



APPLICATION REPORT Food & Beverage

Level measurement in flour silos with intense dust formation

- Monitoring of flour supplied for the production of frozen pizzas
- Non-contact (FMCW) radar level measurement of low reflective medium
- Significantly higher measuring performance in a test comparison with pulse radar devices



1. Background

Nestlé Wagner GmbH is among the largest manufacturers of frozen pizza in Europe. Today, the long-established company produces these baked goods with about 1400 employees at two locations in Nonnweiler, Germany.

Because the production facilities run in continuous operation, all of the individual production steps must always be executed without delay. This requires, among other circumstances, that all of the raw materials are always supplied in the necessary amounts. This includes the flour for the pizza dough, which Nestlé Wagner stores in several metal silos that are 12 m / 40 ft in height.

2. Measurement requirements

For optimum flour distribution and the accordingly production line planning, the silo equipment must be monitored continuously. Because flour is an adhesive medium associated with a high degree of dust formation, level measurement is demanding. At one of the two locations a measurement solution already had to be eliminated from the process because thick product deposits regularly resulted in measurement failures and high maintenance requirements. In addition, the measuring accuracy over the entire period was significantly limited due to the product surface of the medium, which has poor reflective properties (ϵ_r value of approx. 2).

For this reasons, to record the tonnage reliably and as maintenance-free as possible in the future, the customer decided to test various level meters from several well-known manufacturers in parallel operation over a period of four months. All of the devices were non-contact radar level meters. All of the measuring solutions suitable for this application had to be approved in accordance with ATEX Ex iaD 20/21 for use in hazardous areas with dust and had to use materials that conform with FDA regulations.



3. KROHNE solution

During the test phase, the good measuring performance of the non-contact (FMCW) radar level meter OPTIWAVE 6300 C proved convincing. Moreover, the measuring instrument was the only one that did not require a purge connection. This was critical to the subsequent selection of the KROHNE device for level measurement on a total of seven flour silos.

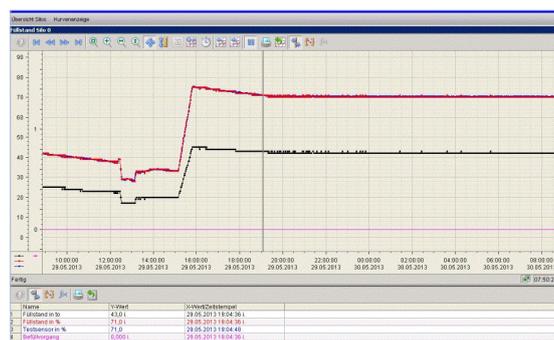
With its 24...26 GHz FMCW radar, the OPTIWAVE 6300 is designed for level measurement in the very dusty atmosphere of the flour silos. Each measuring device is equipped for this task with a DN 80 / 3" drop antenna made of PTFE. In order to measure the level directly from above, the existing nozzles (DN 80 / 3") on the roof of the silo were used in the installation.



Drop antenna of the OPTIWAVE 6300 in a flour silo

4. Customer benefits

With the OPTIWAVE 6300 C, Nestlé Wagner can monitor the supply of flour for the dough reliably. In this way, the device makes a significant contribution to guaranteeing the continuous operation of production. Its FMCW radar technology proved to have considerably higher performance in this application than other radar technologies such as pulse radar, for example, because despite the very demanding surface characteristics of this medium, with a very low ϵ_r value, the OPTIWAVE 6300 guarantees a strong signal in the silo and a high degree of measuring accuracy. Moreover, due to the low blocking distance of the OPTIWAVE 6300, a larger measuring range can be selected and the dead zone remains as small as possible.



The OPTIWAVE 6300 provides precise measured values, even during filling: red = value in percentage, black = value in tons

Another advantage of the non-contact measuring device is the drop antenna developed and patented by KROHNE. In contrast to the open horn antennas of other test devices, the OPTIWAVE 6300 does not require a purge connection that must be equipped with compressed air and a timing sequence. This saves the customer both increased expenses for installation and energy costs for compressed air over the long term. Due to the elliptical antenna form, the product deposits have only a very slight effect on the measuring result. In this way, the specialist for frozen pizza is able to prevent high maintenance requirements and process interruptions.

5. Product used

OPTIWAVE 6300 C

- Non-contact (FMCW) radar level meter for measuring the distance, level, volume and mass of solids
- Drop antenna made of PP or PTFE for use in dusty environments
- Specific installation assistant for accurate measurement with moving surfaces
- Measuring range up to 80 m / 260 ft



Contact

Would you like further information about these or other applications?
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