

VEGAPULS 64 secures raw material supply in the cosmetics industry

Pharmaceutical and cosmetics companies are often hesitant to replace existing sensors because the effort and expense of new approvals can be much greater than the costs of the sensors themselves. In this article, Jürgen Skowaisa, product manager for radar at VEGA, shows by way of a success story that there are other ways.

The multinational company, Croda Ibérica SA, has long been supporting renowned companies in the beauty and personal care industries. The products used must be made from high-quality raw materials that meet the high-quality demands of end users, while production processes must also be sustainable. Achieving this requires, for example, the use of renewable energy, careful handling of natural plant raw materials and the use of certified, sustainable palm oil.

Apart from effectiveness, compliance with quality assurance regulations plays an important role. Market analyses and regulatory requirements must also be considered. A cosmetic product must undergo several tests before it can come onto the market and, thereafter, nothing or hardly anything in the actual process may change. This also applies to by-products, which are manufactured in large quantities at Croda Ibérica's facility in Fogars de la Selva, a Catalan district of Barcelona.

Croda Ibérica is therefore dependant on its long-established processes and measuring points. The company has been working with VEGA Spain for more than 10 years and

relies completely on the company's level and pressure specialist in Schiltach, Germany, for level measuring technology. Croda's Fogars de la Selva factory houses about 200 sensors of different product families, including: pressure transducers; guided radar sensors; different limit detectors for liquids and solids; as well as various pressure transducers.

A special feature of the measuring points is that they all used ATEX-certified VEGA measuring instruments and sensors. The only filling level measuring point at which no VEGA sensor was installed is a reactor vessel, in which temperatures of more than 300 °C are required. This vessel relied on a weighing system to determine the liquid level.

The VEGAPULS 64 radar filling level measuring instrument was launched onto the market in 2016. These sensors are also now in use at Croda Ibérica and are demonstrating advantages in the measurement of a mixture of special detergent recipes and alcohols. Here, the sensors measure the raw material supplies in three tanks with heights of two, three and five metres. The result of these measurements is decisive, because the end products of the raw materials supplied from



The narrow radar beam of the VEGAPULS 64 radar sensor allows it to be installed in confined spaces with internal metal elements.

these tanks into the downstream reactor vessel is present in about a quarter of total factory production.

Since very reliable measured values are crucial, investment at these measuring points was always high. At first, differential pressure transducers were used, but these led to the accumulation of deposits that clogged up the pipe system. The company then switched to guided radar as a measuring principle, but the structure of the tank with its built-in pipes led to heavy deposits on the inserted rod probe.

The medium with its tendency to settle on the tank wall, along with the internal heating coils and pipework led to inaccuracies with the previously installed instruments. These problems were only resolved with the installation of a VEGAPULS 64, which operates at the higher frequency of 80 GHz (26 GHz were normal previously).

Because the VEGAPULS 64 measures uses contact-free radar technology, product deposits are no longer an issue and the technology is ideal from a hygiene point of view. The front-flush, encapsulated antenna, for example, can be cleaned optimally and is insensitive to the extreme conditions of the SIP/CIP (sterilisation-in-place/clean-in-place) processes.

Despite its shorter wavelength, the VEGAPULS 64 is also insensitive to deposits or the formation of condensation on its sensor face. This is achieved, above all, using distance-dependent dynamic adaptation, which reduces the influence of interference directly in front of the antenna system and, at the same time, enables very high signal sensitivity at greater distances. Reliable filling



There is not only a lot of pipework on the outside of the pharmaceutical plant; heating coils and installations also influence the measuring signals inside the reactors.

level measurement is therefore also possible during cleaning cycles.

Reduction of interference signals

The structure of the tank with its complex installations now no longer has any influence on the measurement either. This was achieved due to better focusing of the radar measuring instrument, which depends on the transmitter frequency and the effective antenna surface area. The three times higher transmitter frequency also enables smaller antenna sizes, which still achieve similar signal focusing to previous generation radar sensors. An antenna size of just 3/4-inch is no bigger than a one-Euro coin, which enables much smaller process connections.

