APPLICATION REPORT

PRODUCT IDENTIFICATION AND CHECK METERING ON MULTI-PRODUCT PIPELINE

Oil & Gas / Midstream

"Flexim 's non-intrusive measuring technology is the best solution for our customer as it allows them to replace their obsolete device without disturbing normal pipeline operation."

Dinesh Kumar Shanmugam, Regional Sales Manager, Flexim Instruments Asia

Measuring Task

Batch interface detection, product identification and flow measurement on a multi-product pipeline

Multiple liquid hydrocarbon products such as diesel, kerosene, and gasoline, are often transported in a single pipeline. This is usually more cost-effective than using separate pipelines for each product. The challenge is to clearly distinguish between the respective batches.
Batch separation can be done physically with pig devices or by measuring characteristic physical properties of the respective hydrocarbon, such as density.

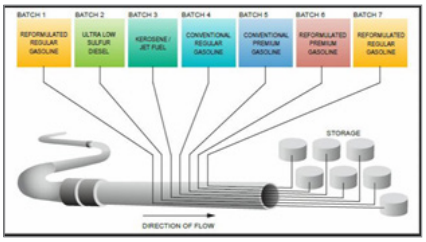
At an important transportation pipeline, an ultrasonic measuring system was used to distinguish separate batches and to measure flow. When this measuring system failed, the operators were forced to fall back on pigging. As this method is laborious, they began to look for a better solution.

Solution

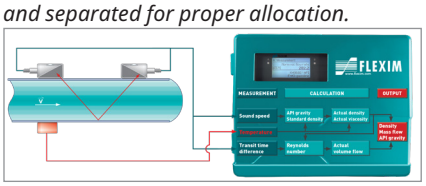
With its non-intrusive ultrasonic technology, Flexim offers the ideal solution for this measuring task. As clamp-on ultrasonic transducers are simply mounted on the outside of the pipe, Flexim 's FLUXUS® ultrasonic flow-meter systems are highly welcome in the oil & gas industry Clamp-on ultra-sonic measurement means there is no opening of the pipe, therefore no risk, no downtime, no wear and tear, no maintenance. However, the application range of Flexim 's clamp-on ultrasonic technology is not restricted to mere flow measurements. Its analytical capabilities make it particularly suited for measuring tasks within pipeline and terminal applications.

With its FLUXUS® H721, Flexim has developed an ultrasonic flow measurement system that is designed specifically for the needs of the hydrocarbon industry. It combines highly accurate non-intrusive measurements of volume flow and sound speed with sophisticated calculation features. Exactly the same arrangement of clamp-on ultrasonic transducers mounted onto the outside of a pipe which is required for flow measurement allows the meter to also determine the acoustic velocity in the medium. This depends on the density – and therefore also on the temperature – of the medium and is a substance-specific quantity. The transmitter's internal HPI computer calculates API gravity, operational density, density at base conditions and kinematic viscosity. Temperature and pressure compensation according to industry standards such as ASTM1250, GPA TP25 and D4311 allows for precise standard volume flow measurement of liquid hydrocarbons.

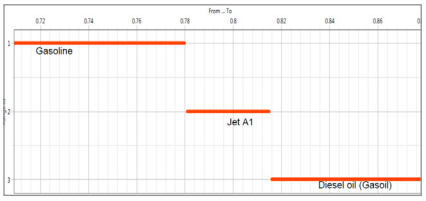
One characteristic and particular advantage of Flexim 's non-intrusive measuring technology lies in the fact that it can be thoroughly tested without any negative impact on normal operation. After Flexim 's service team in South-East Asia demonstrated the suitability of the technology for the task, the client decided to purchase a FLUXUS® H721 hydrocarbon measuring system. The final measuring point is a buried installation in explosion hazard zone 2 (ATEC/IECEX, correspondingly FM Class 1, Div. 2).



Different hydrocarbon products pass subsequently through the multi-product pipeline and must be clearly distinguished and separated for proper allocation.

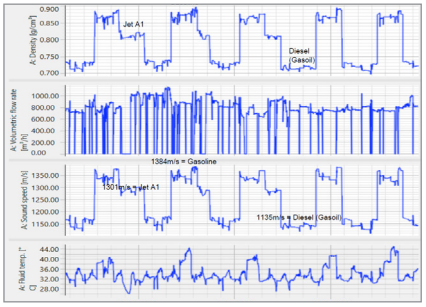


Measuring and computing principles of Flexim 's FLUXUS® H721 ultrasonic measuring system for the hydrocarbon processing industry.



The measuring task: Distinguishing different hydrocarbon products by their characteristic sound speed range.

Installation of a test measurement



The test measurements showed clearly the perfect suitability of the technology for the task.

Measuring Points and Instrumentation	
Pipelines	16”, carbon steel
Media	jet fuel, diesel, regular and premium gasoline
Product density range	45 lb/ft^3 – 55 lb/ft^3 (at reference conditions T = 60° F)
Hazardous location:	ATEC/IECEX Zone 2, FM Class 1, Div. 2
Measuring Device	stationary FLUXUS® H721 ultrasonic measuring system for hydrocarbon applications Clamp-on ultrasonic transducers type GRH (IP68) for under-ground buried installation, mounted in Variofix C (stainless steel)

Advantages

- Increase in efficiency of operation through the replacement of pigging
- Automatic interface detection allows minimising of off-spec product mix phases
- Cost-effective measuring solution with interface detection, hydrocarbon product identification and flow measurement by one single instrument
- Easy retrofit without opening of the pipe and therefore no impact on the availability of the pipeline
- IP68 transducers for underground buried installation

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