Advanced Instrumentation for Improved Plant Operation

Headquarters in Germany
Privately Held
PROMECON USA Inc.
Sales & Service in North America
On-line Real Time UBC Measurement

Optimize mill/boiler performance
Accurate (+/- 0.6 percentage points)
Certified ash for sale in Europe
Minimal maintenance & calibration (1 moving part)
Easy installation & operation
Dependable with high market share
Over 160 sensors operating worldwide
Improves consistency of fly ash & sales
Many advantages over extractive systems
Efficiency Optimization Principle

Minimize energy losses from unburned carbon & flue gas -- function of excess air levels

[Graph showing the relationship between excess air, losses, UBC, optimum, and flue gas]
Dielectric constant of fly ash is a function of the carbon content. Measuring the shift of frequency (microwave) in a resonator ($\Delta f$) enables the carbon content to be calculated.

$$\text{UBC} = A + B \cdot \Delta f$$

A and B are the calibration coefficients.
MECONTROL UBC Design

Measurement Cabinet  | Sensor box  | Sensor

- Power supply
- Signals
- HF-signals (Microwaves)
- Power supply Motor
Particle Size Analysis (PSA)
Particle Size Analysis (PSA)
# Technical Data:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range:</td>
<td>Particle Size 30 - 6000 µm, Velocity 0.01 - 50 m/s</td>
</tr>
<tr>
<td>Materials</td>
<td>316L SS for In-line probe, Sapphire, epoxy resin optics</td>
</tr>
<tr>
<td>Pressure-cast aluminium for</td>
<td>electronics enclosure</td>
</tr>
<tr>
<td>Data rate:</td>
<td>Up to 10,000 particles per second, dependent on process conditions</td>
</tr>
<tr>
<td>Max Operating Pressure</td>
<td>4 bar</td>
</tr>
<tr>
<td>Operating Temp</td>
<td>-20°C to 130°C at measuring point, -10°C to 60°C on housing</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Tube length = 280 mm (11 in), Tube diameter = 25 mm (1 in)</td>
</tr>
<tr>
<td>Air Supply</td>
<td>adjustable air flow meters, Pulse flow with adjustable timer or continuous air, Flow Requires instrument grade compressed air</td>
</tr>
<tr>
<td>Maximum cable length:</td>
<td>100 m</td>
</tr>
</tbody>
</table>
Particle Size Analysis (PSA)
Test Data: PS Reuter West, Berlin
Air Flow System Specifics

Time of flight (no pressure or temperature)
No calibration, no pressure drop
Very small amount of particulate required (1-2 mg/Nm3)
Solid stainless steel sensor rods, on-line installation
Average velocity over sensor length
Accurate (within 2%)
No influence from fouling & erosion
Each measurement requires 2 sensors 14” apart
Much less inflow length (2-3 diameters)
Pressure correlation sensors for clean air (FD fan)
**MECONTROL Air/FG**

**Measurement Principle**

Air Duct or Pipe

Sensor 1: \( X(t) \)

Sensor 2: \( Y(t) = X(t-T) \)

\( S = \text{const.} \)

**Example**

- \( S = 54 \text{ cm} \)
- \( T = 26 \text{ ms} \)
- \( w = 20.8 \text{ m/s} \) (average velocity of the air !)

**Signal Sensor 1**

**Signal Sensor 2**

**“Signature”**

**Correlation**

**Optimum of correlation**

\( T = 26 \text{ ms} \)

**Cross correlation**
Contact Information

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