



APPLICATION REPORT Machinery & Apparatus

Measuring the drum fill level in a fermentation substrate dryer

- Production of agricultural manure through mechanical drying of biological waste
- Radar level measurement of liquid manure for monitoring the solids content
- Measuring point located outdoors with certain weather conditions



1. Background

J. Romberger Maschinenfabrik GmbH, headquartered in Anzenkirchen, Germany, is a specialised equipment supplier in the areas of bulk freight technology and mill construction, conveyor systems and environmental technology, special-purpose machine manufacturing as well as drying plants and solids dosing systems for biogas plants. The company's product portfolio includes the "RST fermentation substrate dryer", which is used for the treatment of fermentation products and the economical production of fertilizers in the agricultural industry. Romberger is also responsible for the installation and commissioning of equipment.

2. Measurement requirements

The fermentation substrate dryer is designed with comparatively low energy and maintenance requirements to increase the suspended solids content in biological waste. To achieve this, heated contact plates are immersed in the fermentation substrate through rotating drums. The wetted sheets are then dried with the air stream, so that the liquid escapes gradually and the nutrient content can be increased through the volume reduction. In order to operate the system almost entirely automated, the level in the drum must be continuously monitored. When the fill level falls below a certain threshold, the manure is dried and must be removed.

For this measuring task, Romberger previously used an ultrasonic level transmitter from a competitor. However, since rising condensation and liquid manure can settle on the antenna of these measuring devices, there have been repeated measurement failures and a considerable impact on the entire plant operations. In addition, the electronics of these devices are prone to be very vulnerable under the prevailing weather conditions (e.g. heavy rainfall). Due to the ongoing problems with the ultrasonic technology, plant engineers decided to implement an alternative level technology for the fermentation substrate dryer.



3. KROHNE solution

The OPTIWAVE 5200 C was chosen. The FMCW radar level transmitter was installed in the front part of the system on an open container with the same fill level as the inside of the drum. Due to its modular housing concept, the level device was able to be installed in a confined space in the horizontal housing position, thanks to the flexible mounting bracket with a slight inclination. An antenna made of tough polypropylene (PP) was used for the measurement.

To prevent product entry caused by manure spray and condensation, the antenna was protected by a tube. Since the use of a non-stick drop antenna was not possible for reasons of cost, the OPTIWAVE 5200 horn antenna was also closed from below by a protective film on-site. Although the antenna protrudes less than the recommended 100 mm from the protective tube, the lower overhang in this application does not affect the measuring result.



Installation of OPTIWAVE 5200 C with horizontal housing position

4. Customer benefits

By using the OPTIWAVE 5200 C, Romberger benefits from uninterrupted level measurement of the drum and continuous operation of the fermentation substrate dryer. In this way, the customer can always maintain the correct operating range and always knows when the liquid manure needs to be discharged and the drum refilled.

During long-term trial operations, the FMCW radar of the OPTIWAVE 5200 C has proven to be clearly superior to ultrasound technology. Despite the slightly inclined installation of the antenna, the comparatively low measuring range as well as the adhering manure product, the KROHNE device produces a strong and accurate measuring signal. Due to the robust housing, the device can be used outdoors – even under adverse weather conditions such as heavy rainfall – without any failure of the electronics. The measured values can be read easily on-site using the display. Despite the significantly higher flexibility and measuring performance, the OPTIWAVE 5200 C is still priced at a very competitive level.

The customer is very satisfied with the OPTIWAVE 5200 C. Due to the positive experience, J. Romberger Maschinenfabrik has decided to fit new equipment with KROHNE level transmitters in the future.

5. Product used

OPTIWAVE 5200 C

- 2-wire Radar (FMCW) level transmitters for liquids, pastes and slurries
- PP or PTFE Wave Horn antennas for the measurement of corrosive products
- Modular design of housing and antenna ensures suitability for a variety of mounting positions
- Quick coupling system for the removal of the converter under process conditions
- Measuring range up to 30 m / 98.4 ft
- Display text in 9 languages (incl. Russian and Chinese)
- SIL2-compliant according to IEC 61508 for safety-related systems



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