SYNENERGY

Unifying hydrocarbon management in a single system

- Oil and Gas Flowmetering and Calibration Supervisory
- Analyzer Management
- Pipeline Management and Leak Detection
- Tank Farm Inventory Management
- Truck and Tanker Loading / Offloading
Hydrocarbon Management

SynEnergy consists of a Suite of software modules, specifically tailored to Hydrocarbon Management, most markedly Oil and Gas. These applications cover a wide range of application from Analyzer Management, Metering Supervisory, Pipeline Management to Tank Farm Management and Truck Loading. By integrating these modules to one Hydrocarbon Management system, functionality is created that was not available before.

**Scalable**

By providing a unified operator interface, which can be web oriented, integration into the plant environment has become easy.

Systems can be created which run on a portable, for instance to do a local manual validation of an analyzer.

Or a pipeline wide network of metering stations can be combined with fully automatic calibration, running on a central server, while running a pipeline leak detection system.

SynEnergy improves the quality of the hydrocarbon accounting. Furthermore the Operational Expenditure (OPEX) can significantly decreased by ensuring the highest accuracy, the least losses, the lowest maintenance and hence minimal downtime.
Basic software modules

KROHNE Oil & Gas combines its excellent measurement equipment for oil and gas with in-depth knowledge of analyzer equipment and calibration. This is drastically enhanced with the following basic software:

CalSys
is well known as the standard for validation and calibration of metering systems, analysers and instrumentation. CalSys can be used in fully automatic mode, semi-automatic mode or manual mode. In all cases it optimizes the validation process by minimizing errors in operation, calculations and registration using a well-structured and proven approach.

(Virtual) Flow Computing
KROHNE Oil & Gas has been creating flow metering systems since 1983, originally under the name of Polar Systems. The culmination of all this flow computing knowledge is integrated into extremely versatile flow computing software.

This software consists of NMi approved software modules, which can be dragged on the screen like building blocks. Together they create the complete metering functionality, while ensuring proper documentation.

Unique for the Polar software is that it can run in a FC51 Flow computer, but that it can also run unaltered as a "virtual" flow computer in a PC. Virtual flow computing is ideal when large number of streams must be catered for.

Level Computing
In level computing, a large amount of data has to be analysed to calculate the level and refer it to the calibration data for the tank.

KROHNE Oil & Gas has greatly simplified this task by integrating this software into field-mounted units, together with integrated strapping tables and conversion algorithms. Because of these front-end calculations, field wiring is greatly simplified and maintenance becomes far easier.
Analyzer Management

The former Imtech Systems, now part of KROHNE Oil & Gas has been a system integrator concentrating on hydrocarbons since 1983. From the very beginning, the goal has been to achieve the highest accuracy amongst others, by concentrating on validation and calibration. From there KROHNE created a complete analyzer management system which ensures the highest performance. KROHNE’s Analyzer Management Systems are used in refineries, to ensure the maximum performance of all analytical equipment in the plant.

Analytical Performance
Analytical performance ensures the Accuracy and precision of the analysers and transmitters by orchestrating the validation and calibration process. The first tool is the significance testing of the validation and calibration results. More importantly, Statistical Process Control (SPC) is used to check whether a validation should result in a calibration. This accounts for outliers, trends, non-randomness, reproducibility rate and systematic errors. Performance reports can be generated per plant, area and analyzer.

Availability
Availability monitors the operational state of the analysers, creates Time rated performance indicators and generates availability reports.

Maintainability
Maintainability uses the QMI information to generate maintenance activities, ideally preventive maintenance. Via communication with SAP, automatically work orders can be generated.
Our metering software is a culmination of 25 years of experience with oil and gas metering. Systems can be created, based on virtual flow computers only, from purpose built up to the most advanced complete redundant systems with an availability of 99.99%. KROHNE Oil & Gas metering software is built with connectivity in mind. Web-based interfacing is available. Interfaces are available to DCS (such as OPC), to Hydrocarbon Accounting and SAP for maintenance or accounting.

KROHNE Oil & Gas is a key player in metering and calibration of Oil and Gas. KROHNE has 80 years of application experience in flow and level measurement, traditionally in the oil market. Though acquisition combined with own developments, KROHNE Oil & Gas has also become strong in the gas metering market. KROHNE Oil & Gas also owns and builds complete calibration laboratories. From this, the essential knowledge of high accuracy primary and secondary calibration is obtained. We provide complete software solutions for both sectors: measurement and calibration.

Custody Transfer Computing

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Performance Monitoring

Nowadays meters and analysers are becoming intelligent. As a result on-line performance monitoring has become possible. Ultrasonic meters, for instance, can be verified against analysers using velocity of sound. With this, the correct calibration of the metering system can be guaranteed. Actual Metering can also be combined with actual Proving and Validation &Calibration using CalSys. By combining above with Statistical Process Control, events can be predicted and maintenance scheduled, thereby minimizing expensive ad-hoc maintenance.

