HySand

Determination of sand moisture using an Acoustic Emission sensor

HySand addresses a key challenge in quartz sand processing: drying in a rotary kiln is a high-temperature process that requires large amounts of energy and causes a significant proportion of CO_2 emissions due to fossil fuel heating. At the same time, the demands for climate-neutral products and economical production amid volatile energy prices are increasing. The high temperature level of the drying process is also a decisive factor in the conversion: the drying gas typically has to reach around 800 °C on entry, which makes new supply and operation concepts particularly challenging from a technical point of view.

For a more climate-friendly energy supply to be reliable in practice, robust, measurable and controllable process management is required in addition to heat generation. This is precisely where the sensory part of the project begins: an online monitoring concept will be developed that continuously monitors the drying process and, in particular, the remaining moisture of the sand. The motivation is to evaluate process conditions no longer primarily on the basis of empirical values or selective measurements, but rather on the basis of data and in real time – with the aim of reducing quality fluctuations and minimizing energy consumption.

Technologically, the concept is based on Acoustic Emission (AE) technology. For this purpose, requirements are defined, a suitable sensor system is designed and constructed, and tested in initial investigations. The resulting data is verified by laboratory tests and then systematically evaluated in order to identify reliable correlations between AE signals and moisture level. This forms the basis for energy-optimised process control in the future and, in the long term, enables automated process control during operation – an important factor in ensuring that climate-friendly drying is not only technically possible, but also permanently stable and economically viable.

back to top