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Let's Solve Water

Tech note

Continuous monitoring against sludge drift

SLUDGE LEVEL SENSOR IFL 700 IQ

Increasingly frequent heavy rainfall events and rising rainfall peaks result in high hydraulic loads and overloads for wastewater treatment plants. This increases the risks of technical damage to the plant, disruption of the biological treatment performance or sludge drift. In order to avoid such damage, continuous sludge level monitoring is becoming increasingly important, in addition to emergency drains in the sewage system and rainwater retention basins. The IFL 700 IQ sludge level sensor is the ideal solution for this, also with regard to avoiding sludge drift.

Heavy rainfall challenges the sewage treatment plants

An increasing number of initial rainfall events, but above all higher peaks, have enormous consequences for the sewer net-work and thus also for the sewage treatment plants. The resulting combined sewage can be temporarily stored in stormwater overflow basins in certain quantities, but even this has its limits. For this reason, the hydraulic peak loads of the sewage treatment plants are more and more in the focus.

Risik of sludge drift

A possible and relatively quick consequence of such peak loads is sludge drift. The hydraulic load leads to a distribution of the sludge in the entire sedimentation basin. The sludge diluted in this way can no longer settle at the bottom of the basin and will eventually drift away. The resulting loss of biomass reduces the cleaning performance of the plant. In addition, the effluent values increase and may even exceed the permitted limits.

The danger of sludge drift can affect wastewater treatment plants of any size. Small plants are less able to absorb hydraulic peaks. In larger plants, the volume of sludge drift would have enormous consequences, both for the receiving water and for the operation of the plant.

Figure 1: Sludge level sensor IFL 700 IQ

Continuous sludge level monitoring

To counteract this risk, continuous monitoring of the sludge level is becoming more important. Compared to punctual and possibly manual measurements, continuous measurement provides objective information about the conditions in the basin at all times.
In addition, the measured values can be processed on the PLC and enable automatic control and regulation of the sludge level. This includes, for example, early additional sludge removal or increasing the power of the return sludge pump if there is a risk of sludge drift.

WTW
a xylem brand

Sludge level sensor IFL 700 IQ

With the IFL 700 IQ (Figure 1 und 2), the WTW brand offers a precise, reliable and low-maintenance sludge level sensor for primary and secondary clarification.

The sensor is immediately ready for use after a few settings (immersion depth, basin depth) and, in addition to the measured value, then also provides a detailed display of the echo profile, thus making the conditions in the basin visible. Unwanted signals (e.g. installations or scraper) can be faded out and the automatic and contactless scraper removes disturbing air bubbles.

Recognising sludge drift at an early stage

As already described, the sludge is initially distributed more or less evenly in the basin before it is driven off. As a result, the sludge level is no longer clearly recognisable, because there is no clear separating layer between sludge and clear water.
As soon as this is the case, the IFL 700 IQ basically outputs the bottom signal. This also makes sense in applications with very little or thin sludge, but is misleading when sludge is beginning to drift. To avoid this and to detect the beginning of sludge drift, the IFL 700 IQ offers a corresponding function. If this is activated, the sensor gives an invalid reading instead of a sludge height of zero metres when sludge is moving upwards. The sensor now looks at the entire basin, and any sludge that floats upwards will override the bottom signal.

In order to activate this function and also to set it correctly for the specific plant, we recommend contacting WTW customer service. This is because the IFL 700 IQ should trigger the alarm neither too early (during normal operation or when the actual sludge level is zero) nor too late (when sludge discharge has already occurred).

The simultaneous or near real-time occurrence of this alarm signal (invalid measured value of the IFL 700 IQ) with increased flow values (hydraulic loading or overloading) indicates the risk of sludge discharge, and appropriate countermeasures can be initiated.

Radio connection

The measured values of the IFL 700 IQ can be transmitted via the IQ Sensor Net converters via relays, mA signals or various field buses (e.g. Profibus, Profinet, Ethernet/IP) to the PLC.

The sensor can be connected to the controller not only via cable but alternatively also wirelessly via two MIQ/WL PS radio modules (Figure 3). This allows the sensor to be installed at the ideal location on the scraper bridge. A radio connection of two or more sensors with one additional radio module each is possible and thus allows the monitoring of further basins.

