



Endress+Hauser's SANAS accredited verification and calibration laboratory

Preston Reddy, business driver for Service at Endress+Hauser South Africa, talks about his company's verification and calibration offerings, the difference between them and the advantages of using the company's local SANAS-accredited Flow Calibration Centre to get the best out of the monitoring instruments at the heart of plant control.

Technical experts frequently come across the metrological terms: calibration and verification. For some, these two concepts are known and easy to differentiate, but these terms can also cause confusion as their definitions and requirements may not be easily understood.

According to the International Vocabulary of Metrology (VIM), the term verification is defined as the 'provision of objective evidence that a given item fulfils specified requirements'.

An interpretation of verification consists of checking calibration results as 'objective evidence' to comply with a 'specified requirement', such as the Maximum Permissible Error (MPE), defined either by a manufacturer, a legal metrology organisation or an end-user in a process application. This situation is illustrated in Figure 1, where the device's relative measurement errors obtained by the calibration rig turn out to be smaller than the MPE, meaning that the flowmeter calibration in this example (the item) fulfils the specified requirement.

Endress+Hauser's on-site verification offerings include Heartbeat verification; and In-line ultrasonic clamp-on verification, which each have their own strengths.

Heartbeat Technology™

Heartbeat is Endress+Hauser's built-in diag-

nostics solution that continually monitors and records data about the functional reliability, safety and accuracy of its instruments. The new Heartbeat-enabled Proline generation flowmeters, for example, offer unprecedented diagnostic coverage from the measuring tube to the outlet. This ensures an extremely low residual risk of a passive protective function failure. Traceable factory calibration and redundant internal references complement the safety-by-design principle with minimal failure rates in accordance with IEC 61508.

In terms of verification, Heartbeat Technology can be used to:

- Verify the correct function of the measuring device according to the specifications and generate a protocol – without interrupting the process flow.
- The automatically generated protocol is structured to support the documentation required by internal and external formalities, laws and standards.

In-line ultrasonic verification

In-line verification involves the temporary use of a second flowmeter inserted into the same flow line as the instrument that requires verification. The portable ultrasonic Prosonic Flow 93T flowmeter, for example, is ideal for this purpose. Designed for temporary moni-

toring and test measurements with clamp on sensors, these units use batteries, making them independent of mains power.

Data from these economical ultrasonic units can be saved via a USB port to a flash drive or other storage device without the need for additional software, making them ideal for use for verification measurements at existing flow metering points.

Features of in-line ultrasonic instrument verification include:

- The in-line verification is a direct comparison of the results obtained from the Unit Under Test (UUT) against the In-line Ultrasonic clamp-on flowmeter.
- A verification certificate, which indicates the measured error between both the measurements, is generated from the data.

Calibration made easy

According to the VIM, calibration is a procedure 'to establish a relation between a quantity value given by a UUT and a reference quantity value (ref) obtained by a calibration rig, within its associated measurement uncertainty'.

The main objective is to check the accuracy of measurements by comparing the device in question with that of a known traceable reference. One fundamental requirement for carrying out a calibration is that the ref-

erence system must have traceability to the fundamental units of measurement needed to reproduce the unit flow.

Calibration of devices assist in:

- Meeting the requirements of industry regulators and standards such as FDA, IFS, ISO 9000, etc.
- Preventing inaccurate measurements influencing the quality of the final product.
- Preventing energy or material losses due to improper control.
- Preventing safety issues arising as a result of poor monitoring.

Endress+Hauser's Calibration offerings fall into two categories on-site and laboratory-based calibration.

On-site calibration involves transporting portable rigs and buffer solutions to where the instrument is being used at a plant. On-site calibration is performed by highly trained Endress+Hauser engineers. Convenient and cost-effective, this approach removes the need to send instruments off-site as specialists come to the plant, which keeps downtime to an absolute minimum.

On-site calibration also offers the highest flexibility because calibration can be scheduled according to the process demands of the application.

Laboratory calibration services can be carried out at Endress+Hauser or a third party laboratory on a single-service or repeat contract basis. Endress+Hauser South Africa is now ideally placed to carry out calibrations of customers' instrumentation from its SANAS accredited facility in Sandton.

Calibration Services performed in laboratories such as this have the advantages of the lowest calibration uncertainty and the widest possible calibration ranges.

SANAS accredited flowmeter lab

Endress+Hauser's metrology laboratory at its South African Head office in Sandton is a SANAS-accredited flowmeter calibration laboratory, a status that is internationally recognised in accordance with ISO 17025: General requirements for the competence of testing and calibration laboratories.

Placing Endress+Hauser ahead of its local competitors, this service ensures that the company's flowmeters as well as those from third parties can be verified and calibrated to perform within their expected specifications.

