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SAVONIA UNIVERSITY OF APPLIED SCIENCES ENVIRONMENTAL TECHNOLOGY RESEARCH AND TEACHING

Surface Water Pilot Plant and Water Supply Test System

The environmental technology department has a surface water pilot plant, a water supply test system and a water laboratory. Together they form a water research setting that can be used inter alia to examine and develop methods connected with water treatment and water security.

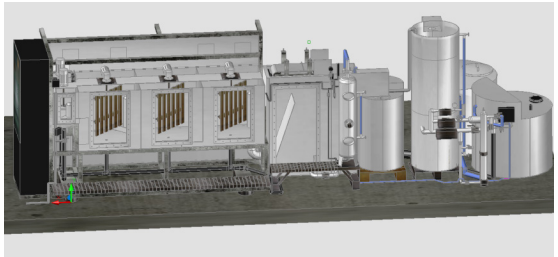
The surface water pilot plant and the water supply test system are controlled by a computer that also stores the measuring data retrieved from test events. The apparatus can be used to carry out short and long term measuring periods and to monitor them, as the automated equipment and the online control system offer precise and reliable testing periods. Furthermore, it is possible to simulate different deviations in the circumstances similar to real life. The whole process can be controlled in real time through the Internet, too.

The surface water plant and the water supply test system can be utilised for multiple purposes:

- Chemical test drives
- Testing disinfection methods
- Testing and developing unit processes for water treatment
- Testing and developing measuring and monitoring devices

The unit processes in the surface water pilot plant:

- Rapid mixing
- Three-phase flocculation
- Flotation
- Rapid sand filtration
- Disinfection (chlorination/UV treatment/ ozonation)
- pH control



3-D model of a surface water pilot plant.

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TECHNICAL INFORMATION

Surface Water Pilot Plant:

- Maximum capacity of the water production 3 m^3/h.
- Raw water source: Kallavesi surface water.
- A 1.4 m^3 raw water tank, a 4 m^3 treated water tank and a 1.4 m^3 tank for raw water from other sources.
- Possibility to use different chemicals (for ex. filtration substances)
- Possibility to connect the surface water plant with separate process units.
- Real time measurements: temperatures, pH, electrical conductivity, flow rate, performance of the equipment, and level measurement.
- Controls: input water flow rate; pH value in the precipitation tank (lime water or lye) dependent on the flow rate/standard value; and post chemicalisation with carbon dioxide as a standard value or dependent on the flow rate.
- Data collection by the control room computer that also stores the data.

Water Supply Test System:

Pipes:

- 2 x 100 m copper pipeline, outer diameter 12 mm (inner diameter 10 mm)
- 2 x 100 m composite pipeline (Uponor), outer diameter 16 mm (inner diameter 12 mm)
- 2 x 100 m composite pipeline (Uponor), outer diameter 50 mm (inner diameter 41 mm)
- Real time measurements: flow rate, temperature, pressure, pH, thermal conductivity, turbidity, organic content (UVAS), and particle counting (PAMAS).
- Every pipeline in the system has several sampling points for taking biofilm samples.
- Controls: flow rate in the pipelines (control valves) and off/on control for different pipelines (magnetic valves).
- Possibility to perform pressure shocks and to circulate the same water in different pipelines.
- Water supply test system with its online monitoring equipment.

Water supply test system with its online monitoring equipment.

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