DFM 6.1 for RAS Flow

Activated sludge consists of a mixture of microorganisms and suspended solids. Bacterial cultures are cultivated in a processing unit to break down organic matter into carbon dioxide, water, and other inorganic compounds.

There are many different types of activated sludge processes, including variations in aeration methods and methods of returning sludge to the process. The activated sludge process provides efficient Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and nutrient removal when professionally designed and properly operated. The process itself is flexible and many changes can be made to suit specific requirements.

What is Return Activated Sludge?

Settled activated sludge is collected in the secondary clarifier or the membrane basin and returned to the aeration basin to mix with incoming raw or primary settled wastewater. At the end of the process, activated sludge is still a highly active biomass, but it is now mixed with treated wastewater. Usually, this is transferred to a settling tank so that it can be separated from the treated wastewater, and this will then be transferred onto tertiary treatment. The remaining sludge is sent back to the treatment unit and is called return activated sludge. This allows operators to conduct the process as a continuous cycle.

Why measure RAS Flow?

For conventional activated sludge operations, the RAS flow is generally about 20 to 40 percent of the incoming wastewater flow. Changes in the activated sludge quality will require different RAS flow rates due to the settling characteristics of the sludge.

How do you measure RAS Flow?

Return Activated Sludge has a high concentration of solids and air bubbles. Activated sludge flow is a critical measurement that should be metered by an in-line magmeter or clamp-on Doppler flow meter. Doppler technology transmits high-frequency sound through the pipe wall into the flowing liquid. Sound is reflected to the sensor from the flowing suspended solids or gas bubbles in the liquid, and the reflected sound returns to the ultrasonic sensor(s) at a shifted frequency proportional to the flow velocity.

Using a clamp-on Doppler flow meter for RAS flow means that the sensor is mounted to the outside of a pipe and is unaffected by the suspended solids and gas bubbles in the fluid that would cause maintenance issues on contacting insertion or inline flow meters.

What about transit-time technology?

Transit-time technology works by measuring the time-of-flight difference for ultrasonic pulses transmitted from one transducer to another. Depending on the mounting configuration, the signal may cross the pipe once, twice or four times. Because the signal needs to travel through the pipe and liquid, transit-time works best when the fluid is free of suspended solids or bubbles so that the ultrasound has a clear path. Because RAS has a high concentration of bubbles and suspended solids, the signal tends to be attenuated, meaning flow measurement readings are typically inaccurate and unreliable for clamp-on transit-time technology.

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