

OptiQuant™ Sludge Level Monitor

The OptiQuant™ Sludge Level Monitor continuously measures the sludge level in tanks as sludge depth from the water surface or as sludge height from the tank floor. Continuous measurement helps operators determine sedimentation characteristics, efficiently manage sludge recirculation, optimize sludge extraction, and correct for unusual conditions that may occur.

Most importantly, the monitor can provide graphical profile of the clarifier, depicting solids washouts or upset events in the final sedimentation stage so that counter-measures can be started immediately.

Optimizes Sludge Extraction From Sedimentation Tanks

Sedimentation tanks separate solids from the liquid. At some point, the settled sludge needs to be pumped out, recirculated, or disposed of. The key is to ensure that the maximum amount of solids has been extracted to keep dewatering and final disposal costs down by disposing solids with very low water content.

This process can be automated with the OptiQuant SLM, optimizing sludge extraction. When the blanket reaches an operator selected height or depth, the OptiQuant SLM sends a signal that can start or stop the sludge recirculation pumps. This ensures that the sludge height or depth is always held within fixed limits and avoids desludging interruption.

Effective Self-Cleaning System For Reliable Results

Fouling and algae build up typically blind the transducer because of its proximity to the surface and the right conditions for excessive biological growth. Because fouling causes erroneous readings, the transducer signal must be manually adjusted to compensate.

The OptiQuant SLM has a wiper that effectively cleans the probe so that signal adjustment is rarely necessary. The wiper operates on user-selectable number of wipes. The only required

maintenance is changing the wiper blade, typically every 3-6 months, depending on the application.

Self Diagnostics For Maintenance & Troubleshooting

The OptiQuant SLM can send alarm signals to alert operators of changes in the tank or that maintenance needs to be done. Transitory changes caused by solid debris and bubbles are "ignored" by the probe.

The analyzer also senses when the wiper blade needs to be replaced, saving you the guesswork of when to change it and the expense of changing the blade too often.

Graphical Display Depicts Clarifier Profile

The sludge settling graph on the instrument display helps operators identify key features of the sludge blanket. This includes the sludge height, sludge level, top of the sludge blanket, the threshold line, and the tank bottom. Normal operation produces a series of small peaks and valleys on the graph. If the sedimentation process is disrupted, the analyzer will display the rising blanket, alerting operators that sludge may be entering the discharge weir.

Measures Sludge Height or Depth

The OptiQuant SLM can measure the depth of the sludge from the surface or the height of the sludge from the tank floor. If sludge depth is measured, the surface is set at 0.0 feet and the level is determined from this point to the top of the sludge blanket.



The Hach OptiQuant™ Sludge Level Monitor

- Optimizes sludge extraction from sedimentation tanks
- Effective self-cleaning system for reliable results
- Self diagnostics for maintenance and troubleshooting
- Graphical display depicts clarifier profile
- Measures depth from the surface or height from the tank floor
- User-selected echo signal to define the sludge blanket



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If sludge height is measured, the bottom of the tank is set at 0.0 feet and the level is measured from this point to the top of the sludge blanket. This measurement tells you how much water is on top of the blanket, making extraction more precise, which is especially helpful when measuring in thickening tanks.

User-Selectable Echo Signal

Sludge measurement is based on the time required for the ultrasonic echo to return to the probe. This means you can define the surface, or threshold, of the sludge blanket. The threshold is based on the probes response to a selected density within the sludge profile.

A user-selected fixed threshold is useful when the sludge is inconsistent or the density changes frequently, as is often the case in municipal and industrial wastewater.

Principle of Operation

The OptiQuant SLM uses an ultrasonic pulse to accurately measure the sludge level. An ultrasonic signal sent from the probe transducer is directed towards the sludge blanket in the tank. Height and depth measurements are based on the time it takes for the ultrasonic echo to return to the probe.

Sludge measurements range from 0.7 to 20 feet (0.2 to 6 m) with a resolution of 1.2 inches (0.03 m). The response time is 10 seconds, allowing real-time data to be continually displayed.

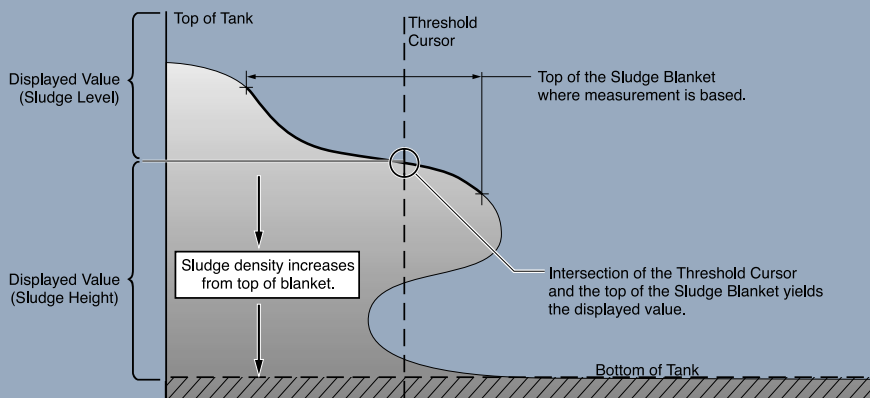
Applications

The self-cleaning probe and insensitivity to floating sludge make the OptiQuant ideal for use in clarifiers, the sludge treatment phase, or anywhere the solid/liquid interface needs to be monitored.

