

filter management

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enhanced performance

Emission Monitoring in the Gypsum Industry

Increased efficiency



US-EPA
MACT



Certificate No: 9389

PCME and Gypsum

PCME are the preferred supplier of continuous particulate monitors to a number of the world's leading Gypsum and Plasterboard manufacturers. PCME's worldwide involvement with the industry over many years has led to the development of many unique solutions for in-stack dust monitoring. PCME provides an unparalleled range of instrumentation to monitor the low levels of dust normally associated with the filtration systems used in the manufacture of Gypsum-based products. These units not only help to protect our environment by aiding legislative compliance but also help in reducing operator costs by reducing filter maintenance and process downtime.

Quarrying ...

processes such as Crushing and Drying often utilise Bag Filters to prevent dust emissions to air. To monitor the low emission levels from these filters (typically less than 5 mg/m³), Electrodynamic® systems are employed. These instruments feature a patented non-contact charge induction technology and unlike traditional Triboelectric units are unaffected by contamination of the sensor rod and are virtually maintenance free. To overcome interference issues experienced by traditional monitoring techniques associated with the moist conditions found after Rotary Dryers and Heated Roller Mills, PCME offer a unique, patented insulated sensor which is successfully used in thousands of moist and damp applications worldwide.



Crushing Plant Filter protected by an approved (TUV/MCERTS) advanced Electrodynamic® unit



A Patented MCERTS approved, fully insulated sensor used in moist applications such as Dryers and Calciners



Electrofilter after a Calciner monitored by a Dynamic Opacity instrument

Calcining...

operations may be monitored for particulate emissions by a number of different systems. The choice of instrument is dependant on both the method of filtration together with stack conditions (temperature and humidity). For both Flash and Kettle Calciners utilising Electro-filters, Dynamic Opacity systems are preferred. These TUV and MCERTS approved units provide a more sensitive response than traditional Opacity instruments and are less affected by particulate build-up on their optics, their ratio-metric operation allowing them to work with their lenses 90% obscured.

The compact design of both Transmitter and Receiver heads facilitates ease of installation. Unlike traditional Opacity systems which require precise alignment often using a laser, PCME's Dynamic Opacity instruments offer a unique built-in audible alignment aid "Sure-Sound"™ ensuring the quick and easy alignment of the sensor heads.

In applications where Baghouses are used, Electrodynamic® systems are favoured. These applications especially after Kettle Calciners are often extremely humid and cause traditional systems to fail due to either sensor contamination or electrical short circuits. PCME's industry-proven fully insulated sensors overcome these

problems providing approved (MCERTS) solutions to monitoring these extremely aggressive locations.

Filter Management Systems...

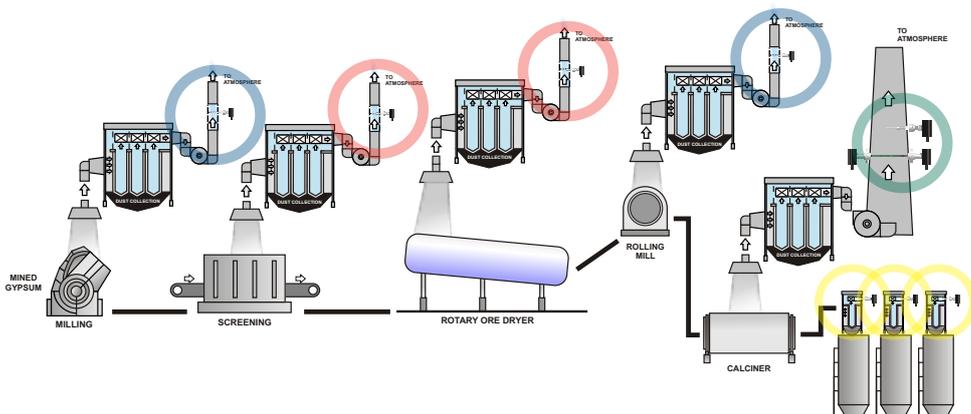
employing multiple networked Electrodynamic® sensors allow each compartment of large multi-chamber Bag houses to be continually monitored to determine the deterioration of the filter elements. These systems provide a proven method of not only reducing total environmental emissions but also provide information to allow preventative maintenance procedures, thereby greatly reducing unplanned filter outages, maintenance times, lost production and spare filter element inventories.

