Flow measurement in liquid concrete

Measurement technology for the harshest conditions

The company BTD Bohrtechnik AG operates in the field of special civil engineering and in the geothermal sector. Their core expertise lies in manufacturing and developing drilling machines, drilling tools, and backfilling materials. Liquid concrete is used for this technology to strip the drill holes. A reliable flow measurement is absolutely required here to deliver optimum results. That is why BTD Bohrtechnik AG uses electromagnetic flowmeters from JUMO.

Geothermal energy counts as renewable energy and is defined as thermal energy stored below the surface of the earth. This so-called geothermal energy is a source of energy for heat production that is constantly available. A distinction is fundamentally made between near-surface (up to 400 m) and deep geothermal energy (greater than 400 m up to several thousand meters). In Central Europe, the average temperature increases by about 3 degrees Celsius per every 100 m of depth. As of a depth of 10 m below the surface of the earth, the temperature remains practically constant throughout the entire year.

The first work step in using geothermal energy is to drill a hole using a mobile drilling unit. The geothermal probe is then installed in the drilled hole. After that the hollow space is compactly filled, which thereby ensures the thermal transfer of the probe. Brine is almost always used as the heat transfer medium. It is a mixture of water and antifreeze fluid. This mixture is continuously pumped through the probe into the deep. There it heats up and is transported back to the surface of the earth.

The JUMO flowTRANS MAG S01 electromagnetic flowmeter is used in this application to determine the exact volume flow of the liquid concrete. This is aligned with the calculated and previously planned volume. Process information regarding possible air pockets can thereby be evaluated. Electromagnetic flowmeters often present the only option for these applications to ensure high abrasiveness and solid-laden liquids in the required measuring performance.

For many years the magnetic-inductive measurement method has been tried and tested in mining industry applications for quantity measurement. One major advantage of this measurement method is the free pipe cross section of the measured value transducer. This means that no additional pressure losses occur and that the measuring pipe can be cleaned very easily. Special materials need to be selected for the pipe coating and the measuring electrodes due to the highly abrasive features of the medium that is to be measured. These materials are the perfect answer to the raw process conditions. This means

that service lives can be extended compared to standard coatings and that long-term stability is ensured in the process.

At BTD Bohrtechnik AG, JUMO technology is also used in further process steps such as the final pressure check that is part of the system's leakage test. As the water needs to have a specific temperature in this test, the temperature is controlled using push-in RTD temperature probes. A JUMO paperless recorder is used for acquiring and evaluating data for these process parameters.

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