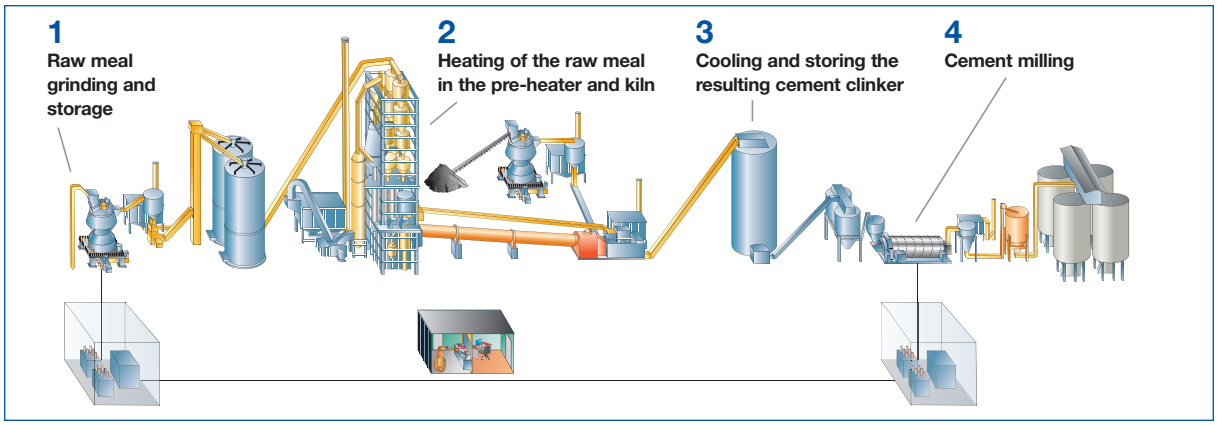
Application sheet

High temperature measurement in cement industry applications

The Application - The cement manufacturing process has four stages:-



The intense heat needed to convert the raw meal into clinker in the preheater and kiln must be carefully controlled. If the temperature wasn't correctly monitored it could lead to the furnace becoming too hot and creating a fire or explosion. The dusty environment leads to risk of fires and so temperature must be tightly controlled and equipment well protected. Manufacturing the cement at the wrong temperature could also compromise product quality.

As temperature is so critical, it needs to be accurately monitored throughout the process to enable operators to look for trends to warn them if there is a problem. Monitoring equipment needs to display data in real time in an easy to use format to enable operators to recognise a problem and act on it quickly.

There are three critical areas that need to be monitored; the kiln, preheater and clinker feeder. The high temperatures, dust and very harsh environment means that conditions for monitoring equipment are very challenging.

Monitoring Location	Preheater	Kiln	Conveyer to silo
Monitoring requirements	General temperature	Clinker Temperature Measurement	Hot-Spot Detection
Temperature Range	1100 to 1300°C	1450°C	50 to 300°C
Other factors	Dust	Dust	Dust
Ambient Temperature	approx.100°C	up to 100°C	25 to 30°C
Solution	Ratio pyrometer - Sensytherm IR-MQ1 with cooling housing & air purge	Ratio pyrometer - Sensytherm IR-MQ2 with Thermo-Jacket	Radiation pyrometer Sensytherm IR-PD RGNG with air blower

The Problem

When accurate temperature measurement instruments have been installed on the critical processes they need to be protected.

Cement manufacturing sites are difficult, arduous applications with extreme heat, corrosive dust and chunks of cement falling from a height. Critical measurement equipment is operating under extremely challenging conditions and often needs to be replaced due to damage.

The Solution

- Look for equipment with robust housing with ATEX and air-tight 1/2 G EEx d approvals for dust explosion protection
- Use precious metal sensors which can handle the intense heat in the kiln and preheater
- Talk to the manufacturer about additional protection options
- Consider remote options to keep the more sensitive equipment away from the most damaging environments
- Ask if the product contains a redundancy feature, so there is a backup if a sensor fails

The next step

For more information on temperature measurement applications, email **moreinstrumentation@gb.abb.com** for our free Temperature Jargon Buster.

Technical data

ABB offers a range of accurate, reliable equipment for high temperature applications in the cement, steel and coatings industry. ABB are the only temperature equipment supplier which has equipment fully compliant with the ATEX directives and rated intrinsically safe, non-incendive, dust-ignition proof and air tight.

1 SensyTemp High temperature thermocouples - straight thermocouples for technical temperature measurements in combustion processes and in hot gas atmospheres such as cement kilns and rotary tubular kilns.

Features

- Communicates with FF, Profibus PA, HART, 4.20mA or direct sensor output
- Options with base metal thermocouple and metallic protection tube up to 1,100°C or with precious metal thermocouple and ceramic protection tube up to1,600°C
- Suitable for main process connections
- Suitable for main process control systems

2. Sensytherm IR infrared thermometer - a robust product for use in metal production and processing, glass smelting and cement kilns. Infrared technology enables accurate monitoring even in dusty environments and it is sensitive enough to pick up small, migrating hot spots.

Features

- Non-contact temperature measurements on highly reflective and glowing surfaces
- No interference from smoke, steam and suspended matter in the field of view and on inspection windows

- Measurements at increased ambient temperatures with fibre optic cable without an additional cooling device
- Precise temperature measurement of small or moving hot spots
- Application-adapted parameter setting of the sensors ex works
- Easy integration in process control systems
- Rapid temperature measurement as a result of fast response time

3. TTF300 Field Mounted temperature transmitter – the new generation of HART temperature transmitters for demanding applications

Features

- Transmitter-controlled LCD display with TTF300 configuration options
- Innovative, large terminal block with cable guide in IP 67 / NEMA 4X aluminium or 316L stainless steel housing
- Improved accuracy based on sensor adjustment
- Sensor input redundancy for 3-wire Pt 100 connections
- High measuring accuracy ± 0.1 K and long-term stability of ± 0.05 % per year
- Expanded diagnostic functions and asset monitoring
- Approvals: ATEX and air-tight 1/2 G EEx d

Service

As products in demanding applications tend to have a short life span, quick delivery is critical. ABB can deliver within two weeks for an average product and help can be on hand more quickly for critical applications and breakdown situations. There is commonality of parts throughout the range to ease stock management of common components, and allow replacements to be found quickly.

Each application has different requirements, ABB's knowledge, expertise and comprehensive range of products means that we can help you to find the best solution in even the most challenging of applications.

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