Alarm Management/ Expert System

Our standard systems include extensive alarming capabilities to ensure that only relevant alarms will be generated. Add to this an Expert System and you can now even augment such alarms with expert advice on how to react in a given situation. The system architecture is open to permit user’s experts to add new strategies to continuously improve the system. Operators can also add their own experience to help colleagues.
Pipeline Management and Leak Detection

KROHNE Oil & Gas has delivered compete pipeline systems for liquids and gas. These pipelines include process plants, metering sites and block valve stations. The proven leak detection system continuously monitors the pipeline and warns when and where a leak occurs.

Pipeline Monitoring System
With pipeline monitoring the pipeline pressures, temperatures and volume/mass can be monitored and valves can be controlled.

Leak Detection and localisation
In many countries leak detection has become mandatory and must comply with official regulations (see bottom of this page)
Leak detection always suffered from false alarms due to limitations of the underlying software. There is always a compromise between the time to detect a leak and the possibility of false alarms.
KROHNE Oil & Gas has overcome these compromises by developing an Extended-Real Time Transient Model (E-RTTM). This model combines the highest sensitivity even under transient conditions with zero false alarms through Leak Pattern Recognition.
This gives reliable results for stationary and transient flow conditions, even during start-up and stand-still. The model is successfully being used for liquids, gases, and LPG.

Pipeline Management
With the pipeline management module, (semi-) automatic blocking of the pipeline becomes feasible. Via the localization software in leak detection, a Geographic pipeline overview can indicate the exact location of the problem on a map. Zooming-in allows you to pin-point the affected area and to facilitate damage control. The complete emergency procedure can be made available, including the phone numbers of management and the fire brigade.

API 1130 (USA)
- Computational Pipeline Monitoring (CPM) for liquid pipelines
- Focus: Design, testing and implementation of single-phase liquid pipelines

TRFL (Germany)
- Technische Regel für Fernleitungen (Technical Rules for Pipelines)
- General rules for all pipelines in Germany
Tank Farm Management / Truck & Tanker Loading

KROHNE Oil & Gas has extensive experience with tank farm management and with truck and tanker loading/unloading. Standard functionality is already available at field level, and a high level functionality is available in SynEnergy. The total system can easily be tailored to specific local needs.

Tank Farm Inventory Management
KROHNE has designed a powerful and intelligent system for tank monitoring & control. All variants are available, from a single tank, to comprehensive multi-tank farm, including loading & offloading. The basis of our systems is KROHNE’s innovative level measurement technology, which allows for easy retrofitting and installation. The software gives overviews of complete tank farms, but can go down to the smallest details. The highest accuracy will be maintained.

Product Movement
SynEnergy handles the movement of the different products from tank to tank and tank to loading area. Extensive logic is available to ensure that incompatible product will not mix and that the proper interlocking is available. Movement can be based on batching, on level and on quantity. In the process, an exact mass balance will be maintained as a safety measure. Specific care is taken with custody transfer of products and proper documents can be created.

Truck and Tanker Loading
SynEnergy is designed for loading and unloading systems for ships, rail cars and trucks, but is flexible enough to even handle drum, container and vessel filling. The products include refined products, LPG, crude oil. The system is custody-transfer approved. The module manages the technical loading, batching and commercial processes. The system organizes order processing including paper work (loading documents, etc) with a possible connection to SAP.
KROHNE Oil & Gas Overview

- Liquid flowmetering systems
- Gas flowmetering systems
- Supervisory systems
- Flow computers
- Tank Management Systems
- Loading & Offloading systems
- Leak Detection Systems

From the well head, through massive pipelines, onto tankers and into the terminals and refineries; the flow of oil and gas products needs to be measured accurately and reliably. That is the world of KROHNE Oil & Gas.

In 2001, the leader in flow metering KROHNE in Duisburg, grouped together all its experts and established a specialist company at their main manufacturing site in the Netherlands. The company has grown continuously since then. The need for more space while retaining access to a qualified workforce brought KROHNE Oil & Gas to custom-designed premises in Breda.

The dynamic growth continues with the workforce having grown to over 160 persons solely dedicated to the oil and gas industry.

Through acquisitions and expansions KROHNE Oil & Gas now has 8 manufacturing facilities in the Netherlands, UK, India, Malaysia, USA, Brazil, South Africa headquarters in Breda servicing the world’s oil industry through offices of the KROHNE group, in more than 60 countries worldwide.

The scope of KROHNE Oil and Gas starts with custody transfer flowmetering for oil, gas and liquefied gas and continues through tank management, loading and offloading and leak detection and localisation systems.