KROHNE

achieve more

OPTISWIRL 4200 – Making processes more efficient while reducing costs

Perfectly equipped for the ISO 50001 energy management standard

OPTISWIRL 4200 – Making processes more efficient while reducing costs

The rising price of raw materials and energy means that now, more than ever, companies are having to deal with the topic of energy management. On the one hand it is important to reduce energy costs and save over the long term and on the other hand you can benefit from the certification according to the ISO 50001 regulation. As an ISO 50001 certified company you can improve your energy performance by implementing an energy management system. Furthermore, you ensure that your company meets the specific energy policy in your country and show this conformity to your customers.

Selecting the new OPTISWIRL 4200 vortex flowmeter featuring integrated pressure and temperature compensation is an excellent way to ensure the sustainable economic success of your company. You are simultaneously supporting your energy management system which, with the appropriate certification.

OPTISWIRL 4200 product portfolio

OPTISWIRL 4200 C flange

Vortex flowmeter with online density compensation

OPTISWIRL 4200 C sandwich

All advantages of the flange version in a space-saving sandwich design

OPTISWIRL 4200 C 1R / 2R

Integrated reduction of nominal diameter for space-saving and economic installations and large measuring spans

OPTISWIRL 4200 F

Remote version with field housing converter with connection cable up to 50 m / 164 ft

OPTISWIRL 4200 C dual version

Two independent sensors and two signal converters for multiproduct pipelines, redundant measurement or increased safety demands

OPTISWIRL 4200 – The All-in-One Solution

OPTISWIRL 4200 C flange

Vortex flowmeter with online density compensation

- First choice for auxiliary and supply processes
- Integrated pressure and temperature sensors
- Signal filter technology AVFD (Advanced Vortex Frequency Detection) for stable measurement under different process conditions
- SIL 2 certified acc. to IEC 61508 edition 2
- Gross and net heat measurement for hot water and steam
- Comprehensive communication options
- Remote version with field housing converter with connection cable up to 50 m / 164 ft

Accurately measure steam quantities

Even though steam boilers have an extremely high degree of efficiency, the efficiency of the steam system as a whole is considerably lower. Reasons for this include non-insulated steam lines, leaks, contaminants or faulty condensate separators.

People often overlook the pressure and temperature fluctuations that can occur during the process. However, such fluctuations have a considerable impact on the measuring error of a system (table on right), which can result in a high loss of energy. Exact measurements can help in this case to identify losses and increase the efficiency of the steam system.

Energy costs when measuring saturated steam and superheated steam

	Saturated steam		Superheated steam		
Effective pressure (bar over)	5 bar	17 bar	1.7 bar	2.8 bar	4.4 bar
Temperature	+158.9 °C	+207.1 °C	+180 °C	+170 °C	+180 °C
Measuring error at pressure deviation ±1 bar	16 %	5 %	37 %	27 %	19 %
Measuring error at temperature deviation ±10 °C	22 %	18 %	2 %	3 %	3 %
Non-calculated energy costs* at pressure deviation ±1 bar (€) p.a.	216,000 €	168,000 €	215,000 €	218,000 €	222,000 €
Non-calculated energy costs* at temperature deviation ±10 °C (€) p.a.	299,000 €	568,000 €	14,100 €	21,400 €	31,200 €

*(*Nominal pipe size DN100, 50 % capacity, energy costs 60 €/MWh)*

Using and maintaining compressors more effectively

There must always be sufficient compressed air of appropriate quality at the right pressure level in a system. Energy efficiency depends partially on accurate systems for measurement and control and partly on the degree of efficiency of the compressor. The table on the right illustrates potential measuring errors.

When measuring air consumption leaks are the most frequently occurring difficulty. They lead to increased running times for the compressor as well as increased energy consumption and more frequent maintenance.

A well-maintained compressor running at maximum efficiency has a degree of efficiency of 85 %. Soiled oil or air filters have a direct impact on and can decrease the degree of efficiency by up to 10 %.

For this reason it is necessary to know the free air delivery (FAD)* of a compressor as it also gives the user information about maintenance requirements and energy efficiency. Measuring the free air delivery helps with the optimal scheduling of maintenance intervals and when it comes to operating the compressor at the highest possible degree of efficiency.

* The free air delivery is the amount of free air that can be taken in through the compressor at the inlet on the suction side.

