



## CALSYS FOR METERING

### Instrument validation

- Instrument accuracy evaluation
- Integrated with Metering System
- SQL Server and OPC support
- Standard Procedures and Reports
- Flow computer integrity check
- On-line reference and samples
- Overall metering system uncertainty

## The solution to verify the overall metering uncertainty

The main purpose of any flow metering system is to determine the amount of fluid that is transferred from a supplier to a customer within a given period. It is crucially important that the uncertainty of this measurement is within the limits agreed between the two parties and, in case of fiscal metering, as required by the authorities.

CALSYS™ for Metering software allows you to check and prove that your flow metering system is performing within its uncertainty limits in a traceable, objective and automated manner.

The software runs on any current Windows-based platform and uses an SQL Server database for secure and robust data storage. It is based on the de-facto OPC communications standard to automatically retrieve data from the field instruments.

### Accuracy and Uncertainty

Most people speak about accuracy, which is normally stated in terms of error (bias) e.g.  $\pm 1\%$  of span,  $\pm 0.6\%$  of reading,  $\pm 0.2$  degree. However the term uncertainty is better suited, because it combines the bias with a level of confidence that the value actually lies within the range e.g.  $30000 \pm 20$  kg/h at 95% confidence level

All common test / calibration equipment is supported such as dead-weight testers, pressure boxes, temperature baths, signal calibrators and calibration gases.

## Automation levels

A procedure may be automated up to any level:

- Completely manual, in which all values (measured and reference) are entered manually, or
- A more integrated system in which the measurements are obtained through the flow computers, or
- A completely automatic system without any human intervention.

A typical automated validation system is a Gas Chromatograph in combination with a reference sample conditioning system. The validation procedure will automatically switch the analyser to reference stream and back to process stream and validation results are automatically processed and reported to the operator.

### Validation and Calibration

A validation is a sequence of activities to check the performance of a particular instrument, such as a flow meter, an analyser or a transmitter.

If the instrument performs incorrectly, then it requires calibration (adjustment).

Note: Confusingly the terms calibration and adjustment are sometimes used instead of the terms validation and calibration, respectively (as used in this brochure)

## CALSYS for Metering

CALSYS comes with standard and field-proven validation procedures and reports for all common flow metering principles, including:

- Pressure transmitters
- Temperature elements / transmitters
- Differential pressure transmitters
- Orifice plate inspection
- Ultrasonic meters (VOS check)
- Turbine master meter proving
- Coriolis zero flow check
- Gas chromatographs
- Density transducers
- Specific gravity transducers
- Dew point analyser
- AGA3 / ISO5167 calculation check
- Flow computer totalizer check
- In-series validation of flow meters / flow computers
- Overall meter run evaluation check

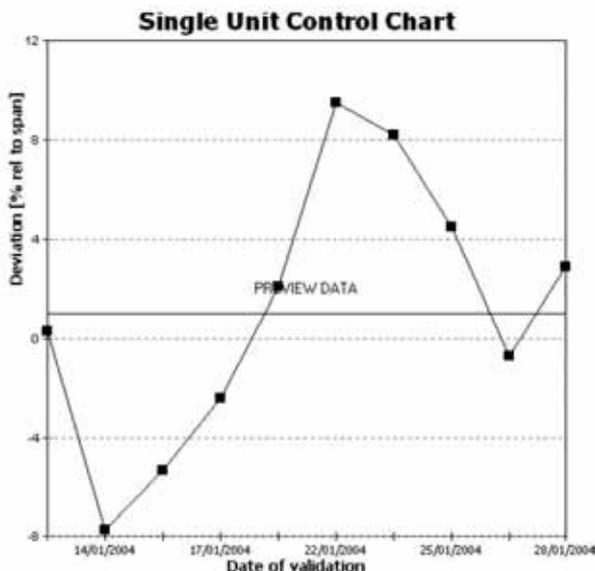


## Statistical Control and Evaluation

The most straightforward way to check the performance of an instrument is to check if the current deviation in measurement from the latest validation, is within the required limits.

A more sophisticated verification method is to use Control Charts in combination with Decision Rules. This will not only consider the latest result but also the previous results in order to detect any non-random behaviour of the measurement, like a trend, an oscillation and a systematic offset.

Furthermore, CALSYS for Metering can provide a number of statistical tests to verify the behaviour of the instrument over an extended longer period to detect if there are any external factors that negatively influences the measurement, e.g. if the instrument is sensitive to seasonal influences.



## Key features

- Automates instrument validation to the highest extent
- Objective, reproducible and traceable validation and calibration results
- Standard procedures and reports for all common flow meters, analysers and instrumentation
- Session Manager to organize the verification of complete meter runs and systems
- Closely integrates with the Metering System
- User-based system security
- Test and calibration equipment is logged from a predefined set of equipment
- Statistical process control and evaluation on the validation results
- Checks and calculates the overall metering uncertainty
- Allows for easy integration (based on SQL Server and OPC)
- Option for graphical operator screens, real-time and historical trends and alarm managements