Used in conjunction with PLC control systems, PCME Electrodynamic® sensors have provided the proven means for Gypsum manufacturers to optimise their filter usage by controlling bag-cleaning cycles thereby substantially reducing costs associated with premature bag failure and compressed air usage.



Networked Electrodynamic® sensor

Gypsum!!!



Typical monitoring points on a Gypsum Plant

/Plasterboard Manufacture

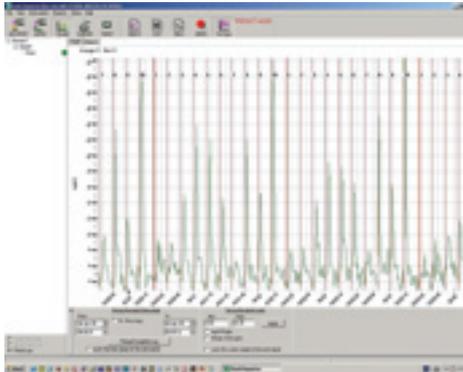
PCME's range of particulate monitoring instrumentation encompasses many different technologies to provide the best solution for each application and provide enhanced benefits for users. Set out below are a selection of proven solutions for the Gypsum and Plasterboard Industries. For further details please contact us directly on sales@pcme.co.uk or discuss your requirements with our experienced team of local distributors.



Silo Filter monitored by a networked Electrodynamic® sensor

Silo Filters.....

can be remotely monitored with either single sensor units or multi-channel networked systems. These devices log data on-board to assist the accurate setting of alarm levels to facilitate warnings of silo filter leakage or rupture and the prevention of nuisance emissions.



Bag leakage trends from a Silo bagfilter observed remotely via an Ethernet connection

Scoring, Chamfering and Cutting...

filter systems together with other process filters are often positioned in areas remote from the control room. To monitor these bag houses, PCME provides a wide range of Electrodynamic® instruments ranging from single channel units to multi-channel (up to 32 sensors) systems. These sensors use modbus communication to network to a single control unit. The control unit logs historical data for environmental reporting and process control, displays emission values and allows easy configuration of the system.

The controller may be connected directly to a LAN to allow remote interrogation of the system by a number of different users, eg environmental, process, maintenance. Both historical and real-time data together with alarm status may be displayed simultaneously on different PCs and a Predict software package used to remotely diagnose filter maintenance issues.



Advanced probe contamination check

Advanced probe contamination check

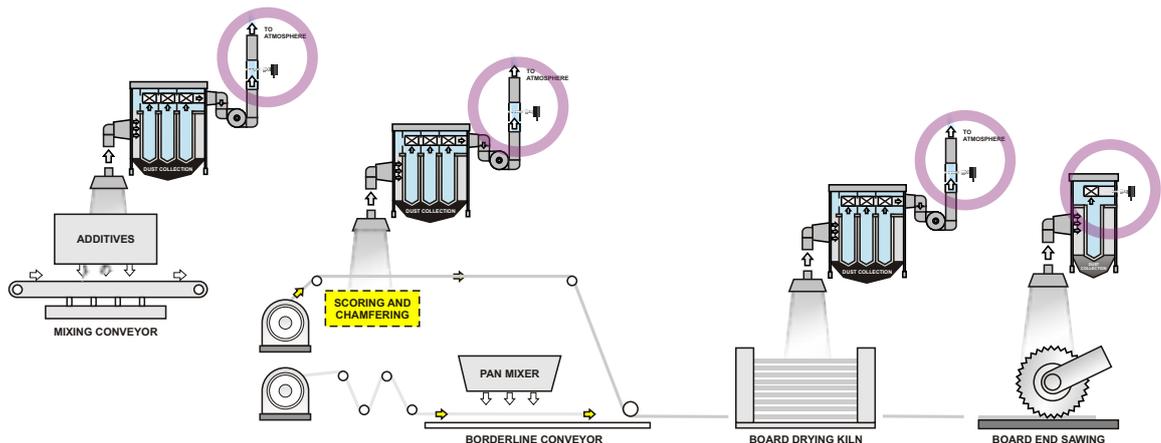
To provide the utmost confidence in the measurement of PCME's advanced particulate monitoring systems, a unique patented secondary contamination ring is utilised which monitors any leakage currents or signals across the insulator thereby proving the measurement integrity of the sensor at all times.

