APPLICATION REPORT

Food & Beverage

Flow measurement of natural gas at a commercial bakery

- Flow monitoring of gas consumption for production ovens
- Use of an all-in-one Vortex flowmeter with temperature and pressure compensation
- Integrated flow calculation of natural gas to standard conditions
- Cost-effective and reliable solution without the need for additional equipment

1. Background

Lantmännen Unibake is one of the world's leading producers and suppliers of quality baked goods. The large-scale bakery company also operates several state-of-the-art production facilities in Denmark, one of which is located in Holstebro, in the Central Jutland Region. The factory produces wheat bread products – French bread, sandwich bread and flutes – for the company's two brands: Hatting (retail) and Schulstad Bakery Solutions (foodservice).

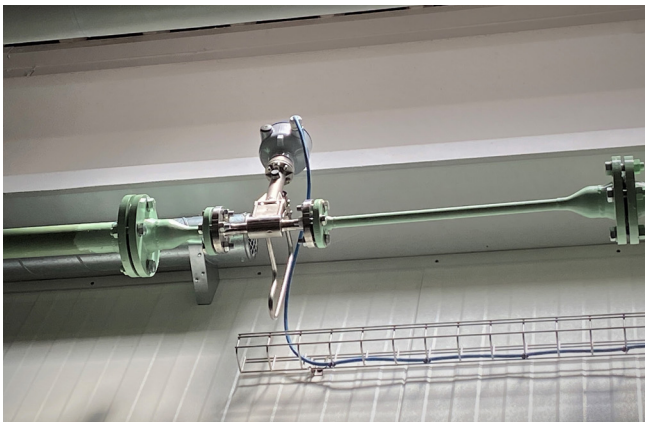
2. Measurement requirements

The bakery operates several production ovens heated with natural gas. Monitoring the consumption of natural gas is key to efficient production and cost control. For continuous performance assessment of each individual oven and to double check on the readings provided by the CT meter of the gas provider in place, the bakery was searching for a cost-effective, yet accurate and reliable flow measurement in its four oven supply lines. The flow instrumentation was required to compensate for pressure and temperature conditions and calculate the consumed volume flow rate to standard conditions.

3. KROHNE solution

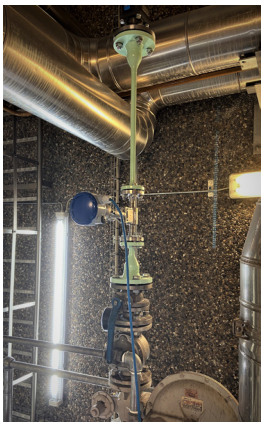
The bakery opted for the OPTISWIRL 4200 Vortex flowmeter to monitor the natural gas consumption of its ovens. The all-in-one flowmeter was supplied with DN15 (~½") flanges and installed either as a compact version (1 unit) or with a field-mounted signal converter (3 units). The remote version enables on-site monitoring of flow rates at eye level, which is particularly useful where the flow sensors are installed in less accessible sections of the natural gas supply lines.

All OPTISWIRL 4200 units were equipped with integrated temperature and pressure sensors to compensate for fluctuations in natural gas conditions. As the Vortex flowmeter also features an integrated flow computer for calculating standardised volume flow rates, there was no need to install additional equipment.



Flow sensor of the OPTISWIRL 4200 installed in the natural gas supply line of a bakery oven

Field-mounted signal converter of the KROHNE Vortex flowmeter



OPTISWIRL 4200 installed in a vertical standpipe

4. Customer benefits

The industrial bakery benefits from a cost-effective and reliable solution with minimal installation effort. With the all-in-one flowmeter, there is no need to install additional sensors for pressure and temperature, nor to purchase a separate flow computer. Since all parameters, such as volume flow, temperature, and pressure, are measured at a single point, measurement accuracy is improved and higher compared to external compensation and flow calculation. The integrated flow computer compensates for pressure and temperature fluctuations that affect the volume flow and converts the natural gas consumption to standard conditions (Nm^3/h).

The readings from the four natural gas lines were thoroughly checked and compared with those from the main supply line, which is used by the gas provider for billing. No significant deviations were detected between the OPTISWIRL 4200 flowmeters and the custody transfer flowmeter in the main line.

While other commonly available Vortex flowmeters either rely on the installation of external sensors or require temperature and pressure sensors to be connected via exposed and therefore vulnerable wiring, the KROHNE Vortex flowmeter features a fully integrated design. External wiring is only required for the standard power supply and output signals of the 2-wire device. This eliminates the need for additional cabling during commissioning and reduces the risk of damage to cables, such as those connecting a pressure sensor to a signal converter, as is common with other Vortex flowmeters.

5. Product used

OPTISWIRL 4200

- Vortex flowmeter for utility applications and energy management systems
- For natural gas and other gases, liquids, saturated and superheated steam (+240°C / +464°F)
- Integrated P+T measurement: direct output of mass, normalised flow, energy (gross/net heat)
- Compact or field-mounted version
- Flange: DN15...300 / ½...12"; wafer version: max. DN100 / 4"
- 2-wire, 4...20 mA, HART®, FF, Profibus-PA

Contact

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