

# THE BURNER AND ANALYSER ADVANTAGE

Felix Bartknecht & Dr. Oliver Andrick, Testo, and Markus Paur, UNITHERM CEMCON, explain how combining burners and gas analysers can ignite efficiency in cement plants.

The cement industry is a cornerstone of modern infrastructure, demanding high efficiency, precision, and reliability in its operations. A critical component in the production process is the burner system, which directly impacts the quality, energy efficiency, and environmental sustainability of cement production. UNITHERM CEMCON, a manufacturer of burners for cement plants, has optimised its commissioning and servicing processes through the integration of Testo gas

analysers, known for their accuracy and durability in industrial applications.

### Burner design

In the highly competitive field of supplying premium burners for cement plants, Austrian company UNITHERM CEMCON has played a key role in the global market for over 70 years.

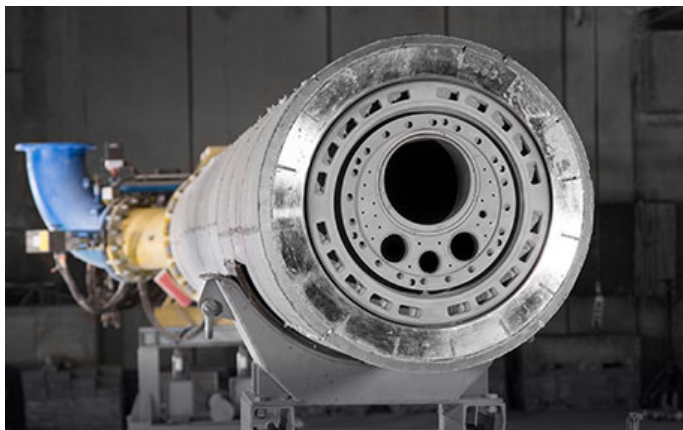


Figure 1. UNITHERM CEMCON M.A.S.<sup>DT</sup> kiln burner.



Figure 2. The testo 350 exhaust gas analyser comprising of Control Unit and Analysis Box.



Figure 3. Markus Paur, Lead Commissioning Engineer at UNITHERM CEMCON, utilises the testo 350 exhaust gas analyser daily for service and commissioning tasks.

Working to promote innovation, the company has supplied and commissioned more than 450 firing systems worldwide in the past 20 years, with a product portfolio that includes kiln burners, calciner burners, hot gas generators, fuel supply systems, and accessories.

The company's commitment to efficiency and manufacturing quality sets new standards across various applications. The innovative designs of their burners like the M.A.S. design, enable optimal performance with a wide variety of fuels, which is essential in modern cement production (Figure 1). As conventional fossil fuels (e.g., coal, oil, and gas) are increasingly being replaced by alternative fuels (e.g., biomass, waste-derived fuels, tires and rubber, sewage sludge, and waste oils and solvents), cement plants are adopting strategies to reduce environmental impact and enhance efficiency. This shift not only reduces dependency on traditional fossil fuels but also lowers greenhouse gas emissions.

However, the use of a broad mix of fuels presents new challenges for equipment suppliers and plant operators. UNITHERM CEMCON's cutting-edge solutions are designed to meet these challenges, ensuring reliability and efficiency in diverse fuel scenarios, and supporting the industry's move towards a more sustainable future. A crucial aspect for maintaining high customer satisfaction is the efficient installation and servicing process, for which UNITHERM CEMCON relies on state-of-the-art gas analyser technology from the German company Testo.

### Testing & measurement

Testo is a leader in the design, development and manufacturing of portable test and measurement instrumentation. The German-based company produces and calibrates instruments for a wide range of applications, including combustion and emissions testing. For many years, the testo 350 exhaust gas analyser (Figure 2) has proven itself as a rugged, easy-to-use device designed to meet the standards for precise industrial emission measurements and data administration.

The testo 350 Control Unit, which manages emission measurements, features a clearly structured graphic display and user-friendly interface. When combined with the Analysis Box, it can operate with up to six gas sensors, five of

which are optional. This configuration allows technicians to select from sensors for CO, NO, NO<sub>2</sub>, SO<sub>2</sub>, H<sub>2</sub>S, CxHy, and CO<sub>2</sub>, plus O<sub>2</sub>. The increased measuring range enables unlimited measurements even at high gas concentrations, which is often the case during commissioning procedures.

“Since 2011, we have been using measurement equipment from Testo,” says Markus Paur, Lead Commissioning Engineer at UNITHERM CEMCON (Figure 3). “Their devices are exceptionally robust, durable, and easy to transport. The testo 350 exhaust gas analyser in particular is the ideal tool for delivering top-notch service to our customers worldwide.”

The testo 350 exhaust gas analyser is employed to monitor process gases at the kiln inlet and preheater exit, providing a reliable cross-check for any existing continuous monitoring systems. The precise measurement data gathered is used to evaluate the situation and optimise performance. Additionally, this manual measurement technology facilitates the integration of the process into the digital world.

Integrating Testo gas analysers into UNITHERM CEMCON’s service concept creates a robust system for optimising combustion in cement plants. This collaboration offers several technical advantages for plant operators. During burner commissioning, Testo gas analysers provide real-time data on combustion gases, enabling experts to fine-tune burner settings for optimal performance. Accurate emission measurements ensure that burners operate within desired parameters, enhancing efficiency and reducing startup times.

Regular monitoring with Testo gas analysers enables early detection of deviations from

optimal combustion conditions (Figure 4). This proactive approach helps maintain peak burner performance, resulting in consistent clinker quality and reduced fuel consumption. Furthermore, precise emission measurements ensure compliance with environmental regulations. By monitoring emission levels, burners can be adjusted to minimise harmful emissions, supporting sustainable cement production practices.

The data logging capabilities of the testo 350 exhaust gas analyser enable detailed, real-time analysis of burner performance. This information is invaluable for predictive maintenance, allowing for timely servicing before issues become critical, thereby reducing downtime and maintenance costs. As a result, many cement plants use Testo analysers as a reliable cross-check or backup solution for their mandatory continuous emission monitoring or kiln inlet process gas analysis systems.

### Case Study

A case study from a cement plant utilising a UNITHERM CEMCON kiln inlet burner illustrates the practical benefits of using Testo gas analysers. During the commissioning phase, the precise data from a testo 350 exhaust gas analyser allowed for rapid optimisation of the burner settings, resulting in a significant reduction in fuel consumption and a decrease in startup time.

Continuous monitoring during regular operations identified minor deviations in emission levels, which were promptly corrected, ensuring compliance with stringent environmental standards.

### Summary

The collaboration between two industry leaders, UNITHERM CEMCON and Testo, exemplifies a strategic approach to enhancing efficiency, precision, and sustainability in cement plant operations. The synergy between UNITHERM CEMCON and Testo’s technologies not only optimises combustion processes but also supports the industry’s goals of reducing environmental impact and operational costs. As the cement industry evolves, such partnerships are crucial in driving progress, achieving new performance benchmarks, and promoting sustainability for plant operators worldwide. ■



**Figure 4. Regular monitoring using the testo 350 exhaust gas analyser allows for the optimisation of combustion parameters and processes conditions.**