



filter management

# Particulate Monitoring for Incineration Processes

particulate emission monitoring

INCINERATORS

16 PARTICULATE  
Mg/m<sup>3</sup>  
047 CARBON  
MONOXIDE  
Mg/m<sup>3</sup>  
00 SMOKE  
%  
10 OXYGEN  
%  
928 SEC. OUTLET  
°C  
420 WASTE GAS  
°C

EN-14181

US-EPA



Particulate  
0-30mg/m<sup>3</sup>  
0-150mg/m<sup>3</sup>



BlmSchV 17 0-15mg/m<sup>3</sup>  
BlmSchV 13 0-150mg/m<sup>3</sup>  
BlmSchV 27 0-30mg/m<sup>3</sup>



Certificate No: 9389



# Particulate monitoring for

PCME provides a full range of particulate monitoring instruments for incineration processes. These include continuous emissions monitoring systems (CEMS) fitted to EN-14181 and other regulatory requirements for incineration and cremation plant fitted with no abatement and dry scrubbing. Ensuring flow of activated carbon and limestone are being added appropriately to processes for gas reduction purposes.

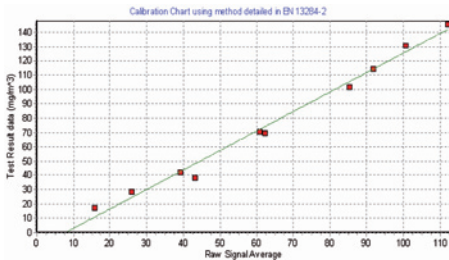
PCME's instruments provide a robust solution for plant operators of the following incineration plant:

- **Municipal waste incineration**
- **Co-Incineration processes falling under WID**
- **Chemical and industrial waste incineration**

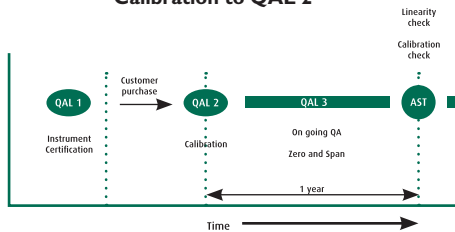
## Robust solutions to EN-14181 (13284-2)

### Compliance measurement

Incineration processes falling under the European Waste Incineration Directive must operate continuous monitoring instruments to ensure emissions are below defined emission limits (ELVs) within defined uncertainty. EN-14181 is the standard which defines Quality Assurance Levels (QAL1, QAL2, QAL3) to ensure measurements are made with defined uncertainty at the ELV. EN-13284-2 is derived from EN-14181 and is the specific standard for the quality assurance of Automatic Monitoring Systems (AMS) for Particulate.



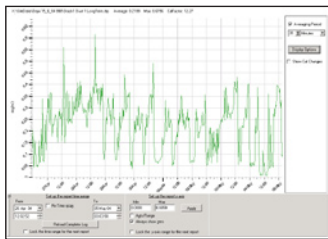
Calibration to QAL 2



Issues satisfied when used to meet EN-13284-2

QAL2 calibration procedures requires 15 sampling points over 3 days or 5 points over 3 days if emissions lower than 30% of ELV. For non-WID processes, regulators often encourage three sample points.

Instruments include automatic zero and span checks to ensure any drift in instrument performance is detected and therefore that instrument results are not compromised. These checks meet MCERTS and TUV requirements and are supplemented in certain products with statistical analysis to meet the specific additional requirements of QAL3 according to EN-13284-2.



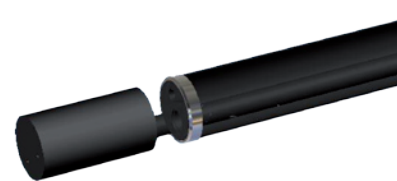
Results from Municipal Incinerator with Carbon and Limestone Dry Scrubbing

Optional reference material are provided for users required to audit instruments according to the Annual Surveillance Test (AST) as defined in EN-13284-2.

Instruments can be supplied as stand alone modbus compatible sensors which permits cost-effective integration into wider CEMS systems or provided with an integral control and recording module. This permits recording of emissions and instrument data. Half hour average, daily and QAL3 (zero and span) results are automatically analysed and reported according to EN-13284-2 requirements.

