

Application: De-sludging of Primary Sedimentation (Clarifier) Tanks

Product – Quadbeam Technologies S20 Immersion Suspended Solids Sensor & MXD series

The first stage of a wastewater treatment plant is influent screening which removes plastic and other indigestible solids. The second is separating heavier particles from the liquid in the primary sedimentation tank. The heavier particles accumulate at the bottom of the sedimentation tank and are referred to as the sludge blanket whilst the surface overflow effluent (supernatant) is transferred to the next stage in the process. The accumulated sludge requires emptying at regular intervals to make room for more settling in a process known as de-sludging.

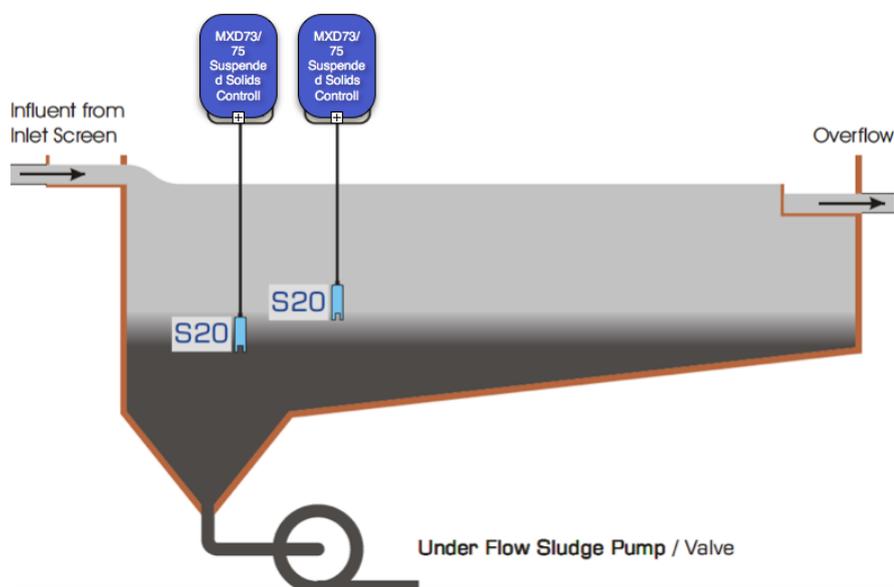


S20-IMM

A sludge pump controlled by a timer is usually unsatisfactory because under heavy loads it will allow sludge to overflow, and under light loads will pump out water with the sludge. To control the de-sludging process it is necessary to know the level of the sludge blanket in the tank. De-sludging can be controlled in two ways using either one or two Quadbeam MXD73, MXD75 or MSSD20 transmitters with Series 20 sensors.

With a single sensor installation the Series 20 sensor is immersed in the tank to the maximum height of the sludge blanket. When the sludge reaches this level the control relay in the 53/33 is energised and the underflow pump is started. The pump is switched off after a preset time. With a single sensor installation, there is always the possibility that too much sludge is discharged and the sludge blanket is lost.

The preferred solution is to use a second Series 20 sensor, which is immersed at the depth of the minimum sludge blanket level. When the relay in this second controller is energised, the underflow pump is switched off and the blanket is always maintained.



Some Factors which affect the formation of the sludge blanket:

- Influent rate
- Wastewater source and it's composition
- Settling rate
- Blanket height / solids concentration correlation
- Downstream solids concentration requirements

The influent to a primary clarifier is raw / screened wastewater often mixed with re-cycled effluents from within the plant. The suspended solids are typically large and easily settled. Extreme influent flows can cause disruptions in the sludge blanket accumulation.

The retention time is the amount of time wastewater and sludge remain in the tank, which depends on the depth of the tank, the influent rate, surface overflow rate and the required solids concentration of the sludge.

For a primary clarifier, the under-flow solids concentration can be less if the sludge is intended for thickening (0.5% to 1.5% solids) than if it is intended for digesting (2.0% to 5.0% solids).

The supernatant should be relatively free of suspended solids, grease and scum. This effluent is usually transferred to an aeration basin.