This new antenna version has helped to reduce the interference signals in the near range considerably. Since the antenna system was integrated into the process connection, no antenna is required to protrude into the tank, so it is now possible to measure reliably right up to the process connection. The tank volume can therefore be utilised better, which results in more flexibility.

Another positive aspect has emerged, which Croda Ibérica did not initially have in mind but which turned out to be extremely important in practice. With the VEGAPULS 64, it is possible to measure right down to the bottom of the tank, even when filled with quite different media. This is very advantageous in view of the fact that the tank must be emptied completely every two weeks.

With media with low relative permittivity, some signal pulses will penetrate the medium and are reflected by the bottom of the tank. Two signals are therefore received, the actual filling level and the bottom of the tank. The signals from the tank bottom are greater when the relative permittivity of the medium is lower, and when the reflectivity of the tank is higher – when it has a flat metal bottom, for example.



The measuring uncertainties were resolved with the installation of VEGAPULS 64 radar level sensors, which operate with a high frequency of 80 GHz. These were simply fitted onto pre-existing nozzles.

Because of the much shorter wavelength of the 80 GHz signals of the VEGAPULS 64, these reflections are damped in the medium much more strongly than with 26 GHz sensors. The reflection from the bottom of the tank is therefore much lower. This results in the liquid level measurement down to the bottom of the tank being much easier to establish than with previous generation sensors.

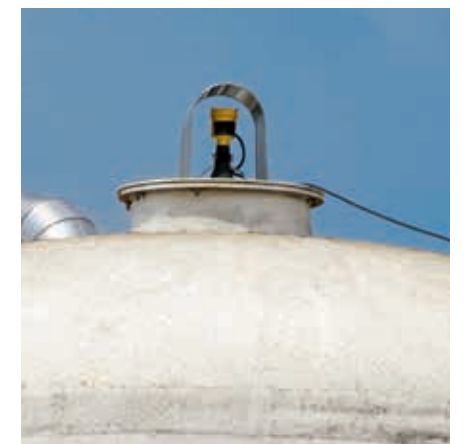
Fast commissioning

Although the structure of the tank is complex, the conversion and installation of the VEGAPULS 64 was very simple and quick, because the existing process connection could be made available for use.

This procedure has already proven effective in other applications in the pharmaceutical and cosmetics industries. Plants and vessels have usually already gone through acceptance testing and constructional modifications, often at great expense. Thread sizes can be adapted with appropriate adapters, on clamp connections, for example. Other process connections are available for use in aseptic applications where only PTFE is may be used for wet-media contact. These process connections meet the requirements of 3-A and EHEDG approvals.

Sensor integration and operation remained familiar because the VEGAPULS 64 is also equipped with the proven plics® concept. The PLICSCOM display and operating module serves in exactly the same way as other solutions for the commissioning and operation of the sensors for displaying measured values on site. No additional PCs or special software are required.

The display and operating module can be inserted into and removed from the sensor at any time, without interrupting the power supply. Wireless Bluetooth communication was also introduced last year. This is particularly useful where access is difficult or for rugged industrial environments and Ex areas.



Temperatures of more than 300 °C are required in this reactor, which processes a constituent that is present in about a quarter of the facility's output.

The VEGAPULS 64 module is downward-compatible and can be used with the entire installed base of plics® sensors: in pressure and filling level applications with 70 different instrument types, without software update and with the proven operating structure.

Users can configure and parametrise plics® sensors from a safe distance with any iOS or Android Smart phone or tablet. Display and diagnostic functions are also available and all that Croda Ibérica's maintenance team had to do was to install the sensor.

In addition to reliable measured values, Croda Ibérica values the professional knowledge of the VEGA technician. They have had the same contact for years, who responds quickly to calls and has solutions to hand in the event of unforeseen incidents.

Despite proven technology, Croda Ibérica is always interested in new, innovative solutions in filling level measuring technology, especially because these parameters play an important role in the company's success. The company did not hesitate long when the VEGAPULS 64 came onto the market and these sensors have been supplying reliable level measurements ever since. □



One of Croda Ibérica's storage tanks fitted with the new VEGAPULS 64, which allows non-contact filling level measurement down to the bottom of the tank, despite various internal installations.