

# APPLICATION REPORT

Water & Wastewater

## Standard volume flow measurement to increase the efficiency of the compressed air system in a water treatment plant

- Creating consumption profiles to save energy
- Pressure and temperature-compensated flow measurement of compressed air
- Accurate determination of compressed air flow rates over a broad measuring range



### 1. Background

Groupe des Eaux de Marseille is one of the leading group of companies in the Provence and Mediterranean regions in southeast France. Comprised of 18 companies, the Group specialises in water supply in addition to its services in the fields of environmental protection, engineering and energy management.

Eau de Marseille Métropole is responsible for managing the drinking water distribution networks in the municipal association of Métropole d'Aix-Marseille-Provence. As part of an energy and environmental strategy, the company has been carrying out an energy assessment of its facilities over the past few years. The company had its energy management system certified according to ISO 50001 at the beginning of 2016.

### 2. Measurement requirements

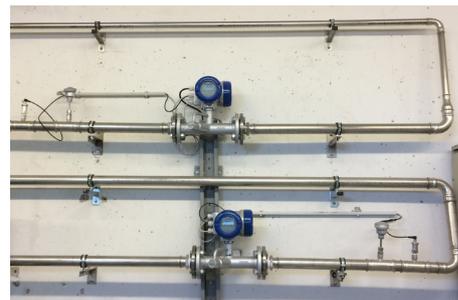
Management at the drinking water treatment plant in Saint-Barnabé in Marseille wanted to determine the compressed air flow produced by the compressors. The goal was to create consumption balances and calculate the efficiency of the compressors. This, in turn, was to optimise energy costs and consequently the entire process.

At the time no measuring point existed for this. The operator required a measurement of pressure (6...7 bar / 87...101.5 psi), temperature (approx. +25°C / +77°F) and flow to determine the standard volume (between 100...585 Nm<sup>3</sup>/h / 62.3...364.5 SCFM). They wanted as accurate a measurement as possible – starting from a flow of zero and over the entire measuring range. At the same time the customer wanted to comply with ISO 50001.

**KROHNE**

## 3. KROHNE solution

A solution made up of a combination of the OPTISONIC 7300 C ultrasonic flowmeter (in DN50, with flange connection), the OPTIBAR P 1010 C pressure transmitter and the OPTITEMP TRA-P10 temperature assembly including OPTITEMP TT 22 C head-mount transmitter was used a total of four times. One of the devices is located at the output of the main compressors, two others are installed in the supply line of two ozone plants. One more device is located behind that to measure the compressed air consumption. A horizontal stainless steel pipe with the recommended inlet and outlet runs was installed (inlet:  $\geq 20\text{DN}$ , outlet:  $\geq 10\text{DN}$ ). The ultrasonic flowmeter enables accurate flow measurement starting at the minimum flow. It also feeds the pressure and temperature transmitters. The OPTISONIC 7300 calculates the standard volume flow ( $\text{Nm}^3/\text{h}$ ) with the help of pressure and temperature measurements.



Ultrasonic flowmeters with pressure transmitters and temperature assemblies

## 4. Customer benefits

Compressed air consumption balances were created in real time according to the ranges. The standard volume flow measurements are accurate, repeatable and can be compared over time. Ultrasonic flow measurement now makes losses in the compressed air supply visible. Using the consumption analysis, the customer was able to improve energy efficiency: the operating pressure was lowered from 6 or 7 bar / 87 or 101.5 psi to 5.5 bar / 79.7 psi. The power consumption of the compressors was thus reduced by 15%.



Compressed air measurement

Thanks to the installation, Eau de Marseille Métropole was also able to optimise the process of air production. This allowed the customer to achieve a further 20% in energy savings. The measuring instrumentation paid off quickly. The customer complied with the ISO 50001 standard.

## 5. Products used

### OPTISONIC 7300 C

- Ultrasonic flowmeter for natural gas, process gas and utility gas applications
- Large dynamic range

### OPTIBAR P 1010 C

- Pressure transmitter for basic pressure and level applications
- High accuracy ( $\pm 0.25\%$ )

### OPTITEMP TRA-P10

- Temperature assembly for standard applications
- Plug-in RTD sensor assembly with a straight welded multipart thermowell

### OPTITEMP TT 22 C

- Programmable head-mounted temperature transmitter with RTD input
- Input: 1 x Pt100, 3-wire; Output: 2-wire, 4...20 mA



## Contact

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