



**Breen Probe - ADM**  
**On-line Detection and Measurement**  
**Acid Dew Point**



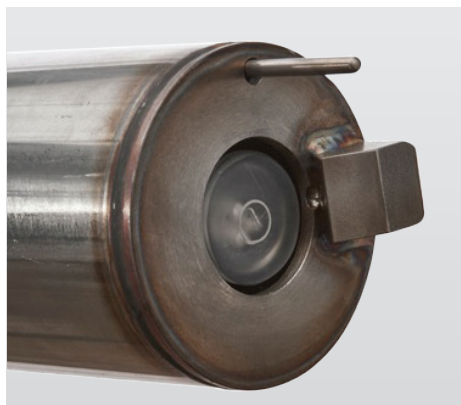
MISSISSIPPI®  
LIME

Discovering what's possible with calcium

# Acid Dew Point On-Line Detection and Measurement

## ACID DEW POINT

The direct measurement of the process gas dew point provides plant and process operations with information that would otherwise be a multi-variable equilibrium problem that is neither elementary, nor precise. Breen Probe technology removes the guess work and provides realtime feed back for control of process gas temperatures.



**Breen Probe**

## Direct Measurement of Acid Dew Point

The Breen Probe, includes a detection tip, electronic and pneumatic controls for 24/7 operation, with a full range of outputs for integration into the plant process control system.

## Targeted Application

The Breen Probe – ADM is ideally suited for all industrial applications within the operating temperature range. Applications include, Fired Heater-APH inlet and outlet, FCCU-CO boiler SCR outlet and downstream gases, black liquor recovery boilers and other corrosive flue gas applications.

Unlike traditional Acid Dew Point Meters, the Breen Probe-ADM measures the dew point of combustion and process gases, independent of the condensable species (i.e. dew points of ammonium bisulfate, sodium bisulfate, sulfuric acid, water, etc.) and hence would be applicable for a wide variety of corrosion and fouling applications.

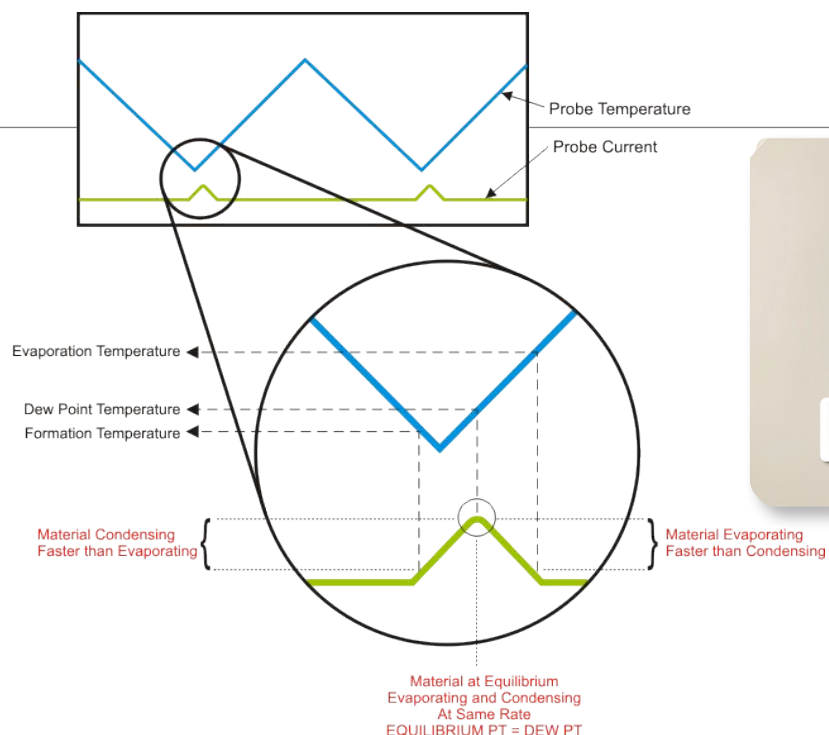
## The Breen Kinetic Measurement Algorithm

The Breen Probe – ADM condensables dew point measurement device measures conduction across a uniquely constructed probe surface resulting from condensed acid below its dew point. The condensables measurement technique and probe designs are described in United States Patent No. 6,677,765 and 8,256,267 and other foreign patents.