Effective pressure (bar over)	4 bar	8 bar
Temperature	+20 °C	+20 °C
Measuring error at pressure deviation ±1 bar	20 %	11 %
Measuring error at temperature deviation ±10 °C	4 %	4 %
Energy costs** not measured at pressure deviation ±1 bar (€) p.a.	164,250 €	122,859 €
Energy costs** not measured at temperature deviation ±10 °C (€) p.a.	32,850 €	44,676 €

*(**Nominal pipe size DN100, 50 % capacity, energy costs 75 €/1.000 Nm³)*

Save costs on installation by using compact measuring systems

In order to measure fluctuations in pressure and temperature, measuring systems consisting of a vortex flowmeter, a separate pressure sensor and a separate temperature sensor as well as an additional flow calculator are generally installed. This results in high costs for assembly and installation.

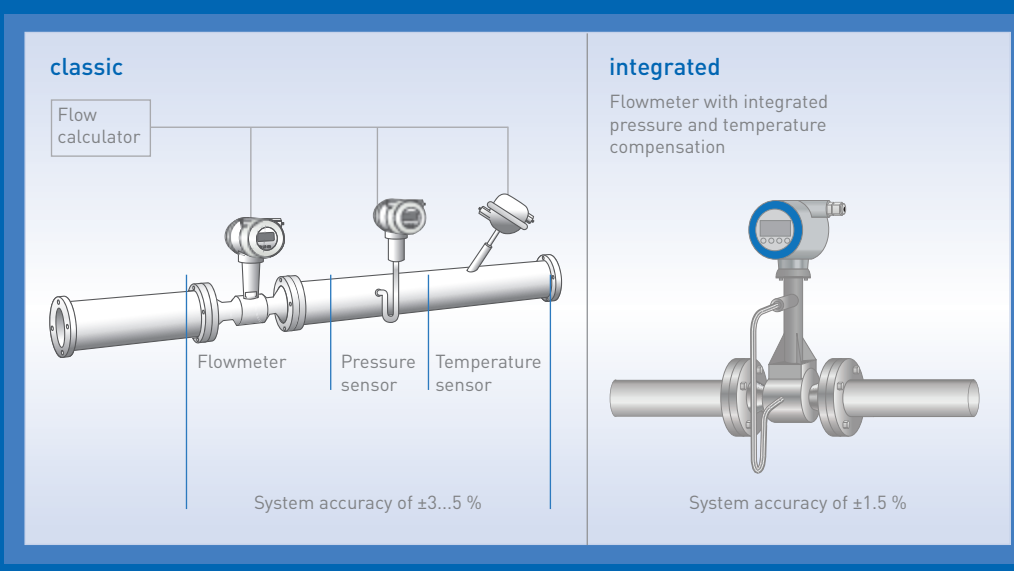
However, with the installation of a vortex flowmeter featuring integrated pressure and temperature compensation such as the OPTISWIRL 4200, there is no need to install separate sensors, cables and infeeds. This makes it possible to save up to 50 %.

Installation	classic (individual devices)	integrated (with pressure and temperature compensation)
Flowmeter		
Pressure sensor		---
Temperature sensor		---
Flow calculator		---
Installation costs - mechanical		
Installation costs - electrical		

Higher measuring accuracy with the use of compact measuring systems

With the classic installation of a vortex flowmeter and separate pressure and temperature sensor as well as flow calculator, all errors occurring in the measuring chain must be taken into account when determining system accuracy. This can result in a measuring error between ±3...5 %.

Using a vortex flowmeter with integrated pressure and temperature compensation such as the OPTISWIRL 4200 allows you to not only lower installation costs but also increase the measuring accuracy of the measuring point. In this case the accuracy is ±1.5 % of the measured value.



Easy gross and net heat quantity calculation

When it comes to energy, the most accurate measurement of consumption is essential. By combining flow, temperature and pressure measurements in one device, OPTISWIRL 4200 provides the basis for a precise mass flow calculation. In steam applications, the software even determines the enthalpy – the heat content – of the steam. Therefore, OPTISWIRL 4200 is able to calculate the gross heat quantity.

In case net heat quantity consumption of process is asked for, a single temperature sensor can be added to the return line. OPTISWIRL 4200 uses the readings to calculate the amount of heat consumed.

Thereby, proving that the OPTISWIRL 4200 is a reliable partner for modern energy management systems.

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