### Light scatter particulate monitoring

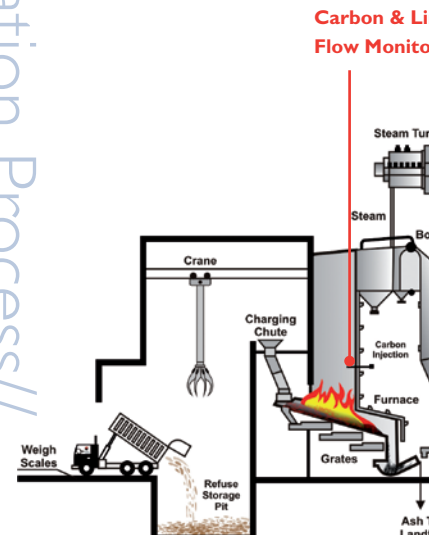
PCME's light scatter instruments were specifically designed with a range of features to minimise ongoing costs and time. The instrument has an extended measurement volume to ensure accurate measurements and unlike some other light scatter instruments, has a changing the measurement principal of the instrument. This means that problems can really be detected early on and the interpretation of results in the respect of all regulatory bodies interpretation.



The instrument has no moving parts in the detection chamber and can be supplied to operate at temperatures exceeding 1000°C.

For guidance on which measurement technique is most suitable, please consult with PCME.

## Incineration Process



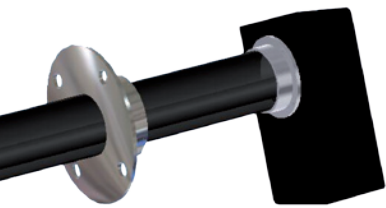
# for incineration processes

PCME monitors with special focus on processes falling under the European Waste Incineration Directive (WID) requiring solutions for monitoring systems with bagfilters. PCME also provide process control instruments suitable for reducing emissions from bagfilters and

**Industrial waste incineration • Medical waste incineration • Sewage sludge incineration • Cremation**

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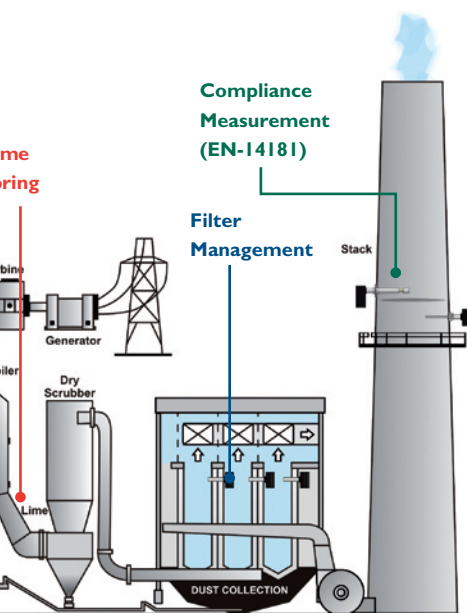
fully developed to satisfy EN-14181 having a full range of options for operation to this standard. The instrument provides a representative measurement across the stack with automatic span checks which operate without the need for manual intervention. This has the real benefit that instrument maintenance and QAL3 tests are fully compliant to EN-14181 in



**LMS181 Light Scatter Sensor**

factor module, increasing instrument reliability and operating temperature up to 400°C.

should be used in a particular applications, please



## Electrodynamic particulate monitoring

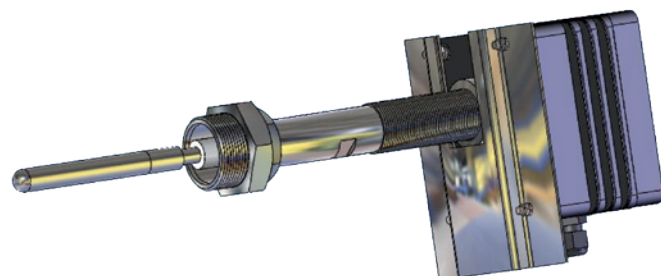
For incinerators controlled by bagfilters, the DT991 provides a pragmatic solution to EN-14181. The instrument has sufficient resolution to effectively monitor particulate emissions even when the particulate loadings are abated to below 0.1mg/m<sup>3</sup>. This means the instrument can be used to satisfy regulatory requirements, but can also effectively monitor the dust profile during the cleaning of the bagfilter and assist maintenance personnel diagnose bag failure. The instruments include the quality assurance features (including recording of QAL3 results) as required by EN-14181.



