filter management

compliance measurement

DASTEC S.R.L.
Representantes / Distribuidores Exclusivos
Buenos Aires, Argentina
Tel.: (54-11) 5352-2500
E-mail: info@dastecsrl.com.ar
Web: www.dastecsrl.com.ar

PCME

Emission Monitoring Solutions for Power Generation

EN-14181 (LCPD)

mCERTS
Particulate
0-15mg/m³
0-30mg/m³
0-150mg/m³

US-EPA

TÜV
BImSchV 17 0-15mg/m³
BImSchV 13 0-150mg/m³
BImSchV 27 0-30mg/m³

Certificate No: 9389

PCME solutions for particulate monitoring

PCME's involvement with the Power Generation Industry over the last 14 years has lead to the development of a range of unique solutions for the in-stack measurement of particulate concentration. PCME provides a wide range of complimentary monitoring techniques to measure the varying dust loads found in different generation techniques. These units not only help to protect our environment by aiding legislative compliance but also support ISO-14000 objectives and save operational cost by reducing filter maintenance and process downtime.

coal fired power stations

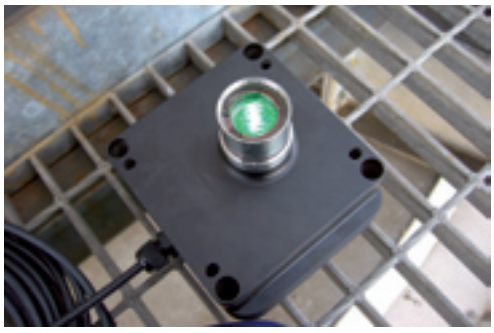
Boilers//

Approved (MCERTS /TUV) Dynamic Opacity Instruments monitoring the output from a Boiler Plant Electro filter on a Coal-Fired Power Plant

The most common form of filtration found on coal-fired power station boilers is the Electro-Filter. These filters require special consideration when selecting a monitor as their action alters the charge characteristics of the particulate and therefore will affect the response of probe-based Tribo-electric dust monitors.

To overcome this issue, PCME supply Dynamic Opacity systems. 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 the ease of system 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 (Patent Pending), ensuring the quick and easy alignment of the sensor heads.



The compact design and the use of Sure-Sound ensures the quick and easy installation of Dynamic Opacity Sensors

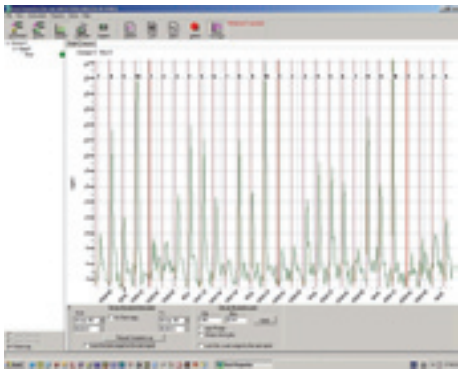
Unlike traditional Opacity systems, Dynamic Opacity units are unaffected by changes in particulate colour making them most suitable for plants employing fuels from different sources which can result in differing particulate tints.

This measurement technology is featured in a wide range of dust monitoring systems accredited to International standards and designed to fully meet the exacting self testing (zero, span and contamination checks) required under International regulations.

Coal Mills//

Cyclones or Bag Filters used to collect Finished Ground Coal after Coal Mills may be monitored to assess efficiency by employing Electrodynamic Sensors. These systems are available in approved versions for use in Hazardous Areas (ATEX Dust Zones 20, 21 and 22).

In addition to their environmental duties, these units are often used in conjunction with PCME's Predict Software package and Ethernet connectivity to identify bag row failure before major environmental excursions occur. The large dynamic range of Electrodynamic instruments allows, for the first time, the possibility of the truly remote observation of the condition of both bag and cartridge filters. Used in conjunction with low level emission warning alarms, it allows the inspection of filter elements before Dust Emission levels breach regulatory limits thereby allowing scheduled maintenance and eliminating plant down-time time normally associated with unplanned plant stoppages. (for further details please see PCME document Advanced Bag Filter Diagnostics)



The Deterioration of Row 10 is highlighted in real time before Environmental limits are breached

FGD Plant//

The choice of technology to monitor the Particulate Emissions from Flue Gas Desulphurisation plant is dependant on the stack conditions. For dry applications on heated extractive lines either Electrodynamic or Pro-Scatter techniques may be used. In damp applications where water vapour is present a Patented Fully Insulated sensor may be successfully employed.