Minimizes Discharge

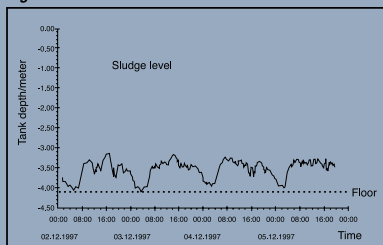
Normally, the sludge level in the final sedimentation tank varies with the inflow rate. Real-time monitoring of sludge level fluctuations along with inflow periods enables operators to quickly respond to these variations, optimizing sludge extraction.

Figure 1. Interpretation of the SLM graphical display



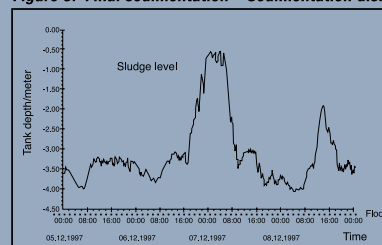
The slope of the displayed profile usually starts as a steep curve that decrease from left to right. The line then becomes more level, indicating the top of the sludge blanket.

Figure 2. Final sedimentation – Normal mode



This progress line shows the typical sludge level variation in a circular sedimentation tank in normal operating mode. The recirculated sludge is continuously extracted. Optimized extraction control is made possible by measuring the sludge level with the OptiQuant™ monitor.

Figure 3. Final sedimentation – Sedimentation disrupted



In this case, a period of heavy rainfall has disrupted the sedimentation and thickening characteristics of the final sedimentation stage. The OptiQuant™ monitor will automatically detect the impaired sedimentation and display the separation layer independently of density – thus alerting you to the potential danger for solids to be discharged at the outlet.

Increased Efficiency Saves Time and Money

The OptiQuant SLM is designed for full-time, unattended use. It saves time and money by:

- Measuring sludge levels to provide key data for sludge management decisions
- Easy installation; virtually maintenance-free
- Preventing incorrect values caused by probe fouling with the self-cleaning wiper
- Providing reliable measurements during normal and extreme conditions
- Performing a daily self-test and calibration
- Its ability to actuate pumps automatically

Outputs

The OptiQuant™ monitor's microprocessor:

- Includes an easily read graphical display, DIN field bus capacity, and simple keypad
- Provides a 0-20/4-20 mA analog output for connecting directly to a PLC/SCADA system
- Has two SPDT alarm relays
- Is easily networked with other Hach probes and AquaTrend network devices
- Can actuate return activated sludge pumps
- Output can be read on the controller or a PLC/SCADA system
- Allows up to 28 days of data logging

OptiQuant™ Sludge Level Monitor Specifications *

Components

Ultrasonic probe with a self-cleaning wiper, microprocessor-controlled measuring unit with a self-monitoring, digital measured value display with a graphical display and graphical output.

Measuring Principle

Ultrasonic measurement

Range

0.7 feet to 20 feet (0.2 to 6.0 m)

Resolution

1.2 inches (0.03 m)

Measurement Interval

10 seconds (adjustable)

Calibration

Factory calibrated

Service Interval

6 months

Output

0-20/4-20 mA, max 500 Ohms

Alarm Relays

One high and one low alarm limit relay; both are SPDT Ratings: 24V at 2A resistive

Operating Temperature

Probe: 35 to 140° F (+2 to 40° C)

Controller: -25 to 140° F (-10 to 40° C)

Power Supply

115 VAC ± 10%, 50/60 Hz, 14 VA, 24 VAC, or DC ± 25% 800 mA

230 VAC ± 10%, 50/60 Hz, 14 VA, 24 VAC, or DC ± 25% 800 mA

Dimensions

Controller: 12 x 11.25 x 3.75 in. (306 x 286 x 93 mm)

Probe: 4 x 4.75 in. (100 x 120 mm)

