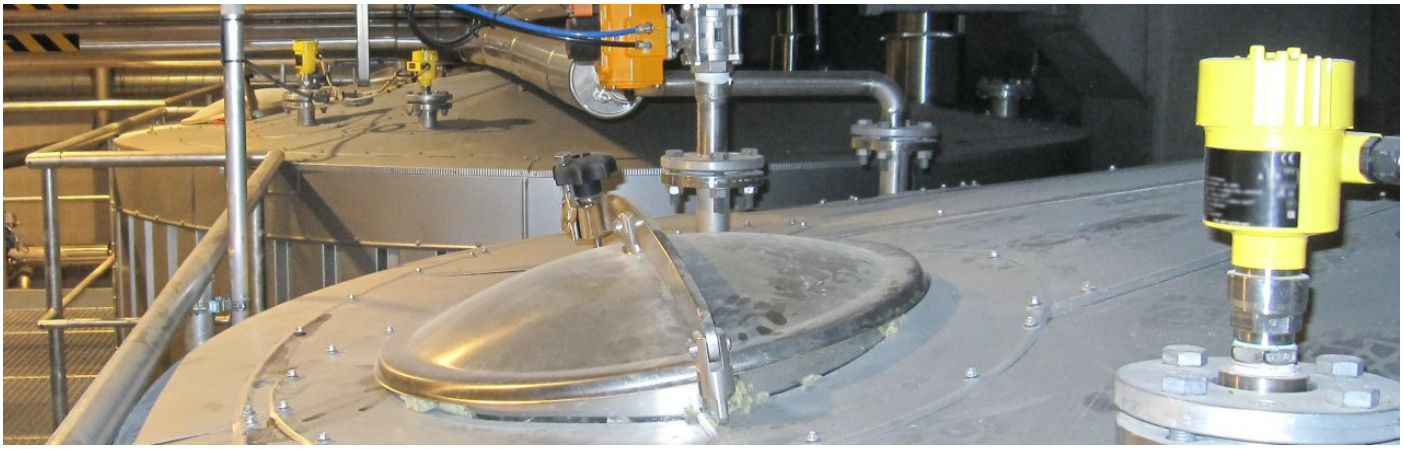

When wind and weather no longer matter, thanks to 80 GHz radar level sensors

About 250 million years ago, Central Europe was covered by ocean water, which eventually dried up and left behind enormous layers of potassium chloride, commonly referred to as potash, on the earth's surface. At the K+S site in Zielitz, the fruits of this geological upheaval are still being harvested today and processed into potash-based fertiliser. VEGAPULS 64 takes on the role of watchman in large lye tanks used in the preparation of the potash.

The previous level monitoring systems delivered inaccurate readings due to weather, condensate and buildup

Whether in private gardens or in commercial farming – without potash fertiliser, many a flower bed would be less colourful and many a harvest much smaller. One of the largest and most modern facilities for producing potash fertilizer is the Zielitz potash plant in the area of Saxony-Anhalt; it is also the largest single production site of K+S Kali GmbH. Potassium-containing crude salts for the production of fertilizers, products for industrial applications as well as products for the feed and food industry are extracted there. Every year around 12 million tons of the crude salt are mined at the Zielitz facility, which represents about 30% of K+S Kali's total production.

To produce fertiliser, the crude salt is mined underground, pulverised and then dissolved in water. The unusable components are then separated by means of flotation. In this process, huge quantities of the caustic solution are pumped back and forth to achieve a higher brine concentration. Two so-called 'Intze' tanks, which are 15 meters high and particularly noticeable due to their shape and design, serve as buffers for the liquid.

The two storage tanks require continuous level measurement to ensure that the level is monitored at all times: On one hand for environmental and operational safety reasons, and on the other, to enable precise calculation of the buffer capacity. Because brine is extremely aggressive, non-contact level measurement has always been the preferred method. But due to the conical shape of the tanks, the deepest measuring point is located in the interior, far from the outer edge. The initial solution was to construct a very long boom, with a level gauge mounted at the end, so that measurement could be carried out exactly in the middle of the tank. Another challenge was the heavy buildup of deposits on the tank wall.

The conspicuous shape of the tanks can be seen from afar.

Level measurement and point level detection in small storage and buffer tanks

Storage and buffer tanks enable a reliable material supply for various ongoing processes. The plant operators need to have exact level data from these tanks at all times to ensure timely replenishment and facilitate continuous production. In addition, the measured values form the basis of the statistical consumption analysis for validation and quality monitoring.

Measuring task

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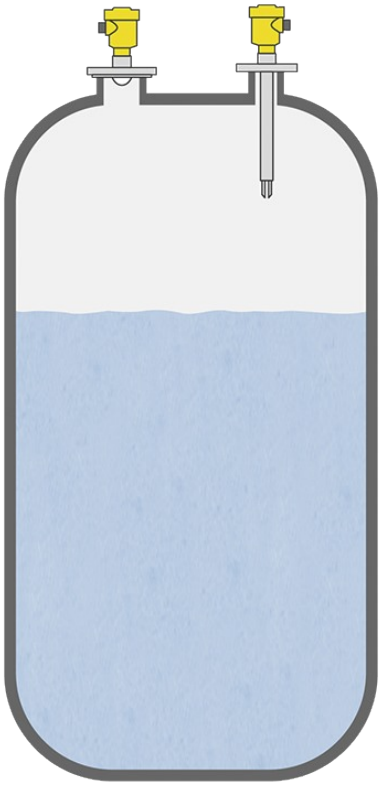

