APPLICATION NOTE Oil & Gas

Monitoring energy consumption at an oil and gas field

- Equipping more than 70 bypass lines with gas flow measuring devices
- Vortex flow measurement of natural gas with integrated pressure and temperature compensation
- Detecting technical losses due to soot formation in burners

1. Background

A multinational oil and gas company explores and refines raw oil and natural gas in Northern Serbia. The oil and gas field stations have only recently been refurbished to meet the most complex production processes. All facilities comprise of a wide range of energy consuming devices such as heavy fuel and gas boilers, steam heaters, glycol dehydrators and compressors. Most of the systems are fueled with natural gas from the gas fields.

2. Measurement requirements

In order to control the energy efficiency of each of their gas field stations, the company decided to monitor the natural gas consumption of their systems as well as to detect technical losses due to soot formation in burners. The customer was therefore searching for a cost-effective gas flow measuring technology to be mounted in more than 70 bypass lines. Given the volatile parameters of the medium, it was a requirement that temperature and pressure measurement (4...60 barg / 58...870 psig) be part of the solution. ATEX zone 1 Ex ia approvals were also mandatory.

Vortex flowmeter mounted in a bypass line

KROHNE

3. KROHNE solution

Mobile metering system with a flanged OPTISWIRL 4070 C

The KROHNE representative, WIG DOO BEOGRAD, recommended using the Vortex flowmeter OPTISWIRL 4070 C, thereby prevailing over competitor solutions using turbine meters, rotary gas meters or multivariable transmitters. The operator installed more than 70 Vortex flowmeters from KROHNE at the gas field stations. The instruments were mounted in bypass lines to allow easy dismantling without process interruption. The majority of these lines were meant to be part of a permament system of piping with different nominal sizes from DN 15 / ½" to DN 100 / 4" (classes: 150 lb, 300 lb and 600 lb). At these measuring sites flowmeters with sandwich process connections were used. Five other flowmeters were fitted at mobile metering systems that allow for temporary flow measurement at 14 varying measuring sites. These flowmeters were installed with flanges and all devices have corresponding ATEX approvals (Ex II 2G EEx d ia [ia] IIC T6).

The vortex flowmeter measures the operating volume flow of natural gas as well as calculates an accumulated standard volume flow of as low as 4 Sm^3/h). As all devices also feature integrated temperature and pressure sensors, they can compensate for the unsteady parameters of the medium. Their readings are provided via 4...20 mA HART to a control room, from where they are telemetrically transferred to a SCADA system.

4. Customer benefits

Installation of flowmeter with sandwich connection

The operator of the oil and gas fields now benefits from reliable energy monitoring that enables them to get an accurate overall measurement of their own consumption. The OPTISWIRL is a cost effective alternative to mechanical gas flow meters as it is maintenance-free and features integrated temperature and pressure compensation. It therefore requires no additional instrumentation to compensate for the unsteady parameters of the medium. This also makes the flowmeter a suitable device to control the maintenance requirements of burners and to prevent technical losses. Every time the nozzles of the burners start sooting, the pressure raises which can be effectively detected by the OPTISWIRL. As a result, predictive maintenance can be carried out, preventing costly process interruptions.

5. Product used

OPTISWIRL 4070 C

- Vortex flowmeter for measuring operating, standard volumetric and mass flow of conductive and non-conductive liquids, gases and vapours
- 2-wire device with integrated pressure and temperature compensation
- Non-wearing, fully welded stainless steel construction with high corrosion, pressure and temperature resistance
- Optimal process reliability thanks to Intelligent Signal Processing (ISP) – stable readings, free of external influences
- Maintenance-free measuring sensor design

Contact

Would you like further information about these or other applications?
Do you require technical advice for your application?
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