**DT990 Cremation Installation**

For incinerator plants operated outside Europe and those not falling under EN-14181, the DT990 and DT270/770, provide accurate measurement as required by TUV BImSchV 17. PCME has extensive application experience with these instruments used after bagfilters on incineration plant gained over ten years.

For cremation applications, Electrodynamic sensors with ultra high temperature options are capable of operating at temperatures above 1000°C and provide a reliable method of monitoring particulate concentration, flow rate (for ensuring adequate residence time in the combustion chamber) and total particulate emissions. These instruments overcome the reliability and resolution problems of historical opacity instruments.



**DT990 High Temperature Electrodynamic Sensor (up to 1000°C)**



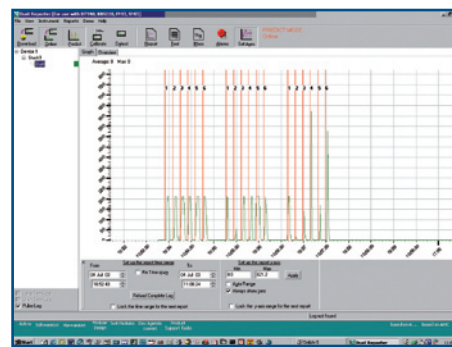
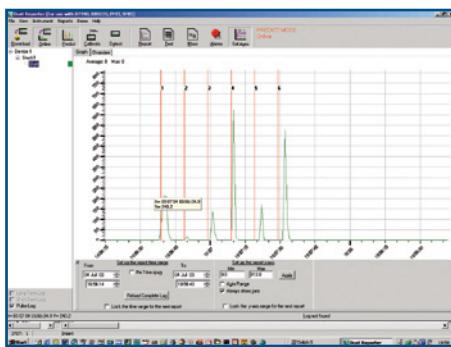
# Emission reductions through effective abatement equipment control

## Filter Management

Large bagfilter systems are used to abate particulate from many modern incineration processes due to their high collection efficiency and overcoming the problems of effluent disposal associated with wet collection systems. Since bagfilters are no different than other process plant, it is important to ensure the plant is always operating at optimum conditions to ensure particulate emissions are minimised. PCME provides a number of solutions to help plant operators obtain this optimal performance:

- A multi-compartment broken bag system, capable of monitoring the emissions from each bag compartment and indicating and isolating the location of a compartment in which a bag failure has occurred
- A 'prediction' system for associating the dust peaks caused by bag cleaning to the cleaning cycle of the bagfilter, enabling the location of failing bag rows to be anticipated and diagnosed
- An integrated bag cleaning and monitoring system, controlling the cleaning of the bagfilter to minimise emissions by not 'overcleaning', linked to pressure drop and emissions data for bagfilter optimisation.

PCME provides the software and hardware integration services to ensure that these improvements are fully integrated into the existing plant control systems



Real time identification of bag row deterioration

## Activated carbon and lime flow monitoring

The injection of activated carbon and limestone into an incinerator can play an integral method of controlling Dioxin and HCl emissions from many incinerators especially those burning PVC waste as found in Hospital and Municipal incinerators. PCME provides instruments capable of monitoring and reporting the flowrate of these powdered materials into the incinerator. These provide alarms when flow-rates fall outside a pre-determined range. PCME has two alternative approaches to powder flow monitoring to ensure reliable operation even in an aggressive plant environment:

- Measurement of flow trends and blockages using a non-intrusive Electrodynamics sensor installed in the pneumatic handling line feeding the powder
- Deriving flow rate from measurement in changes in weight of the powder feeder

The flow sensor can be applied to limestone flow lines while the flow rate monitor be applied to both activated carbon and limestone flow.



Installation monitoring and reporting the flow rate of powdered materials

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