Level measurement and point level detection

Measuring point
Tank

Measuring range up to
10 m

Medium
Liquid primary and intermediate substances

Process temperature
-40 … +200 °C

Process pressure
-1 … +20 bar

Special challenges
Changing media

Reliable

Reliable protection against overfilling

Cost effective

Independent of product and process characteristics

User friendly

Simple to set up with maintenance-free operation

See all recommended products

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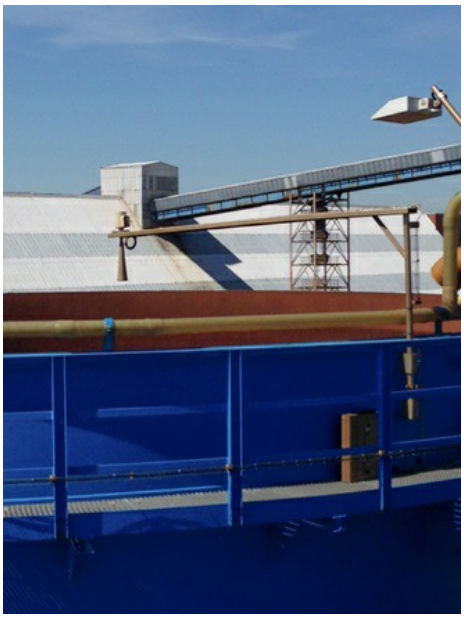

The old boom the measuring instrument was mounted on.

At first, the engineering team tried a measuring method based on ultrasound. However, the large measuring distance led to incorrect measurements, and condensation from rain or snow also caused difficulties. Later, a radar level transmitter was installed and used for many years. This 26-GHz instrument with horn antenna actually provided correct readings, but strong gusts of wind or snow put a lot of strain on the boom.

VEGAPULS 64 optimises level measurement with 80-GHz technology

The situation changed abruptly when VEGAPULS 64 came onto the market in 2016. The plant operator immediately recognized the potential of the new radar measuring instrument, which operates with the very high frequency of 80 GHz. VEGAPULS 64 is especially characterised by its superior focussing and high dynamics. Both are features that have proven their worth at the measuring points of the two tanks.

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The high dynamics now made it possible to use a considerably shorter boom, as the sensor could be mounted at a slight angle to the surface of the liquid. This is not usually recommended when measuring flat liquid surfaces, because a large part of the transmitted energy is reflected off to the side, as with a mirror, and thus does not get back to the receiver. However, there was a slight wave movement on the surface, it was enough for a small part of the energy to be reflected back in the direction of the sensor to achieve a reliable measurement thanks to its large dynamic range. This meant that the wind load was reduced considerably due to being able to use a shorter boom.

This allowed the boom to be shortened. The measuring instrument from VEGA was mounted slightly tilted and yet was still able to detect any filling level accurately.

Thanks to 80 GHz, reliable level measurement is possible at all times (even in snow and stormy weather) despite the difficult tank shape.

What is more, the deposits in the vessel have little effect on VEGAPULS 64. Here, too, the measurement benefits from VEGAPULS 64's very narrow beam angle of 4°, which is a big contrast to the 10° beam angle of the previous 26-GHz radar sensor with DN 80 antenna. This allows the sensor to be used even in vessels with internal installations or heavy buildup on the walls, as the measuring beam simply passes by such obstacles.

K+S at the Zielitz site was one of the first to use the newly launched VEGAPULS 64. As their confidence in VEGA technology was already strong – K+S has been working with VEGA for over 25 years – the company decided that a test run with the new instrument wasn't necessary. As expected, since the radar sensor installation, there have been no problems with condensation, gusting winds or snow.

Conclusion

K+S at the Zielitz site was one of the first to use the newly launched VEGAPULS 64. As their confidence in VEGA technology was already strong – K+S has been working with VEGA for over 25 years – the company decided that a test run with the new instrument wasn't necessary. As expected, since the radar sensor installation, there have been no problems with condensation, gusting winds or snow.

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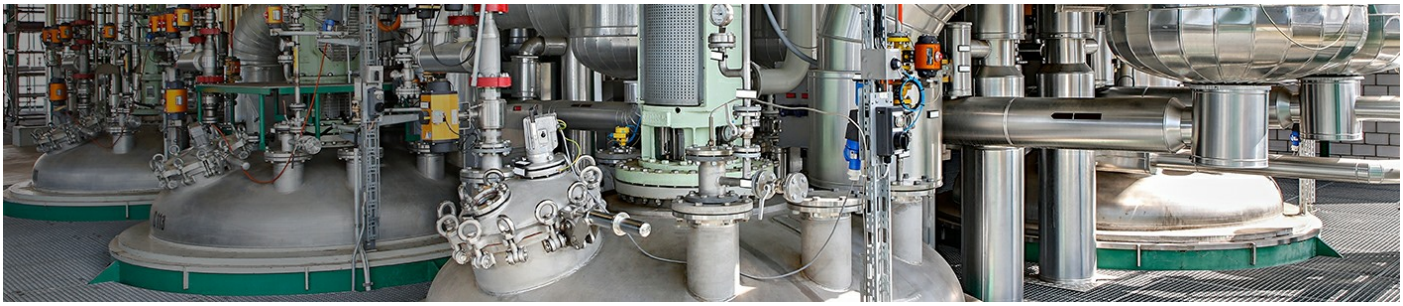
Related products

VEGAPULS 64

Related industries



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