This automated check of the sensors functionality eliminates the need for time consuming manual inspection of the unit, which is common with other monitoring techniques.



The advanced technologies and robust designs utilised in PCME's range of particulate monitoring instruments ensures full operational functionality even with high degrees of contamination

Plasterboard//



Typical Plasterboard Facility

cost and environmental nuisance reduction using filter failure prediction

Although particulate monitoring systems are generally purchased to monitor environmental emissions to atmosphere, many users also utilize these instruments as preventative maintenance tools. The ability to predict when a filter is likely to fail and to be able to identify which row or chamber is at fault has provided users with a proven method to not only reduce the environmental impact and clean-up costs associated with large-scale emission events but also to make significant savings in spares, maintenance times and lost production.

To achieve this the selected monitoring technique must be able to accurately track the very dynamic dust emissions created during a bag filter cleaning cycle. To these ends we recommend Electrodynamic® units in preference to Optical or Triboelectric systems.

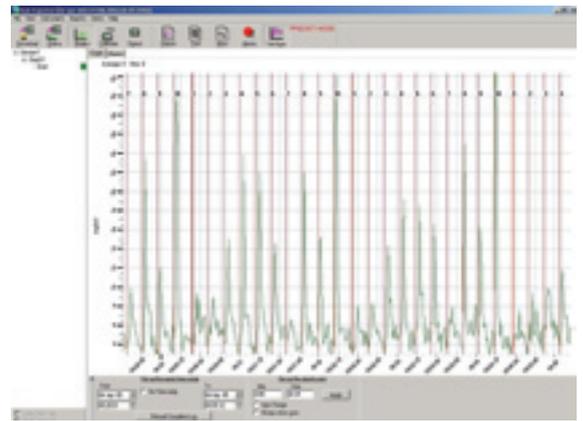
As a filter is reverse jet cleaned, any defects in the filter membranes are exposed resulting in relatively high dust peaks. By monitoring these peaks in real time using the Predict software package, it is possible to identify potential problems within the filter before they result in breaches of environmental limits.

The cleaning signature of the bag house is made easily identifiable by the input to the monitor of the filters cleaning pulses via Auxiliary Input Modules. Additionally further outputs maybe taken from pressure sensors within the bag house to assess the caking of the filter elements, thereby allowing the operator to reduce bag wear and compressed air usage and allowing the optimisation of the filter system.

Predict provides the possibility to observe filter problems remotely and check maintenance work to ensure correct performance of the filter. The use of Predict has proven the ability of a monitor not only to be used for environmental compliance but also to be used as a significant aid to plant maintenance and to also enable users to greatly reduce the instances of catastrophic filter failure.

The use of Predict allows:-

Scheduled maintenance **Reduced maintenance times** **Lower labour costs** **Reduction of spare filter inventories**
Longer bag life **Increased production time** **Reduced environmental emissions due to better filter control**



Predict data identifying damaged bag rows (row10)



Predict offers the possibility of shorter maintenance times and the replacement of fewer filter elements

electro-filter efficiency monitoring

To optimise the performance of electro-filters it important to fully understand how much particulate the filter is actually removing from the gas stream. PCME's unique capability to provide a single monitoring system incorporating two separate sensors utilising Optical technology for use post filter and Electrodynamic® Technology pre filter allows users to successfully measure Electro-filter efficiency.

These two complimentary monitoring techniques are used as they offer the best monitoring solutions in the widely different conditions found in these two locations. Electrodynamic® sensors have a proven capability to monitor the extremely high dust loads found Pre-filter, providing a reliable, rugged monitoring solution whereas Optical sensors are chosen for use Post filter as a result of their capability to measure extremely low dust levels (0.1 mg/m^3 utilising pro-scatter techniques) and their low maintenance requirements.

The ability to observe in real time the performance of the filter allows the operator to adjust operating parameters to optimise not only filter efficiency but also reduce operating costs, extend the filters operating life and decrease the environmental impact of the process.



Effective electro-filter monitoring utilising PCME's Optical and Electrodynamic® technologies

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