Weight

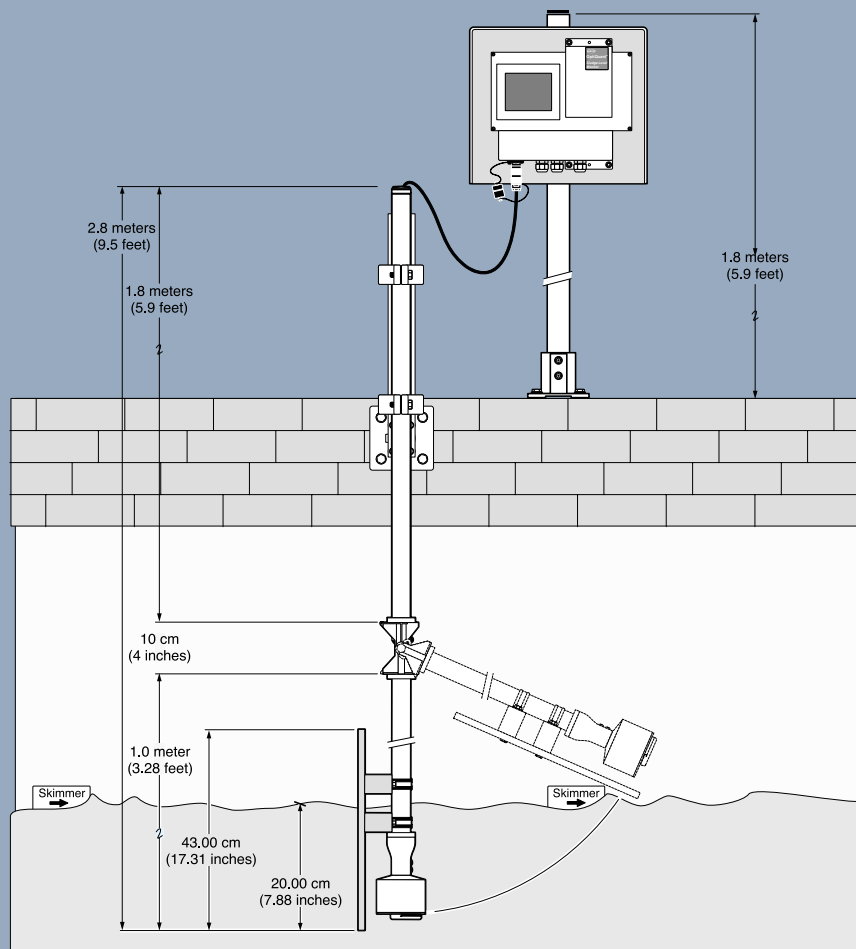
Controller: 3.5 kg (7.7 lbs.)

Probe: 2.0 kg (4.4 lbs.)

*Subject to change without notice.

Installation

The monitor is designed for easy installation either fixed to the rim of the tank or in clarifiers with the skimmers. The probe must be installed with the ultrasonic head submerged at least 8 in. (20 cm), and it must be protected against larger objects in the sewage flow, such as branches or ice. Slight rocking of the mounting links of the ultrasound head will not affect the measurement.



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How to Order

Call Hach today to order the Hach OptiQuant™ Sludge Level Monitor that fits your application.

Sludge Level Monitor and Probe

57308-00	Sludge Level Monitor 115 VAC
57308-01	Sludge Level Monitor 230 VAC

Individual Probe

LXV276.54	Probe, Sludge Level Monitor
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OptiQuant Analyzer

57370-00	OptiQuant OPC Software CD-ROM
57378-00	RS-485 Adapter Kit for OptiQuant

Cable Accessories

LZX369	Cable extension, 39.4 ft. (12 m)
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Optional Accessories

57340-00	Fixed Point Installation Kit (for mounting controller and probe at a fixed location)
57371-00	Pivot Point Installation Kit (for mounting controller and probe on a pivot assembly for clarifiers with skimmers)
LZX328	Wiper Blades, replacement only, pkg. of 5
LZX414.00.21000	Pivot Mount Assembly

Typical Proposal Specifications: OptiQuant Sludge Level Monitor

The sludge level monitor shall consist of a self-cleaning stainless steel immersion probe, and a microprocessor-controlled interface module. It shall utilize ultrasonic echo time to measure depth from the water surface or the height from the tank floor, dependent on user settings.

In addition, the analyzer shall consist of the following:

- The probe shall have a self-cleaning wiper to prevent erroneous values.
- The probe shall operate with a user-selected measurement range of .7 to 20 ft. (0.2 to 6.0 m) from surface.
- The probe shall be able to define the sludge blanket based on the user-selected sludge concentration of sludge in the clarifier or from the graphical display in the interface module. The manufacturer describes this feature as the "Blanket Threshold".
- Response time is 10 seconds and user adjustable.
- The probe will be factory calibrated; users may also enter correction factor.
- The probe will automatically detect the deterioration of disrupted sedimentation. It will sense the ultrasonic echo return with the information of the separation layer independent of density.
- The interface module shall be equipped with a graphical display with the profile of the tank.
- The interface module will have an internal datalogger, two 4-20 mA (maximum of 500 ohms) analog outputs and RS485. It will be able to integrate into a Hach OPC driver or be connected to a PLC or SCADA.
- The analyzer shall meet UL, CSA and CE safety standards and shall operate on 115 VAC or 230 VAC power.
- The enclosure for the interface module will be of the NEMA 4X, IP65 - suitable for external installation.
- The analyzer shall include a one-year warranty from the date of shipment.

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