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POWDER, COAL PARTICLE SIZE DISTRIBUTION MONITORING SYSTEM



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PROCESS

POWdER is the system designed by Loccioni research@environment able to monitor fineness of coal powder flowing within feeding ducts of a coal-fired power plant.

POWdER uses the innovative and non intrusive Acoustic Emissions technique to evaluate coal particle size distribution.

POWDER

COAL PARTICLE SIZE DISTRIBUTION MONITORING SYSTEM

POWdER can “listen to” the acoustic emissions (AE) produced by the coal powder while hitting against the walls of feeding ducts, providing percentage values of three different classes of coal granulometry:

- > 50 mesh for particle size greater than 300µm
- > 100 mesh for particle size greater than 150 µm
- > 200 mesh for particle size lower than 75 µm

POWdER is essentially made by a control unit and one or more acquisition units:

- > **Control unit** processes signals sent by the acquisition units, evaluates and stores fineness data
- > **Acquisition unit** is made by an AE sensor and an RTD with a junction box. Sensors are mounted on the wear plate by means of a magnetic base

FEATURES

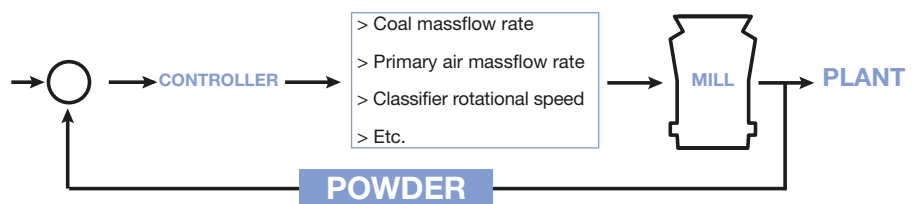
- > **Non intrusive and easy to install**
the system is placed directly on the wear plate in front of boiler burners by means of magnetic clamps
- > **Real-time**
measurements available in few minutes.
- > **Online**
the system can be easily interfaced with plant control panel
- > **Minimum maintenance**
only few maintenance checks, since the system is non intrusive and it does not involve moving parts
- > **User-friendly graphic interface**
user is easily driven through all the possible operation, from system calibration to automatic cycle
- > **ATEX compliant**
acquisition units are ready to work in ATEX zone 2

BENEFITS

- > Feedback on grinding mills performances
- > Burner monitoring, in order to prevent mass blockages and over-temperatures
- > Possibility to optimize coal granulometry according to both emission requirements and combustion efficiency
- > Unburned carbon in fly ashes reduction
- > CO emission reduction
- > Slurries reduction
- > Coal specific consumption reduction
- > Production unbalances prevention



1. POWdER sensor bases



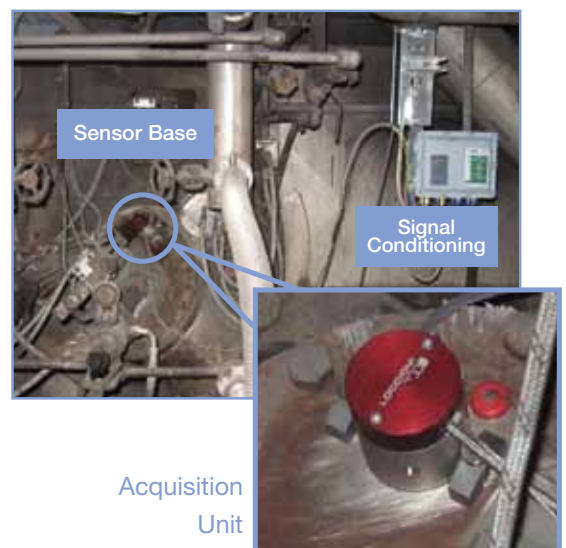
2. Feedback on grinding mill

SAFE AREA



Control Unit

ATEX ZONE 2



Acquisition Unit

3. POWdER typical layout

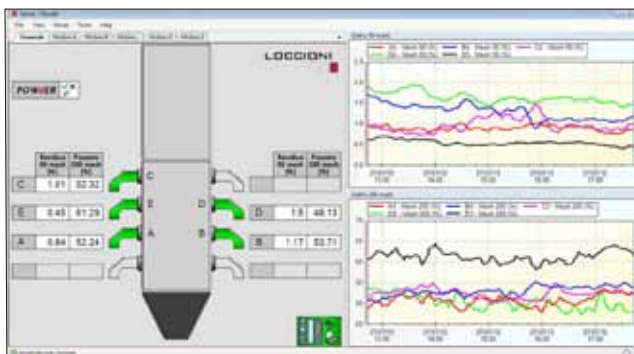
MAIN CHARACTERISTICS

MEASURING

Principle	Acoustic Emissions
Measured parameters	3 coal size thresholds %: 50 mesh, 100 mesh, 200 mesh Wear plate temperature Mass blockage detection Coal massflow unbalances
Granulometry Range	To be set on demand (virtually from 0% to 100% for each threshold)
Measurement Frequency	~1 min for each measuring point
Accuracy	Depending on the measuring range 50 mesh: from 0.2% to 0.5% relative error 100 mesh: from 3% to 5% relative error 200 mesh: from 5% to 10% relative error
Carbon type	Independent
Calibration	Time required approximately 3 weeks

BASIC CONFIGURATION

System components	1 Control unit <ul style="list-style-type: none"> > PC > Acquisition and communication boards > Power supply > Cooling system 4 Acquisition units <ul style="list-style-type: none"> > Acoustic emission sensor > Temperature sensor > Sensor base > Junction box
Output	4 - 20 mA, Modbus, OPC
Connectivity	USB, ethernet, optical fiber



4-5. Data acquisition software

We transform data into value