

Application Notes – Cement Manufacturing Process

At Sintrol, we are committed to implementing solutions for our customer’s problems. Our products are based on our unique Inductive Electrification measurement system and developed using a flexible modular based platform that allows us to tailor our products for the customer. Having worked on hundreds of installations worldwide in the cement industry, Sintrol has been able understand and enhance the process for its customers, offering solutions for legislative requirements as well as optimizing the process. Using its global network of partners, Sintrol has been able to identify several segments of the cement industry process that have typically provided the majority of its applications. The first step is identifying the areas in the process that require dust monitoring solutions. Once these are located, the correct solution can be implemented depending on the needs of the end user. Below are a few of the main areas requiring dust measurements:

Cement Manufacturing Process

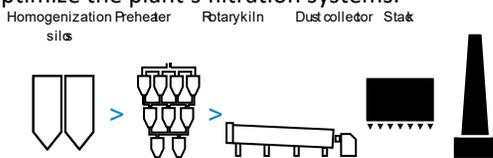
1. Crushing and Milling

In the raw materials handling process, filtration systems are utilized to control emissions in the quarrying process of the plant. To minimize the loss of lime-stone and other materials that are fed into the kiln, dust measurement systems provide plant operators feedback on the deterioration or breakage of the bags in the filter. Monitoring the performance of these filter systems also reduces the maintenance costs and downtime in plant operations.



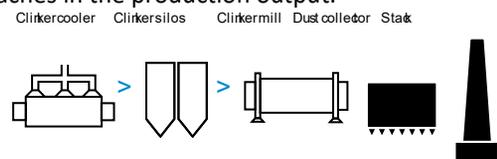
2. Preheater and Rotary Kiln

In both dry and wet processes, materials go through some form of a heating process creating gases released on both ends of the kiln. There is typically a dust removal system and an emissions stack at each end. Filter leak detection provides an early warning that product is releasing into the atmosphere. Trend monitoring in common ducts and emissions monitors can provide trend data that enables plant operators to optimize the plant’s filtration systems.



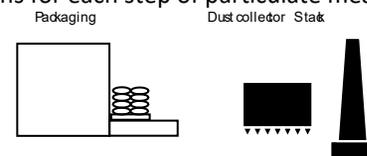
3. Clinker Mill

Once the clinker has been produced and passed into the cooling systems, it is important to maximize the production of cement in the plant. As the gases are passed through a dust removal system, the trapped particles are returned to the clinker silos as product rather than released into the atmosphere as loss. Particulate measurement in the outlet ducts of these filtration systems is essential to optimizing the output of the plant. Identifying a broken filter at the earliest stage allows plant operators to react quickly to breaches in the production output.



4. Packaging

In the last stage of production, filtration units are used as product is transferred to packaging and shipping. Similar to the previous stages of the process, filter leak detection and trend monitoring provides plants with tools to identify when cement is being released into the atmosphere. Sintrol monitors provide the perfect tool to ensure that the cement manufacturing process is able to optimize its total output. Depending on the needs, Sintrol has the right solutions for each step of particulate measurement.



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Solutions

Filter Leak Detection

In each area of the process where there are single or multiple compartment baghouses, Sintrol Snifter Series monitors are the perfect solution to provide notification to the customer of deterioration or break-age of the filter bags. This provides early detection for the customer that excess particulate matter is in its process and releasing out of the stack. The Sintrol Snifters are largely maintenance free devices that can measure dust levels as low as 0.1 mg/m³. This device also has an ATEX 22 version available.

Trend Monitoring

In many larger or combined outlet ducts, a continuous trend measurement is preferred to get a constant reading on dust levels in the process. The Sintrol S303 monitor is equipped with a 4–20 mA output and all the features necessary to provide the end user with a continuous output. With high temperature versions (up to 700°C) available, this is a solution for all areas of the plant with dust measurement needs. The Sintrol S303 monitor allows

the customer to identify increasing trends in the dust levels and possibly identify sources of extra pollutants in its process. For plants that use Electrostatic Precipitators (ESP), our Sintrol E-Spy is the industry's only probe based monitor allowing the end user to get a continuous trend measurement in 4–20 mA output after an ESP. The customer can learn about the efficiency of its ESP, optimize the hammering process, and make adjustments to maximize the efficiency of the filter system utilizing the Sintrol E-Spy.

Emissions Monitoring

For each stack in the plant, Sintrol's S304 and S305 monitors can be calibrated to provide readings in mg/m³ for actual emissions amounts. Sintrol's S305 monitor is a TÜV certified instrument, meeting the QAL1 standards for official emissions measurements in the European Union. These virtually maintenance free monitors are a less expensive and more reliable alternative to the traditional opacity monitors that have been used historically.

Case Study

A multi-national cement company that was concerned with the amount of product it was losing wanted a solution to optimize its filtration systems. Previously, the company monitored its baghouses with differential pressure gauges and relied on visual signals for filtration breakages or malfunctions. Due to the slow response time and inaccuracy of these methods, the plant installed Sintrol Snifter monitors on each outlet duct of its baghouses and added four S303 trend monitors on each inlet duct of its stacks. Combined with Dust log software, the plant was able to identify any baghouse that had filters deteriorating or rupturing before any significant changes to differential pressure gauges. This faster response time allowed the plant to shut down the malfunctioning baghouse compartment, correct the solution quickly and save product that had been releasing into the atmosphere. Currently, the same company now has our solutions in plants of theirs in four countries and looking to expand within its network.

Principle of Operation

Sintrol dust monitors are based on a unique Inductive Electrification technology. The measurement is based on particles interacting with an isolated probe mounted into the duct or stack. When moving particles pass nearby or hit the probe a signal is induced. This signal is then processed through a series of Sintrol's advanced algorithms to filter out the noise and provide the most accurate dust measurement output.

Classic triboelectric technology is based on the DC signal, which is caused by particles making contact with the sensor to transfer charges. Compared to DC based measurements, the Inductive Electrification technology is more sensitive and minimizes the influence of sensor contamination, temperature drift and velocity changes. By using the Inductive Electrification technology, it is possible to reach dust concentration measurement thresholds as low as 0.01 mg/m³.

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