APPLICATION NOTE

Water & Wastewater

Level measurement in a recycled sludge tank

- Collecting sludge from septic systems at waste water plant
- 3,65 m / 12 ft deep underground tank with moving medium
- Pump control for the distribution of sludge to further treatment

1. Background

In the United States, many suburban and rural homes are still equipped with septic tank systems. Domestic wastewater is disposed of through these systems which also perform a degree of on-site waste treatment. However, the residual waste has to be periodically removed from these systems and transported to a waste water treatment plant by septic tank cleaning services (so called Honey Dippers).

An American waste water treatment plant operator in suburban Philadelphia, PA, collects the septic tank waste in a recycled sludge tank. From there it is routed via the main plant influent line to different sludge treatment systems for aerobic digestion, dewatering, lime stabilisation, thermal drying or incineration.

2. Measurement requirements

The sludge from the 3.65 m / 12 ft deep and 1.8 m / 6 ft wide underground tank is pumped to the different plant treatment systems via influent pipelines. The sludge level has to be continuously measured in order to control the pumps and to avoid drying up or overfilling of the tank. The customer had previously used a submersible pressure transducer to ensure a correct start or stop of the pump. However, the device failed to produce stable measuring results due to the constantly moving medium. Hence the customer considered the installation of a more reliable technology.

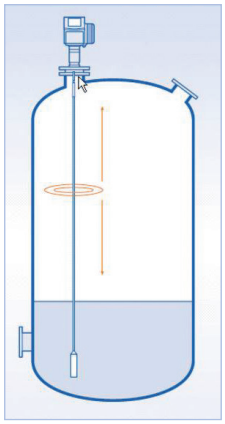
KROHNE

3. KROHNE solution

KROHNE fitted an OPTIFLEX 1100 C with single cable probe (Ø2 mm / 0.08") and a threaded ¾ NPT process connection on top of the tank.

The treatment plant's service technicians easily assembled the OPTIFLEX 1100 C probe by themselves, attached it to the threaded connection and screwed it directly into the metal plate that covers the sludge tank. They ran a quick set-up via the local display and the sensor adjustment was performed at 3.65 m / 12 ft.

The OPTIFLEX 1100 C level meter uses the Time Domain Reflectometry (TDR) technology. It transmits low-intensity electromagnetic pulses along the conductor in the cable probe. When the pulses reach the surface of the sludge, some of the pulse energy is reflected back to the signal converter. The time from when the pulse is transmitted to when it is received is measured by the instrument. The time value is then converted into a 4 to 20 mA analog output current equivalent to the level. This signal is sent to the plant PLC for process control and monitoring.



Mesuring principle of the Guided Radar (TDR) level meter OPTIFLEX 1100

4. Customer benefits

Since the measurement is unaffected by the moving medium as well as physical property variations such as density, the OPTIFLEX 1100 C is a preferred alternative to the pressure transmitter. It is an affordable device for this application that does not necessarily require an extremely high level of accuracy. The customer benefits from a continuous and reliable level measurement of the recycled sludge.

Thanks to the level meter, the pumps can now be effectively controlled and helps prevent serious damage to the pumps from the tank drying up. Even with a ladder or other metal parts installed inside the tank, the performance of the OPTIFLEX remains stable. Other leakage problems were also avoided from the start since the level meter was tank top mounted and the quick installation was another advantage to the customer.

5. Product used

OPTIFLEX 1100 C

- Guided Radar (TDR) level meter for liquids and solids
- For general-purpose use (non-hazardous areas)
- Measuring range up to 20 m / 65.6 ft (liquids) and 10 m / 32.8 ft (solids)
- For process temperatures up to 100°C / 212°F and pressures up to 16 barg / 232 psig
- Converter can be rotated and removed under process conditions
- Alternative to traditional level instrumentation such as RF Capacitance, conductive and DP transmitters
- Excellent price-performance ratio
- Display in 9 languages: including Chinese, Japanese and Russian

Contact
Would you like further information about these or other applications?
Do you require technical advice for your application?
application@krohne.com

Please visit our website for a current list of all KROHNE contacts and addresses.

www.krohne.com