Figure 2: Typical location of the IFL 700 IQ on a scraper bridge in the secondary clarifier

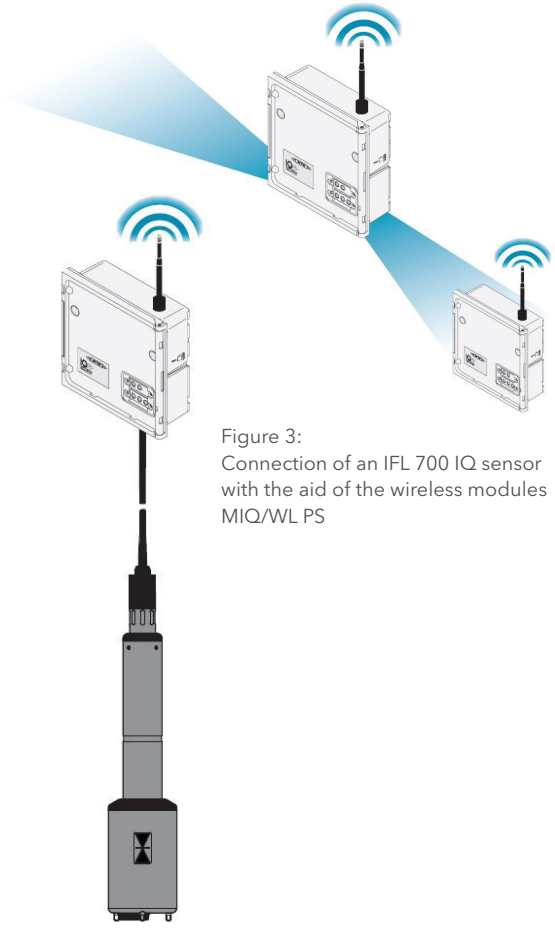

Figure 3:
Connection of an IFL 700 IQ sensor with the aid of the wireless modules MIQ/WL PS

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The IFL 700 IQ in comparison

In addition to the performance mentioned above, the IFL 700 IQ is also convincing in direct comparison with other products on the market. For example, the sensor offers tracking of the “right” echo. This is a great advantage, especially in hydraulically turbulent events, to ensure stable sludge management. In contrast, jumping the sensor back and forth between several signals leads to a constant change in pump operation. Figure 4 illustrates the different measured value curves for the IFL 700 IQ (blue) and a market companion (green). Thus, the IFL 700 IQ is able to track the actual interface despite a batchwise inflow of sludge, whereas the signal of the market companion fluctuates very strongly and the interface is lost again and again.

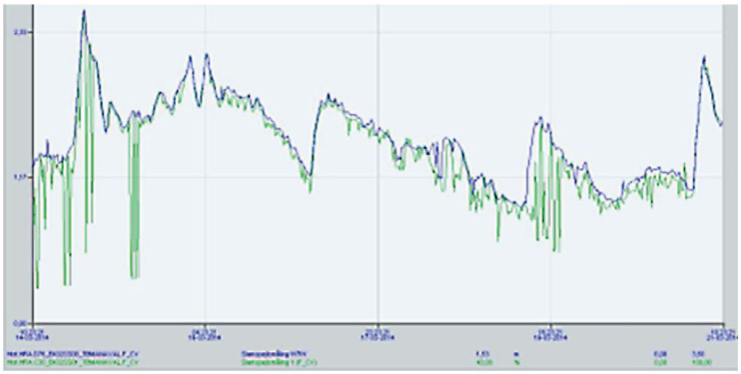

Figure 4: Comparison measurement of an IFL 700 IQ (blue) and a competitor product (green)

Another advantage of the IFL 700 IQ is its low maintenance requirement. On the one hand, no O-rings or wiper components need to be replaced, on the other hand, the smooth surface of the sensor and the mechanical scrapper make excessive algae growth difficult. Therefore, depending on the system, there is little or no need for manual cleaning. Other sensors, on the other hand, have rough surfaces. These favour growth in the form of filamentous algae, which then regularly influences the measurement and must be removed manually. With these devices, cleaning may even be necessary on a weekly basis in some cases.

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Do you have further questions?
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