

APPLICATION REPORT Water & Wastewater

Flushing water measurement for filter regeneration in a waterworks



- Electromagnetic flow measurement in large pipelines (DN 700 / 28") without inlets/outlets
- Volume and flow velocity monitoring to control flush programs
- Protection of activated carbon and multi-layer filters through targeted adaptation of flush behaviour

1. Background

The Aschaffener Versorgungs-GmbH (AVG) in Germany operates a waterworks that treats well water to turn it into high quality potable water. The waterworks was thus equipped with sophisticated treatment technology. This enables a fully automated treatment process from decarbonization (softening) to denitrification (nitrate elimination) down to secondary cleaning through filtration and UV disinfection. The company supplies 130,000 people in the region with a total annual water volume of 7.3 million m³ / 257 million ft³.

2. Measurement requirements

Before the treated water passes to the clean water tanks and from there is fed into the drinking water network, multi-layer and activated carbon filters are used as part of the secondary cleaning to eliminate all herbicide and pesticide residue. As soon as the filters need to be flushed they are filled with flushing water. To guarantee optimal filtration, the rinse behaviour must be controlled (i.e. the volume of water per time unit determined by pressure and flow velocity, in accordance with the desired filter bed expansion and depending on the density and composition of the filter material).

Up to now the waterworks has been trying to control the flushing by measuring the level of the flushing water tank. They found, however, that it was not easy to control the flush behaviour of the water being pumped out of the tanks in this way and that flushing results were invariably poor or insufficient as a result of too high or too low flow velocities. So the customer started looking for a flow measurement solution in front of the 6 multi-layer and activated carbon filters that could control the volume of flushing water going through the pump as needed. Due to the extremely confined space for installation, the required measuring instrument could only be used in one area of the pipeline (DN 700 / 28") without sufficient inlets and outlets.

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3. KROHNE Solution

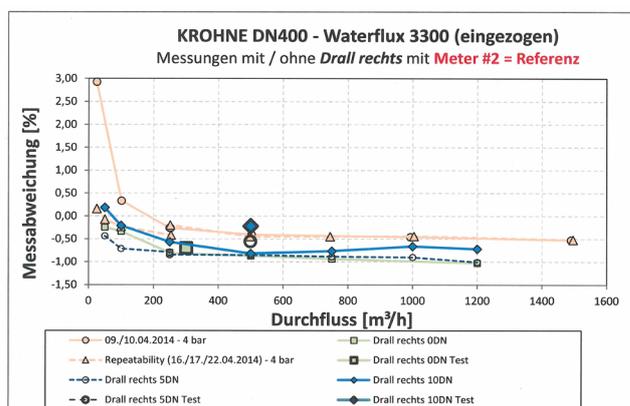
AVG decided to use the WATERFLUX 3300 W. The electromagnetic flowmeter (EMF) features a flow-optimised pipe cross-section that enables installation without inlets and outlets. The measuring device was supplied in DN 400 /16" and installed at a height of 5 m / 16.4 ft in a tapered part of the pipeline in front of the filter systems. In addition to the volume, the WATERFLUX 3300 also measures the flow velocity of the flushing water. The measurements are then transmitted to a PLC to control the pump in accordance with the flush requirements.



Wall version of converter (left) and sensor (right) of the WATERFLUX 3300 W electromagnetic flowmeter

4. Customer benefits

The WATERFLUX 3300 helps with efficiently flushing and operating all 12 filters without the filling material being discharged during the flush process or the filter not having the desired throughput of water after flushing, resulting in further costs. AVG benefits from the use of an EMF which, compared to virtually all competitors' devices in this size, can be used without inlets and outlets. The DN 400 WATERFLUX used in this application was tested in 2015 by PTB (Germany's national metrology institute) under varying reference conditions and inhomogeneous flow conditions. The accuracy values for the EMF indicated by KROHNE when installing without inlets and outlets are hereby completely confirmed.



Test results for the reference measurements of the PTB

5. Product used

WATERFLUX 3300 W

- Electromagnetic flowmeter for water applications
- High accuracy and large measuring range (DN 25...600 / 1...24")
- Optimised flow profile thanks to rectangular pipe cross section
- No inlets or outlets necessary for installation in confined spaces
- Also suitable for custody transfer applications



Contact

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