APPLICATION REPORT

Water & Wastewater

Measuring sewage quantities from municipalities

- Flow measurement of partially filled pipes
- Integrated non-wetted capacitive level measurement
- Measurement in closed piping system enables safe and clean working environment

1. Background

The Käppala Association was formed in 1957 for processing sewage from municipalities north and east of Stockholm. An expanded, modernized plant was inaugurated by the King of Sweden in April 2000. Today it serves 11 municipalities and is regarded as one of the world's most environmentally friendly and advanced water purification plants. The plant is situated in Käppala, Lidingö, an island east of Stockholm in the inner part of the famous Stockholm Archipelago. Wastewater coming from 11 different municipalities, approximately 550.000 people, hospitals, offices and industries travels a 60-kilometer system of tunnels and three pumping stations before its enters the treatment plant, where it takes only 24 hours before it leaves the plant as pure water.

2. Measurement requirements

The wide stretched area of Stockholm is divided into 24 sub areas from where effluent is taken in. The quantities coming in from these sub areas have to be measured very accurately. The customer required a measurement accuracy of better than 1% of full scale in a partially filled pipe. The flow rate fluctuates strongly during the day. The filling rate can be as low as 10% from the pipe size. In the winter season the temperature of the waste water can be low and as fat builds up easily at low flows, creating flow disturbances which can result in a lower accuracy. The tunnels through which the wastewater runs is from natural rocks. A lot of strongly corrosive H_2S is formed, putting restrictions on the materials that can be used, particularly for the electrodes when they are not always wetted. Another customer requirement with regard to the H_2S has been that the measurement should take place in a closed system in order to arrange for a safe and clean working environment for the maintenance engineers. An open channel measurement solution has therefore been rejected.

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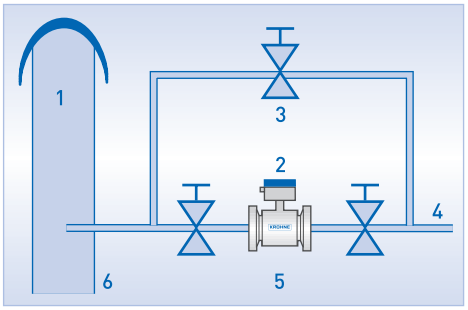

1 Wastewater tunnel system
2 TIDALFLUX flow meter
3 Bypass
4 Region inlet
5 Clean and safe maintenance area
6 Outlet

3. KROHNE solution

The customer has chosen KROHNE's TIDALFUX flow meter, because it meets all his requirements. In total the customer has installed 24 TIDALFLUX meters with various diameter sizes, ranging from DN 600 up to DN 1000. The TIDALFLUX has an abrasion resistant liner and uses wetted electrodes mounted at a height of 10% from the pipe bottom. This is a major advantage, because a competing flow meter that can be used for partially filled pipes has multiple electrodes. In partially filled mode, most of the electrodes are in contact with the strongly corrosive H_2S environment. As a result the instrument broke down in a very short period.

With the TIDALFLUX the filling level is measured by means of capacitive plates and high frequency electronics. It uses a patented, non-contact level measurement. The integrated level sensors behind the liner have no contact with the liquid and are therefore insensitive to fat and oil floating on the surface. To prevent fat building up at the transition from customer pipe to the flow sensor, a thin walled reducer pipe was mounted to create a smooth passage. TIDALFLUX is designed to measure reliably with flows between 10% and 100% of the pipe cross section.

Outlet into wastewater tunnel system

4. Customer benefits

- Safe and clean operational area due to closed pipe design solution
- Accurate measurement with partially filled pipes
- Trouble free flow measurement
- High abrasion and chemical resistance
- No on-site calibration necessary

5. Product used

TIDALFLUX 2300 F

- Electromagnetic flowmeter for partially filled pipes
- Measurement possible down to 10% filling of pipe
- Diameters from DN 200 up to DN 1600 (8" to 64")

Contact
Would you like further information about these or other applications?
Do you require technical advice for your application?
application@krohne.com

Please visit our website for a current list of all KROHNE contacts and addresses.

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