.

The traditional method is to do

the work yourself but to first have an accredited laboratory calibrate one or more reference sensors. You then use the reference sensor to check your own sensors by using calibration furnaces and baths.

"Previously our main job was to calibrate reference sensors," explains Lars Grönlund, manager of Pentronic's accredited calibration laboratory. "A number of our customers with their own expertise and calibration resources still work this way. But more and more are choosing to contract out the entire calibration process."

This is because the process involves many steps and uncertainties, which must all be documented

when you are ensuring traceability yourself. It is not enough just to use a calibrated reference sensor. You must also include in your calculations your own equipment, additional errors in the measurement chain, the measurement environment, and other factors in order to ensure a final measurement uncertainty that is within the desired limits.

If you decide to use Pentronic, you will have the help of laboratories that have long been accredited for doing calibrations in the field. The accreditation means that the laboratory operations are monitored by a Swedish government authority, Swedac, which audits them on a recurring basis. Pentronic has been accredited without a break since 1988 and now has laboratories located in Västervik and Karlstad.



*Pentronic's accredited calibration laboratories are increasingly working on site for customers. From left: Andreas Holm, Karoline Haneck, Morgan Norring and Lars Grönlund.*

You can find information about the methods, measuring ranges and best measurement ability at the authority's website, [swedac.se](http://swedac.se).

With field calibration, we have basically the same possibilities as in our laboratories, although with greater measurement uncertainty. The measuring range is -80 till +1200 °C.

"The performance depends on where and how the measurements are done. We do measurement uncertainty calculations for every job," Lars points out.

A sensor's true measurement performance will often become optimised when the calibration is done under conditions equivalent to those of the final measuring process. That is why Pentronic often makes customised reference sensors for every job. This gives greater certainty and closer margins than when using standard reference sensors.

The purpose of the calibration is to confine the error within specific

margins. At the same time, the calibration means that the measurement performance is improved. Without traceable calibration, the standard for the sensor type is what applies. As an example, according to the standard, the tolerance limit is  $\pm 1.5$  °C for a type K thermocouple at 300 °C.

"By doing calibration on site at the customer's we can get that down to  $\pm 0.3$  °C," Lars says.

In either case, the result is that each individual sensor becomes traceably documented in a way that will satisfy every quality auditor.

Whichever option you choose for traceable calibration, Pentronic is at your service.

"But if you want help with field calibration it's

always important to contact us in plenty of time so that we can accept the job," Lars Grönlund concludes.

