

NIVELCO CASE STUDIES

INSTRUMENTATION IN A VEGETABLE OIL FACTORY

Vandamme vegetable oil factory

In the process of vegetable oil production there is a significant oil concentration in the residual dollop remaining after the primary extrusion. To extract the oil the dollop is washed with solvents. The solvent extracts the oil from the dollop resulting in an oil and solvent mixture. The next phase of the process is the distillation of the solvent from the compound to retrieve the edible oil.

Our client is a multinational company, who has decided to introduce a modern process of oil production, using cold extrusion technology at their Hungarian site, unlike their other plants using the traditional process.

To control the production it is essential that the level in the silos storing the finished products as well as the semi-ready products, such as pure oils and in-production mediums containing oil, as well as the level in the tanks storing Hexan and other necessary compounds is continuously monitored, the measured values are displayed and logged.



High and low level switching was required in the oil tanks to prevent overflow or dry-run. The obvious choice for this task was the NIVOSWITCH RCM-400-3 type vibrating fork level switch.

Fulfilling the request of our customer we delivered the highly polished version ($r < 0,5$) developed for the food industry with 1" BSP process connection and PNP/NPN transistor output. The same model also exists in Ex version if it is to be installed in a hazardous environment. The output signal is processed by a PLC.



Applying Hexan is an important part of the technological process. Corn seed is a raw material that is first pressed and in the next phase Hexan is used to extract oil from the loosened fibre of the dollop. In the final phase the Hexan is distilled from the compound.

Continuous level measurement of the tanks containing Hexan is required. There are however some factors to take into consideration when selecting the appropriate measurement device. The production area is classified as hazardous environment. Hexan has a relatively low dielectric constant ($\epsilon_r = 1,9$), and the tanks are used to store different mediums in the different phases of the production. The finished product, vegetable oil, and at times the semi-ready product, vegetable oil and Hexan mixture, are also present in the tanks.

The recommended solution was our guided microwave level transmitter, the MicroTREK. After due consideration taking into account the low dielectric constant of Hexan, the MicroTREK HTD-425-8Ex 2-wire transmitter with HART output was selected.

This model features twin-rod probe which makes the transmitter suitable to measure all three type of mediums present with $\pm 5\text{mm}$ accuracy and short dead zone at the top. For graphical display and programming SAP-300 plug-in display module can optionally be ordered for the level transmitters.

The output of the MicroTREK level transmitter is connected to a PLC, while an MTL type Ex barrier power module supplies the needed energy.

The overflow protection of the tank is realised by a motor driven valve. A controller was required to control the operation of the valve depending on the measured level value.

For this task an UNICONT PMM-311-1 universal controller was connected to the output current loop of the PLC. The control of the valve depends on the input level signal coming from the Ex-barrier. Relays as well as a programmable PID controller are integrated in the panel device. The input level signal of the PMM controller is also transmitted as a scaled current signal to the input of the central PLC.

Nivelco Co. has not only delivered the instruments but also commissioned the project.

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