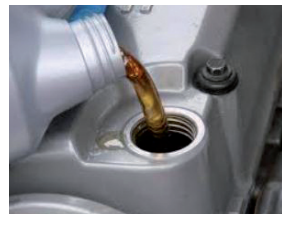
APPLICATION NOTE Oil & Gas

Level measurement on lubricant storage and process tanks

- Horizontal and vertical tanks of various dimensions and shapes
- Level monitoring for improved process and stock inventory management
- Automated data transmission to a control room

1. Background

Mineral lube oils, refined from naturally occurring petroleum or crude oil, are used to reduce friction between moving surfaces. One of their largest applications, in the form of motor oil, is the protection of internal combustion engines of motor vehicles and powered equipment.



Motor oil as lubricant used in internal combustion engines

2. Measurement requirements

A lubricant producer processes and stocks lubricant oil in storage and process tanks of various shapes and dimensions. The horizontal or vertical, cylindrical tanks vary in height (1 to 20 m) and width (2 to 6 m). Each lubricant type needs a separate container and for each newly developed lubricant a tank is built, which adds 10-15 tanks to this production site every year. Lubricant oil is a low reflective and fairly expensive product: the customer needs a technology to accurately and reliably track the exact content of each tank for optimised process and stock inventory. In addition, some of the tanks call for contactless measurement due to the presence of agitators. Given the large number of tanks involved, the need for automated data transmission to a control room goes without saying. The sight glasses used earlier to indicate the oil level of each tank did not meet the above requirements in terms of accuracy and automated data transmission.

3. KROHNE solution

KROHNE has gradually replaced the sight glasses by 60 OPTIFLEX 1300 C TDR guided radar level meters with G1 process connection and single cable Ø 4 mm probes for the bigger tanks or single rod probes for the smaller tanks. They continuously measure the level right to the bottom of the storage tanks and transmit the data to the control room.

KROHNE

20 OPTIWAVE 7300 C FMCW radar level meters with DN 80 (3") flange and antenna are installed on the process tanks and measure the level of the agitated oil surface. 80 OPTISWITCH 5100 C vibrating switches with G1 process connections were added on each tank as additional security to avoid tank overfilling.

OPTIFLEX 1300 C on storage tanks

4. Customer benefits

Both technologies, TDR and FMCW radar, are unaffected by physical property variations like changing density, viscosity or conductivity. Due to their high signal dynamics they are able to measure low reflective medium with great accuracy. The OPTIFLEX TDR guided radar devices measure down to the tank bottom enabling the company to track the exact quantity of lubricant left in each vessel. The OPTIWAVE FMCW radar level meters, unaffected by internal, moving objects (agitators), measure continuously and with great reliability the level in the process tanks even during the filling process. Commissioning of OPTIFLEX 1300 C and OPTIWAVE 7300 C is reduced to a Quick Setup operation making installation straightforward.
Added to the automated data transmission, these measuring devices help saving time and money. The OPTISWITCH 5000 C is a second security to prevent from overfilling the tanks. These devices do not require commissioning as they are simple plug and play switches. Due to the wide product range offered by KROHNE the customer can stick to one supplier which reduces the cost from purchase to service.

5. Product used

OPTIFLEX 1300 C

- Universal level meter, 2-wire guided radar for liquids, pastes, granulates, powders and liquid interface
- Displays level and interface
- Touch screen for simple operation without opening the housing
- Probes available in stainless steel and Hastelloy C-22, other materials on request
- Optional high pressure and temperature versions
- PACTware and DTMs available fully functional and free of charge
- Optional process safety (with Metaglas dual process sealing system for dangerous products)

OPTIWAVE 7300 C

- 2-wire 24...26 GHz non-contact FMCW radar for liquids
- Touch screen for simple operation without opening the housing
- Large choice of options e.g. antenna extensions, antenna heating systems, PP/PTFE Drop antennas with flange protections, stainless steel housing, sealing materials
- PACTware and DTMs available fully functional and free of charge
- Optional process safety (with Metaglas dual process sealing system for dangerous products)

OPTISWITCH 5000 C

- Vibrating switch e.g. for over-fill detection or pump dry-run protection
- High resistance to abrasion
- Permanent fault monitoring function
- Unaffected by adhesion, foam, pressure, temperature changes and external vibrations

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