**FLSMIDTH CEMENT**

ECS/CEMSCANNER®
KILN SHELL
MONITORING SYSTEM

State-of-the-art kiln shell infrared scanning

ENSURE EFFICIENT AND RELIABLE KILN OPERATION

Correct kiln temperature measurement is essential for optimal kiln performance. Our ECS/CemScanner kiln shell monitoring system delivers just this. Combining robust design with advanced software, the system is indispensable to kiln operation and optimisation.

The ECS/CemScanner solution provides a thermal image representing the flattened shell surface, with user-defined colour codes indicating the temperature scale. The thermal profile consists of four superimposed curves showing the minimum, maximum, average, and worst-case temperatures measured around the shell. It may also display the alarm levels assigned to several kiln sections.
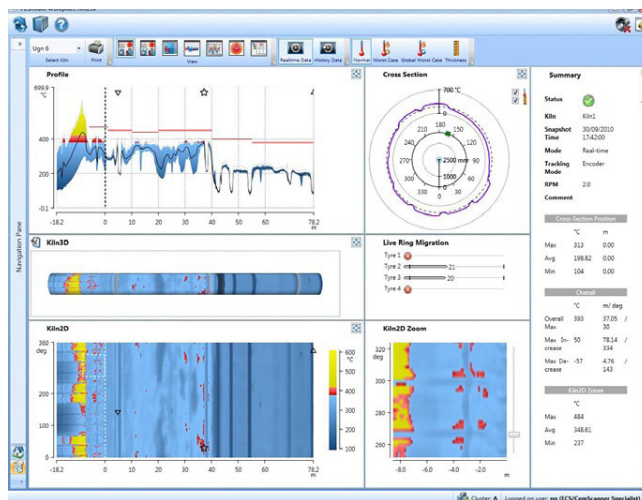
The ECS/CemScanner software provides a detailed overview of the kiln shell condition

KEY BENEFITS

Increase kiln availability

Lower refractory consumption

Reduce stoppages

Decrease thermal consumption

Effectively plan overhauls

MONITOR, PROTECT, AND OPTIMISE YOUR KILN

Tyre slip monitoring

Kiln ovality is crucial to efficient kiln operations, as any significant deformation may impact clinker quality, disrupt operations, increase energy consumption, and increase wear on the kiln lining and other components. As kiln ovality is greatly affected by the clearance between the kiln tyres, monitoring this clearance provides the simplest and most accurate way to monitor ovality. We do this by measuring shell rotation in relation to the tyre rotation. The derived result is termed tyre slip or live ring migration (LRM).

ECS/CemScanner's LRM system is an automatic and continuous online measurement and registration system designed to monitor tyre slip and anticipate and predict kiln constriction. Each tyre's slip is shown on a bar chart and can also be displayed as trend curves, i.e., together with the shell temperatures on both sides of the tyre. Slip alarm levels are indicated on the bar chart, and alarms for slip trends can also be generated.

Fan control

When cooling fans control the kiln's burning zone, the ECS/CemScanner system can automatically control the fans through the plant PLC system. Continuous temperature monitoring of the kiln sections indicates when and where fans are required, optimising fan use. This prevents uneconomical fan operation when not needed, increasing their service life.

Brick thickness

The ECS/CemScanner software can calculate brick and coating thickness, displaying results as a profile or 3D image updated in real time or based on historical data. Allowance is made for different brick conductivities, internal temperatures, and other conditions that may cause abnormally high shell temperatures but are unrelated to brick thickness.

Calculating brick and coating thicknesses is based on solid theoretical grounds. Skilled users attain accuracy results better than 10%, i.e., within a few millimetres. The system requires an encoder to provide a precise kiln position indication and enable comparison of historical thickness calculations. Meanwhile, the 'walk-in-the-kiln' view enables advanced monitoring of coating conditions by plant operators.
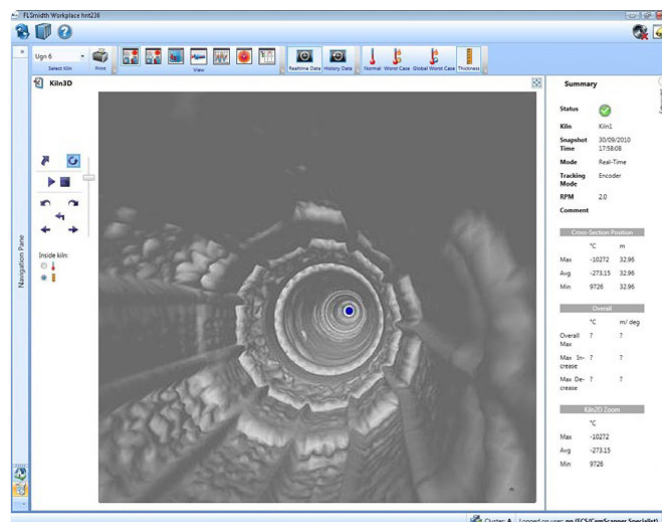
The 3D "walk-in-the-kiln" with selectable view position enables a practical impression of the coating conditions, without stopping the kiln.

