Reliable inventory management in salt storage silos thanks to 80 GHz

Deposit build up in salt storage silos made it difficult to measure the level accurately. This in turn led to difficulties with the production and delivery logistics. A successful measurement was only achieved when a switch was made to 80 GHz technology.

It is probably rather unusual that an industrial enterprise is also at the same time a cultural icon; both an important supplier of raw materials and yet a sought-after partner for cuisine. However, the Sicilian salt producer Italkali Società Italiana Sali Alcalini plays these twin roles with ease. Every year, in the Realmonte mine, thousands of visitors admire the famous ‘salt cathedral’, where salt stalactites hang from above and impressive natural artworks adorn the mine walls. However, this is only the ‘public aspect’ of the company, Italkali is also one of the most important European companies engaged in the extraction, processing and export of salts. Operating in three mines, the company produces different types of salt that cover a wide variety of applications. For example, salt of the brand "Sale" can be found in many Italian households. However, their products are also used for de-icing, water softening in industrial plants and dishwashers, as well as in animal feeds and tanneries. Each type of salt must be processed differently. What all types have in common is that they are first reduced into different grain sizes, cleaned of impurities and packaged, or stored in silos of different sizes.

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Cathedral? Absolutely – a lot of tourists visit the salt mines of Italkali in Sicily. At the same time, however, industrial salt is mined here in large quantities.

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It was exactly in one of these storage silos where, due to a buildup of deposits, difficulties were encountered in measuring the level with any reasonable degree of precision. The product has to be measured over the entire height of the silo. Although the ultrasonic sensor used there was cleaned regularly, the measuring result was often unreliable. Accurate contents measurement is an important element of the process chain. Overfilling is just as big a problem, due to possible environmental pollution, as is a supply hold-up due to an empty silo.
Up to this point, VEGA Italy hadn't had much to do with the salt producer. About three years ago, when then the new 80 GHz VEGAPULS 69 solids radar level transmitter was launched the measurement engineering team at Italkali were quite interested, but did not expect this technology to actually solve the measuring problem in its silos. However, after being introduced to the instrument, they were ready to give 80 GHz technology a chance.

Salts of different grain sizes are stored in the storage containers.

The mine is located 100 m underground in the southern part of Sicily.

The narrow 4° measuring beam and the large dynamic range were the main arguments that spoke for VEGAPULS 69. In addition, the antennas are non-sensitive to deposits and enable maintenance-free operation, even under rough conditions (although an air purge connection is included as a standard, which provides efficient cleaning if needed in extreme applications). For test purposes, two sensors were installed on two silos in the Racalmuto Mine. This 100 meter-deep mine is located in the southern part of Sicily, between the provinces of Agrigento and Caltanissetta.

In these storage silos VEGAPULS 69 is connected to the signal conditioning instrument VEGAMET 381, which powers the sensor, then processes, displays and retransmits the measured values. It also has two alarm relays, so it's an ideal partner for simple control tasks. The installation of the sensor went smoothly. Its also important at this stage to achieve good sensor aiming at the mounting position, so the sensor can measure over the maximum range within the silo. With this in mind, the flange version has an integrated high-quality stainless steel swivel mount that allows adjustment over a range of ±10° for optimal sensor alignment. To make this quick and simple to do, a 'VEGA Tools' app can calculate the correct aiming angle, then the installer only has to place the smartphone on the sensor and adjust it to match. Setup and commissioning was also incredibly easy, even though the engineering team at Italkali had almost no experience with VEGA sensors.

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The sensor really scored points when it was in operation. Because VEGAPULS 69 operates with a frequency of 80 GHz, an antenna diameter of approx. 75 mm creates a narrow beam angle of only 4°. This more precise focusing of the measuring signal means it doesn't get any side-wall reflections and the measurement of the level is more accurate and reliable.
A second aspect that has convinced many VEGAPULS 69 users is its dynamic range. This parameter indicates which applications a sensor can be used in. Thanks to the large (120 dB) dynamic range, even the tiniest reflections can be picked up and measured, providing better performance, even when there are high levels of dust or sensor buildup.

Salt deposits made life difficult for previous sensors.

The salts are used in different applications, e.g. softening plants.

The outcome: Although Italkali didn’t have much experience with VEGA's measuring instruments up till then, the company has been really enthusiastic about the technology since the first deployment of VEGAPULS 69. Less maintenance, more precise measurement and reliable signal evaluation is the balance of the last three years. The engineering team at Italkali also appreciated the technical support provided from the team at VEGA. After the two successful trials at the Racalmuto Mine, it was not long before further enquiries were made about other sites. Now, the Sicilian company has upgraded to VEGAPULS 69 across all three of their mines.

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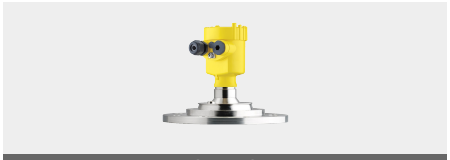
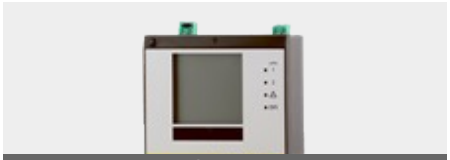


VEGAPULS 69



VEGAMET 381

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