



# APPLICATION REPORT Water & Wastewater

## Automation of flushing water systems in a wastewater treatment plant

- Increasing preliminary treatment efficiency by way of an ultra-compact measuring device
- Electromagnetic flow measurement as a control variable for automated cleaning of screenings and grit washers
- Optimum cleaning performance with significantly reduced water use

### 1. Background

The Association for Water Supply and Sewage Treatment Geiseltal (ZWAG) operates a municipal wastewater treatment plant (WWTP) for a population of 23,000 in Braunsbedra, Germany. The plant processes 2500 m<sup>3</sup> / 660,430 US gallons of wastewater every day. In addition to the biological treatment stage and the sludge treatment, the plant consists of the preliminary treatment, which is made up of the screening and the grit removal.

### 2. Measurement requirements

Along with normal operations, increasing plant efficiency is an important consideration for water management. ZWAG has identified the cleaning of the screens and the sand taken from the grit chamber as one of several starting points for making their processes more efficient. This is because the screenings wash press and the grit washer used to require a relatively large amount of water.

The water supply to these systems is historically controlled proportionally to the influent by a timed interval, not by taking the organic load into consideration. In the case of the grit washer, the rinsing of the sand contaminated with organic matter is often controlled by a timer and the amount of water used to flush the chamber was not recorded. This method of using large amounts of rinse water will result in a satisfactory cleaning, keeping the proportion of organic matter (i.e. the loss of ignition) to less than 3%. However, the same results are also possible using significantly less rinse water.

With the aim of reducing the use of rinse water while maintaining a high cleaning performance, the customer decided to run an automated rinse water system. To this end, the plant operator needed compact and cost-effective process instrumentation that continuously measures the real time and totalised flow values for evaluation purposes.

## 3. KROHNE solution

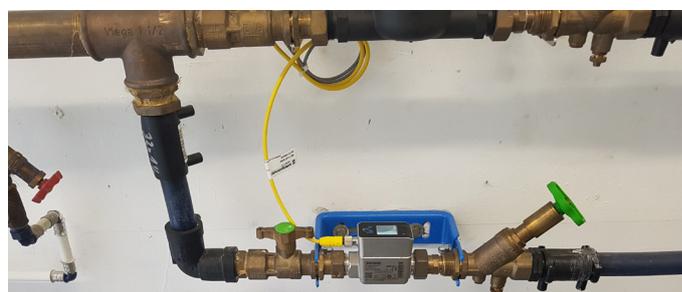
For the process automation of screenings wash press and grit washer, the customer installed the AF-E 400. The cost-effective electromagnetic flowmeter (EMF) is ultra-compact, lightweight and comes with the highest accuracy in its device class along the entire flow range. It is therefore ideally suited for providing the necessary control variables for automated water addition.

The KROHNE device has been easily integrated into the system without having to make any complex changes to the infrastructure on site. The EMF was installed in the customer's existing bypass line using a G1 male thread. The measuring device was only stabilised with the help of a simple wall bracket.

In this application, the AF-E 400 measures both the realtime and totalised flows. Those values are transmitted to the WWTP operator's PLC via a 4...20 mA signal output. If desired, the customer could have chosen IO-Link to transmit the measured values and device information and have the ability to configure the AF-E 400 from the control room in the future.



Automation of flushing water systems with the AF-E 400



Electromagnetic flow measurement for optimising cleaning processes in preliminary treatment

## 4. Customer benefits

Continuous measurement and recording of the used water quantities enables the operator to precisely determine and evaluate the amount of water consumption and to optimise it, taking into account the required washing result. In this way, ZWAG was able to adjust the processes of the grit washer and screenings wash press to such an extent that, based on the loss on ignition, only the really necessary amount of rinsing water is used. The dosing is automated via the PLC. The water consumption of these two plant sections has been considerably reduced by the use of flow measurement while maintaining the same high cleaning performance.

Using the AF-E 400 has already paid off after a short period of time. The efficiency of the entire system has been increased since either the drinking water consumption or the service water treatment and conveyance can now be significantly reduced. The AF-E 400 thus takes into account the changing requirements of modern wastewater treatment plant operation as it provides the customer with the necessary information to act as a true efficiency manager in water management.

## 5. Product used

### AF-E 400

- Electromagnetic flowmeter for utilities and industrial automation
- Best-in class temperature range, accuracy, pressure drop and flow range
- 4...20 mA, pulse, frequency, Modbus, IO-Link



### Contact

Would you like further information about these or other applications?  
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