The detection process consists of cooling the initially hot detector surface by controlled application of cooling air. The descent rate is tightly controlled to allow continuous monitoring of condensate conditions on the probe tip. The presence of a condensed liquid phase is determined by the resistance between two electrodes. When current is detected, the kinetic dew-point [or formation] temperature has been reached.

Following detection of condensate, the cooling gas is removed and the probe is allowed to return to localized gas temperature. As the probe heats, the instantaneous current is measured and reported back to the controller. When the liquid evaporation temperature is reached [detected by a rapid decrease in probe surface current], the process has completed and a new measurement cycle is initiated.

For sulfuric acid processes, we offer the Breen SA Probe. This probe was specifically developed for this challenging environment. It detects moisture leaks and provides a periodic measurement of sulfuric acid dew point. Please see product brochure number PDS103.



## Specifications

### Measurement Specifications

Dew Point Range	180 to 650 °F (82 to 343C)
Accuracy	Within +/- 1 degF of operating range <sup>1</sup>

### Environmental Specifications

Probe	Process wetted materials 304 SS, Pyrex <sup>2</sup>
Max Process Temp	900 °F (482C)
Probe Terminations	-20 to 356 °F (-29 to 190C)

### Installation Specifications

Insertion Depth	60" (1524 mm)/84" (2134 mm)/132" (3353 mm) +/- 0.75" (19 mm)
Probe Mounting Range	Vertical or Horizontal mounting, 4" (101.6mm) class 150 size flange, 9" (228.6mm) O.D. X 0.5" (12.7mm) thick, with a 7-1/2" (190.5mm) dia. Bolt circle. <sup>3</sup>
Air Requirement	75psi (5.17 Bar) @ 25 SCFM (708 l/min) Clean dry instrument air

### Control Cabinet

Ambient Temp Limits	32 to 122 °F (0 to 50C)
Electrical Requirement	120/240 VAC 50/60Hz, 20 Amp, 300 Watt dedicated circuit with fuse or circuit breaker protection hardwired to EPCC.
Analog Outputs	Four 4-20 mA signals
Modbus	31 data points via Ethernet or Serial (232/485)
Alarm Relays	Pressure Relay: SPDT rated 10A, 120V AC/240V AC Power Relay: PDT rated 10A, 250V AC/DC
Probe Cable (supplied by Breen)	3 twisted pair conductors, 20 ga shielded cable to connect Type R TC, Type J TC & Probe Current
Heater Cable	3 conductor 14 ga cable; Type K thermocouple

<sup>1</sup> Sensor is calibrated to a NIST Traceable thermocouple which is accurate within +/- 1 degF of operating range. NIST Certificate available upon request.

<sup>2</sup> 316 SS available by special order

<sup>3</sup> Flanges are flat faced and are for mounting only. Flanges are not pressure rates. A 4" minimum diameter hole is required into the process. Adapter flanges are available to mate to existing larger size flanges.

## APPLICATIONS

- Refining and Petrochemical
  - FCCU - CO Boiler SCR
  - Fired Heater Air Pre Heater (APH) Protection
  - Cold End Corrosion and Fouling protection
  - Blue Plume
  - Cold End Corrosion
  - AbS Fouling
- Pulp and Paper
  - Bark Fired Boiler and Recovery Boiler Cold End Corrosion and Fouling
- RTO's and Biomass
- Metals and Mining
  - Copper Smelters
    - Weak Acid Production
    - Control of Sulfation Air
  - Gas Turbines Combined Cycle
    - HRSG Flue Gas Dew Point

## Flue Gas Treatment

Mississippi Lime Company (MLC) is a leading global supplier of high-calcium lime products and technical solutions. With over a century in business, the company has built a reputation on the purity of its products, commitment to research and development, and a tradition of customer satisfaction.

For industrial facilities that are legislated to reduce SO<sub>2</sub>, SO<sub>3</sub>, HCl or other emissions, The Mississippi Lime Flue Gas Treatment Product line offers calcium-based sorbents that target and mitigate these pollutants.

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[www.aciddewpoint.com](http://www.aciddewpoint.com)

PDS101



Breen, a Mississippi Lime FGT Business Unit Company



Discovering what's possible with calcium