Reliable level measurement with radar even under difficult conditions

Whether a vessel has internal equipment such as agitators, baffles, pipes or heating coils, even strong condensation and buildup – there is a new radar sensor for liquids, VEGAPULS 64, that overcomes these hurdles. It is setting new standards in process level measurement of liquids. The high 80 GHz frequency enables a unique focusing of the radar beam and provides a reliable measurement delivering better productivity, quality and process control.

Good focusing delivers security

VEGAPULS 64 is characterized by two main features; its unique focusing and high dynamic range. The focusing capability of a radar sensor depends on the transmission frequency and the effective antenna surface. If the antenna size remains the same, a higher frequency enables much better focusing. With an antenna size of approx. 80 mm (3 inches), the beam angle of an 80-GHz sensor is merely 3°. In contrast, a radar sensor of the same size but with a ‘traditional’ 26-GHz transmission frequency has an opening angle of approximately 10°. Due to this narrow beam angle, the sensor can safely be used even in vessels with internal components such as baffles, agitators and heating coils because the radar beam simply avoids all these obstacles.

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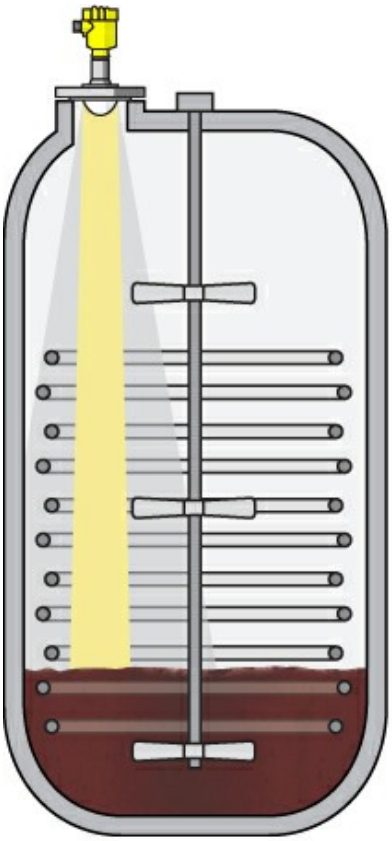

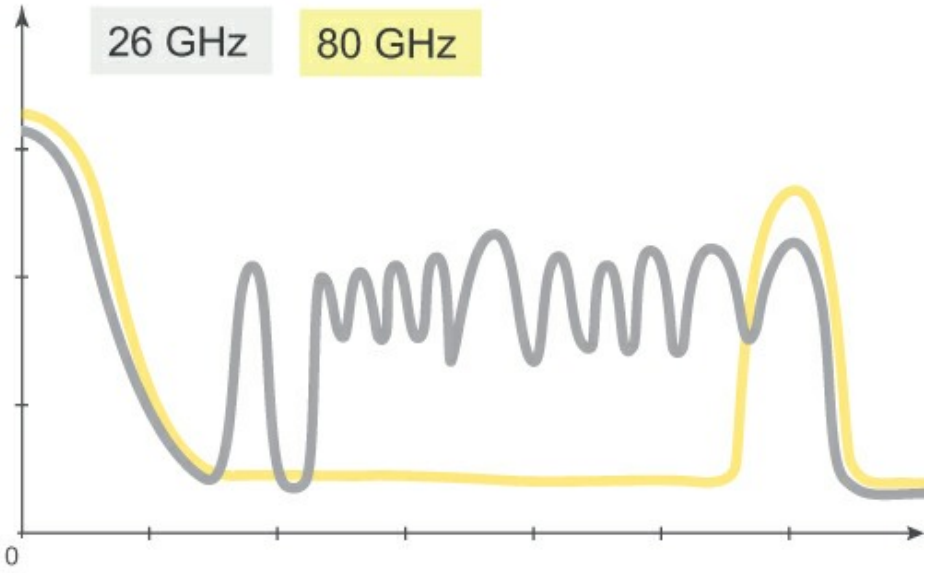

The very good signal focusing of the 80-GHz sensor enables reliable measurement of the liquid level, even in vessels with many internal installations.

Wide dynamic range ensures universal use

The dynamic range of the radar sensors is the next important ingredient. It governs its versatility and capability in field applications. The higher the dynamics, the wider the range of applications the sensors can offer along with higher measurement reliability. VEGAPULS 64 has a uniquely high dynamic range of 120 dB. There is no other radar sensor for liquid applications that covers this high range. This means that even media with poor reflective properties can now be measured much better than with previous radar sensors. These higher dynamics result in more reliable level control, even with foaming and extremely turbulent product surfaces. Additionally, the measurement of even a poorly reflecting hydrocarbon based liquid can be followed down very close to the bottom of the vessel. The accuracy of a sensor, even with a measuring range of 30 m, is +/- 2 mm.

Always reliable measurement, even with buildup and deposits

Deposits or condensation on the sensor influence neither the measuring capability nor the measuring results. Condensate can always be expected in applications where the process temperature in the vessel is higher (or lower) than the ambient temperature. VEGAPULS 64 is unaffected by deposits and condensation. This is achieved primarily by the especially enhanced sensitivity of the sensor in the close range. The VEGAPULS 64 has an encapsulated, sealed antenna system, which offers excellent ‘cleanability’.

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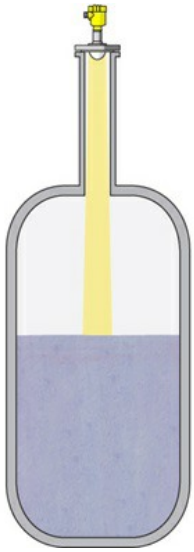
Simple adaptation to existing production equipment

When mounting sockets are particularly long, the wider beam angles of earlier sensors cause strong interfering reflections around the ends of the sockets where they enter the vessel. This means they create strong unwanted interfering echoes, which considerably limit measurement certainty in the area of these reflections. This effect in the upper regions of the container, can considerably reduce the safe available vessel volume, especially in media that reflect radar signals very poorly, like hydrocarbons and resins. Thanks to the very good signal focusing of the 80-GHz sensor, hardly any interfering reflections are generated by these socket ends. The result is a reliable measurement right up close to the top of the vessel. Existing vessels can easily be retrofitted with the new sensor.

Conclusion

200 sensors of the zero series of VEGAPULS 64 have been successfully installed since December 2015 in various industries and applications worldwide The applications selected were mainly those that until now were considered problematic or extremely difficult to carry out measurement in. Today, many thousands more 80 GHz radar devices have since been purchased for solutions across even more sectors.

VEGAPULS 64



A special processing of reflected signals in the close range reduces the influence of condensation and buildup. Focusing interference signals enables reliable measurement even with long mounting sockets or if mounted close to the side walls of a vessel.

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