



APPLICATION NOTE Chemical

Steam quantity measurement for internal energy balancing

- Measurement of flow, temperature and steam pressure
- Recalculation of the steam mass into energy
- Output of heat consumption to an energy monitoring system

1. Background

A large chemical concern operates its own steam network, from which the individual business units draw off steam, e.g. for heating purposes. The company has installed a primary monitoring system for recording and billing the steam and energy consumption.

2. Measurement requirements

A system to measure the steam entering an administration building has to be set up. The steam flows past the measurement point through a DN 150 insulated pipe with 10 t/h at 4.5 bar pressure and a temperature of 156° C. The density is 2.92 kg/m³. Until now, the operating company has deployed a compact orifice flowmeter in combination with a temperature and a pressure sensor to measure the quantity of steam consumed. However, the measurement range of the flow meter was not sufficient to record the wide deviations in the flow volumes of steam. The heat consumption should be output to the monitoring system. Additionally, there is also a requirement to convert the measured steam mass into energy, e.g. kWh.

3. KROHNE solution

KROHNE supplied an OPTISWIRL 4070 C DN150 to measure the flow, which has a bigger turn down than an orifice plate. The vortex flowmeter has integrated pressure and temperature compensation and was supplied with a flow conditioner in order to achieve shorter inlet paths. The OPTISWIRL 4070 C unifies three measuring systems. It measures the process pressure, the temperature and the volume flow. Based on this information, the integrated flow calculator calculates the exact mass and energy flow.

4. Customer benefits

Thanks to the large measurement range, the operating company can measure the actual steam consumption of the administration building with much more accuracy than before. The customer was particularly impressed the measuring principle integrated in the device as well as the integral flow calculator. A further convincing factor was the fact the device is maintenance-free, as the orifice flowmeter used before had to be dismantled for maintenance and then reinstalled afterwards. A final point was that in terms of purchase costs, the vortex device was significantly less than comparative offer for orifice flowmeter and there was no need to install pressure and temperature sensors.



OPTISWIRL 4070 C with integrated pressure and temperature compensation (pressure loop is located on the back of the unit)

5. Product used

OPTISWIRL 4070 C

- 2-wire Vortex flowmeter for the measurement of gases, vapours and liquids
- Integrated pressure and temperature compensation and conversion into energy
- Suitable for damp gases, e.g. saturated steam
- High precision and long-term stability
- Process temperature: $-40^{\circ}\text{C} \dots +240^{\circ}\text{C}$
- Maintenance-free



Contact

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