Flue Gas Desulphurisation Plant

in the power generation industry

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 is a selection of proven solutions for the Power Generation industry. For further details please contact us directly on sales@pcme.co.uk or discuss your requirements with our experienced team of local distributors.

gas/oil fired power stations

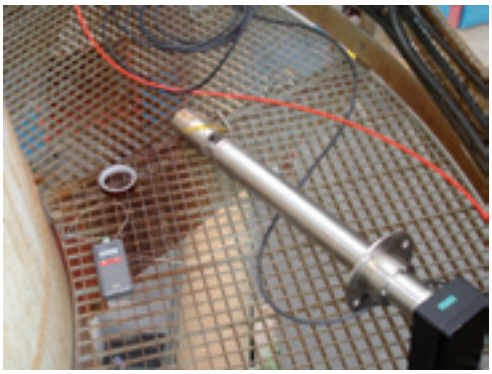
Gas fired power plant falling under LCPD monitored by advanced Pro-Scatter Technology

Particulate Emissions from Gas Fired power stations are extremely low under normal operation but can rise significantly when running on Fuel Oils at start-up or under abnormal conditions. To meet the measurement requirements laid out in International Standards such as the European Large Combustion Pant Directive (LCPD) and US-EPA PS11, Pro-Scatter Instruments are recommended. These systems incorporate a patented optical cell providing one of the largest sampling areas of any forward scatter device. A unique automated contamination check eliminates the need of critical moving parts within the instrument.
Pro-Scatter devices will measure dust loadings as low as 0.1 mg/m^3 and automatically logs instrument self checks (zero and span) to allow automatic calculation of statistical averages required by QAL3 (EN-13284-2).

gas turbines

The interspace between Primary and Secondary HEPPA Filters monitored by an approved (MCERTS, TUV) Electrodynamic Sensor

Modern gas turbines require high levels of protection against environmental particulate to ensure performance, longevity, and minimum maintenance. To achieve this, Fabric Filters are often used in conjunction with high efficiency HEPPA filters to provide high quality air to prevent fouling, erosion, and corrosion of the turbine.
The inter-space between these filters can be monitored by Electrodynamic probe-based sensors to identify leakage in the Primary filter and allow preventative maintenance measures to be undertaken before the Secondary HEPPA filter is blocked or damaged. Properly conditioned inlet air is critical to keep gas turbines operating at peak performance.



Pro-Scatter sensor incorporates a moveable flange to allow appropriate insertion into the gas steam

PCME instruments offer easy set-up/ interrogation of monitors either locally or remotely by either modubs /4-20mA outputs or via Ethernet, GSM & Web connectivity

Technology Choice	Approval Range (TUV BImschV 13 / MCERTS)	To Meet	Application
Dynamic Opacity	TUV (0/150mg/m^3) MCERTS (0/150mg/m^3)	National Standards for Quantitative Measurement	Electro-Filters (>20 mg/m^3)
Pro-Scatter	TUV (0/15mg/m^3)	LCPD / PS11 (US EPA)	Electro-Filters / Bag Houses
Electrodynamic	TUV (0/15mg/m^3) MCERTS (0-15mg/m^3)	LCPD	Bag Houses

Biomass power stations

Biomass power plant monitored by an
Electrodynamic Sensor and Filter Management System

Biomass power stations are rapidly becoming a Green alternative to traditional methods of electricity generation. This type of plant uses renewable fuel sources and often incorporates high efficiency Multi-Chamber Bag Houses as the prime source of filtration. As a result of the world-wide lowering of emission limits, these filters are also being employed on Coal Fired plant.

Bag Houses emit very low levels of particulate (typically single figure mg/m^3). To provide the most cost effective and technically appropriate monitoring solution, PCME has developed a range of patented, probe-based, Electrodynamic monitoring systems incorporating a non-contact, charge induction technique to accurately measure the particulate emissions from these types of filter.

These accredited systems (TUV and MCERTS) systems are easy to install requiring only single point mounting and no ancillary services such as purge air. Unlike traditional Tribo-electric systems these units are unaffected by probe contamination and are virtually free from the effects of changes in particulate velocity.

To provide the utmost confidence in the operation of the instrument, these advanced monitoring systems incorporate not only logged zero and span checks but also a unique patented secondary contamination ring which monitors any leakage currents or signals across the insulator thereby proving the measurement integrity of the sensor.

Patented probe contamination
check system

Filter management systems

Electrodynamic sensor mounted in chamber wall

Multi-chamber bag filters are becoming more and more common on modern power plants; regulatory demands reducing the amount of particulate emissions are resulting in their installation to both replace Electro-filters on existing sites and to provide the prime dust abatement solution in new applications.

The decision to install filter management systems to these filters is driven by the need to improve plant efficiency and in particular to ensure that the functionality of these filters can be controlled and maintained so they may operate at their optimum performance levels.

Employing Electrodynamic trending sensors in each compartment of a multi-chamber bag house allows plant operators to observe the ***real-time changes in base line emissions*** and to have ***instantaneous, plant wide access*** to the functionality of their filter systems.

These systems also allow the potential for total control and performance optimisation of the bag house.

Benefits include: -

- **Real-time leak detection by compartment or row**
- **Prediction of filter failure**
- **Reduction in compressed air usage**
- **Reduction of maintenance times/costs**
- **Potential for increased operational life of bag filter elements**

www.pcme.co.uk

PCME Ltd
Clearview Building 60 Edison Road
St. Ives Cambs UK PE27 3GH

Tel: Int +44 (0)1480 468200
Fax: Int +44 (0)1480 463400
E-mail: sales@pcme.co.uk

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