The company's calibration rig supports customers' process safety and product quality requirements by ensuring that the high precision flowmeters they use comply with process safety requirements while also delivering optimum process control.

SANAS accreditation offers customers

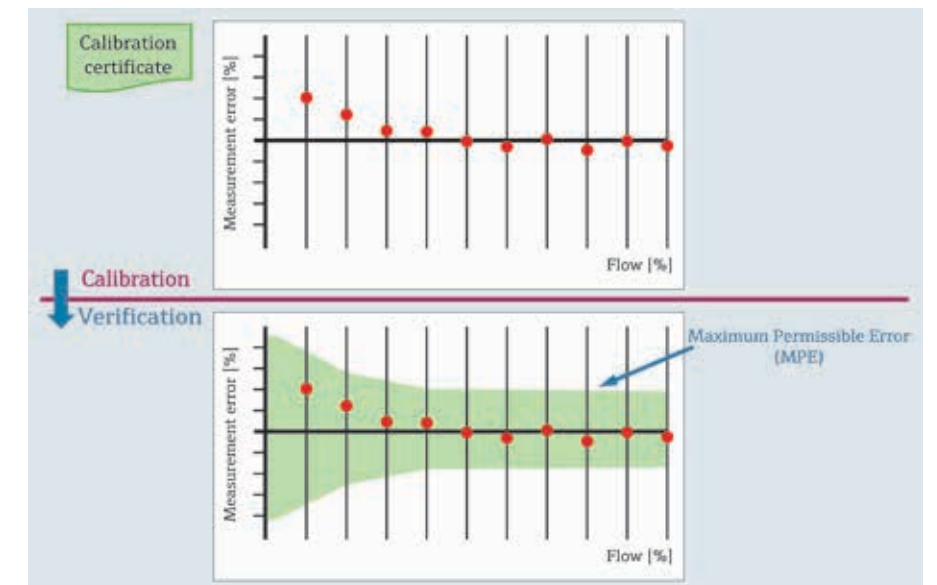


Figure 1: An example of a verification task based on a flowmeter's Maximum Permissible Error (MPE).

traceability of the calibration results to national and international standards via an uninterrupted 'traceability chain' of comparative measurements and calibrations.

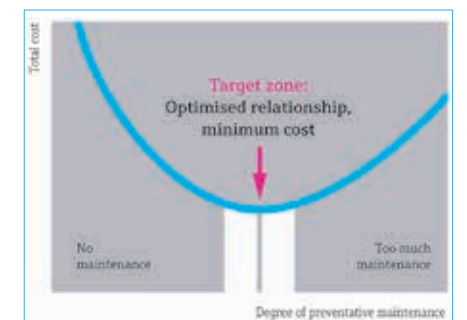
The Flow Centre was designed by Endress+Hauser's Product Centre – Process Solutions (PCPS) in Switzerland to specifically suit South African requirements. The rig can accommodate flow calibrations for instrument sizes from DN08 to DN100 and flow rates of up to 85 m³/h. It uses a closed loop water system with a 200 l tank, and pumps with variable speed drives enable accurate control and optimum stability of flow rates across the calibration range.

Four Promass Coriolis Master Meters are used to compare the customer's flowmeter (UUT) response and accuracy across the applicable flow range. These Master meters are calibrated annually by Endress+Hauser in Switzerland for traceability to ISO 17025 international standards.

To meet the requirements of ISO 17025, the measurement uncertainty – the accuracy and repeatability of the calibration rig – is based on the uncertainty of each component in the measurement process. This enables ISO 17025 accredited rigs to be compared with each other.

In addition to the technical requirements, ISO 17025 defines obligatory administrative controls and procedures to be followed by the calibration facility. Topics such as organisation and management, document control and complaint management are addressed to ensure the calibration facility functions in a manner that promoting quality results.

Only trained calibration specialists who have completed training in Endress+Hauser's Product Centres in Switzerland are assigned



Calibration Management Service helps plant operators optimise performance and maintenance so as to deliver the lowest possible product cost.

to the local Flow Centre.

SANAS accreditation can be seen as a bonus for all South Africans – an assurance of knowing that, for liquids such as petrol, oil or fabric softener, customers are receiving exactly what they are paying for.

Calibration Management Service

Endress+Hauser also offers an extensive Calibration Management Service, which takes the day-to-day management responsibility for a customer's calibration functions and optimises calibration schedules and procedures according to the process needs.

The key goals of this outsourcing service are: improving customers' plant operations; securing calibration process compliance to internal and external regulations; and reducing maintenance and total costs.

"We at Endress+Hauser are always looking for ways to help clients to optimise their maintenance, ultimately, so that they get the best possible value from the instruments used on their process plants," says Preston Reddy, business driver for Service at Endress+Hauser South Africa. □



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