Refractory management

The optional BrickGuide package manages all relevant information on lining performance, consumption, and past installations, allowing more effective refractory maintenance and cost management. The software package includes a graphical presentation of the history of the installations, lining arrangement, consumption, and performance reports for each installed brick type in the kiln.
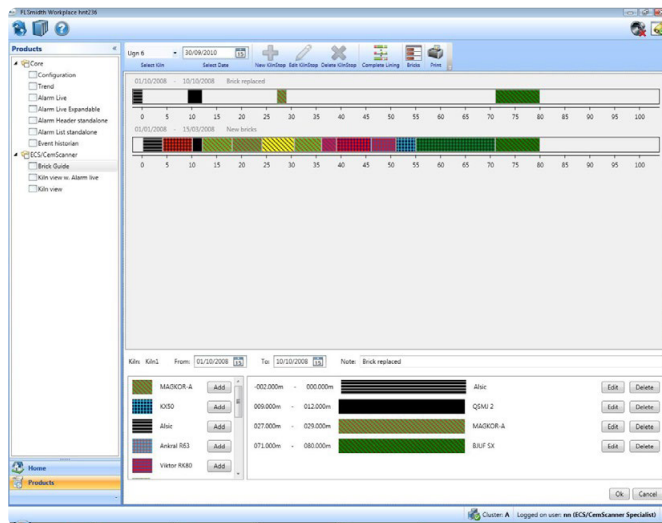
Historical data

With data stored for several years, operators are empowered to analyse kiln performance over time. For example, the maximum temperature trend image provides snapshot information of the kiln surface temperatures over the last days or months. It is also a visual search browser for critical or interesting situations in the past, which can be opened for detailed analysis. Users can also manually save a snapshot of the profile for easy later retrieval.

BrickGuide for brick lining management.
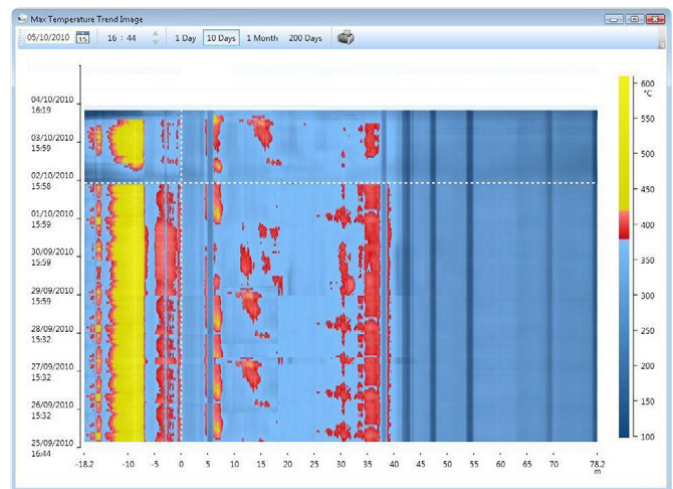
BrickGuide for brick lining management.

CUSTOMISE TO YOUR NEEDS

Components

The ECS/CemScanner system comprises three main components: an infrared scanner head, a data processing unit, and a user interface.

The high-speed infrared scanner offers high reliability, long-term stability, and accuracy. It is positioned in a stainless steel cabinet with ball head support for easy installation. The standard cabinet is suitable for installation in areas with temperatures between -20°C and 50°C. A more rugged air-pressurised and heated cabinet is available for operating environments outside this temperature range.

The advanced CemMicro-III processing unit with an ethernet interface constitutes the system's heart. The CemMicro-III receives measurements from the scanner head, the kiln position encoder (KPE), and kiln and tyre rotation pulses. It then processes and transmits data to the user software through a fibre optic interface or industrial wireless ethernet solutions.

Customise to your needs

In addition to the three main components, various options are available to customise the ECS/CemScanner solution to your application needs. Upgrade solutions are also available to ensure your ECS/CemScanner solution remains fit for purpose.

Stereo scanner: If one scanner head cannot obtain a clear view of the kiln shell, additional scanner heads can be installed. This 'stereo scanner' arrangement ensures that every portion of the kiln shell is fully covered. The software functions as if there were only one scanner head.

Pyrometers: Up to 16 infrared pyrometers can be installed to measure the kiln shell temperature in obstructed areas. With the PyroScan option, temperatures in a particular section are scanned and integrated into the thermal image and profile displays of the ECS/CemScanner software.

Integrated scanner camera: Through the scanner window, an integrated camera visually discloses problems with dust on the window or whether the scanner head is out of alignment.

Kiln camera: Spirometer or 'kiln TV' can be displayed as an integral part of an ECS/CemScanner system.

Trending: In addition to the built-in historical data, specific process data, such as shell temperatures in the burning zone and other sections of the kiln, tyre slips, or maintenance data, such as the scanner head temperature, can be logged for monitoring, trending, and early warning purposes.

Diagnostics: Comprehensive diagnostic information and KPIs on equipment conditions, scanner raw data, and data communication status are available to monitor the system and facilitate maintenance.
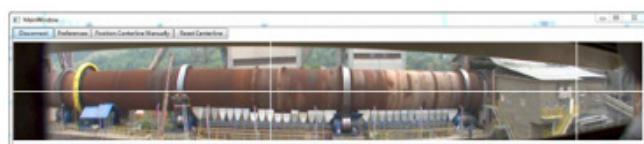
Shell heat loss from the whole kiln and or subsections is calculated and can be displayed as trend curves.
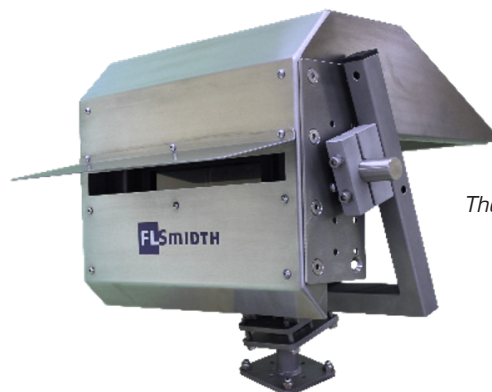
The standard cabinet

The rugged cabinet

Positioning the ECS/CemScanner is easy with the integrated camera

FLSMIDTH CEMENT

C 07-15 800-41-ENG