

## LNG Sampling Systems

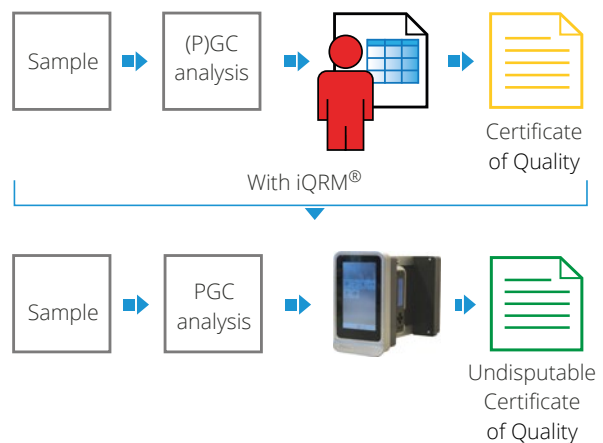
# iQRM<sup>®</sup> Intelligent Quality Reporting Module

360<sup>®</sup>  
KAS

*The solution to automatically generate indisputable Certificates of Quality during LNG custody transfer*

During LNG cargo transfer, the quality of the natural gas transferred between the parties is an important parameter for the settlement of the transaction. As it becomes more and more important to have a certificate of quality with a known uncertainty immediately after delivery, LNG quality measurement systems are often equipped with PGCs for compositional analysis. Based on the average gas composition, a certificate of quality is made. This certificate is often prepared using spreadsheet tools, which may lead to unwanted errors. The obtained results are not easy to check and cannot be certified by an independent third party.

The intelligent Quality Reporting Module (iQRM<sup>®</sup>) is however able to generate an undisputable Certificate of Quality (CoQ) at the end of each LNG (un)loading batch. Accuracy is guaranteed via automated PGC validation and statistical analysis of the validation. Integrating the iQRM<sup>®</sup> with one of our LNG sampling systems provides a single quality measurement system that generates a fully traceable CoQ to prove the contractual quality of a delivery.



### Functionality

The iQRM<sup>®</sup> closes the gap in the traceability chain from PGC measurement to the actual quality reporting of fluid deliveries. It starts with the automatically PGC validation with certified calibration gas. All validations are logged to provide a traceable validation history for the PGC. PGC validation can also be started manually.

According to the ISO 10723, the iQRM supports optional PGC multipoint validations.

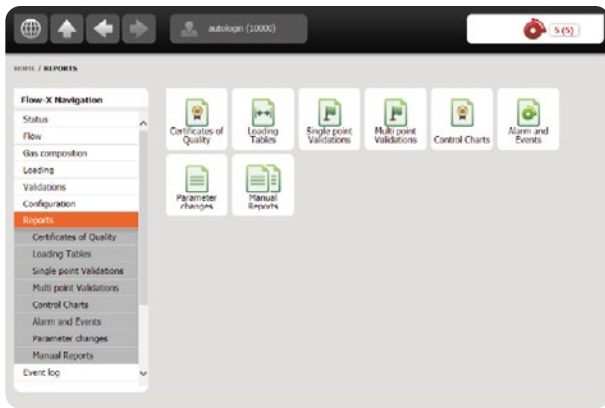
To evaluate the PGC validation results, multiple decision rules based on mean values and standard deviation are applied. In case the flowrate is interfaced to the iQRM<sup>®</sup> the average transferred gas composition can be calculated both time and flow proportional. Before CoQ generation, the iQRM<sup>®</sup> executes a statistical process control with for example process alarm condition checks and the Grubbs outlier checks (according ASTM-E178) on the gross heating value.

The iQRM<sup>®</sup> will be certified by an accredited notified body for weight and measures.

## Configuration

The iQRM® has a friendly user interface, both on the device itself as via integrated webpages. At the front of the iQRM®, a 7 inch touch screen user interface is available. Two security levels (operator and engineer) can be accessed by using a username and password.

All parameter changes are logged in parameter change reports, providing a traceable audit trail. A high security level against unauthorised access is provided as the iQRM® uses the same hardware platform as the FlowX flow computer. Currently up to 150 PGC measurements can be stored for one CoQ, developments to store 600 measurements are ongoing.



Type	Nr.	Purpose
Digital input/output	16	DI: Start validation/Loading start/stop/pause/continue/PGC calibration ready/PGC calibration flag/PGC status/Pre-conditioning system status DO: Validation failed/Validation bad/Validation gas expired/Validation busy/Validation time window expired
Analog input	6, (4 with HART)	Flow rate stream 1 and 2
Serial	5	Unused in normal set-up
Ethernet	2	Modbus/TCP, report printer and user interface

Integration with one of our LNG sampling systems is possible via the various interfaces on the iQRM®.

The iQRM® communicates with the PGC using Modbus/TCP and Modbus/TCP communication with a vaporiser and/or LNG sampling system is supported as well.

Standard supported PGCs are:

- Siemens Sitrans CV.
- Emerson 370XA and 700XA series.
- ABB NGC 820x.

Hardwired I/O is available and can be used for integration in existing systems as well.

### Specifications

Power supply	20-32Vdc – nominal 24Vdc / 1.6A
Digital inputs	24Vdc
Digital outputs	24Vdc open collector, 100 mA
Analog inputs	4-20 mA
Operating temp.	5 ~ 55 °C
Storage temp.	-20 ~ 70 °C
CPU	520 MHz 32 bit CPU with FPGA
Operator HMI	7" touch screen
I/O connections	Via separate DB-37 terminal break-out boards
Integration	In front of panel
Standard scope of delivery	iQRM® hardware with software loaded and configured, including mounting bracket for panel mounting, manuals, power supply connector

The following LNG Sampling product sheets are available:

- LNG Probe & Vaporiser System >2.5 barg
- LNG Probe & Vaporiser System (CryoSamp) > 0.7 barg
- Intermittent (CP/FP) Sampling System
- Continuous Water Seal (Dome) Sampling System
- Continuous Waterless (Membrane) Sampling System
- Intelligent Quality Reporting Module (iQRM)



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