



Acid Dewpoint
On-Line Detection and
Measurement

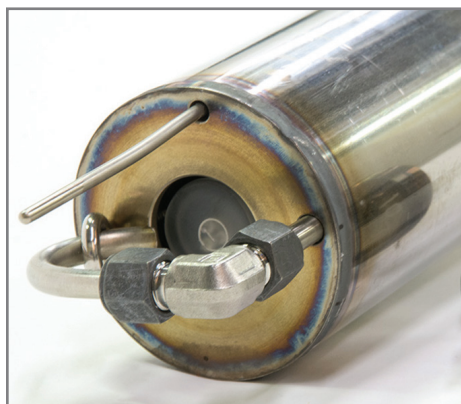


Acid Dewpoint On-Line Detection and Measurement

WHAT IS ACID DEW POINT?

The traditional Acid Dew point of a gas is the temperature, at a given pressure, at which sulfuric acid in the gas phase will condense.

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



AbSensor-ADM

Direct Measurement of Acid Dewpoint

The Breen AbSensor consists of a Probe, with 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. The principle of operation is described below.

Targeted Application

The AbSensor – 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, copper smelters and other corrosive flue gas applications.

The AbSensor - ADM is designed for low dust applications and dewpoint of acid condensables below 350°F. For high dust applications like coal fired power plants with potential higher temperature condensables such as Ammonium Bisulfate or Sodium Bisulfate the Breen AbSensor AbS/SO₃ is recommended.

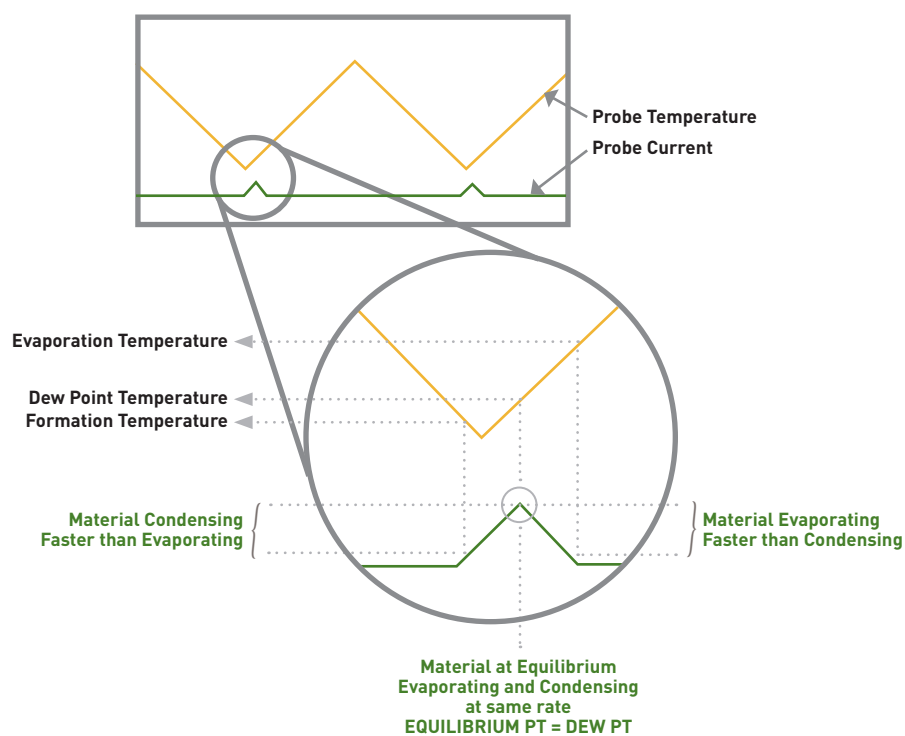
Unlike traditional Acid Dew Point Meters, the AbSensor-ADM measures the dewpoint of combustion and process gases, independent of the condensable species and hence would be applicable for a wide variety of corrosion and fouling applications.

The Breen Kinetic Measurement Algorithm

The AbSensor – ADM condensables dewpoint 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.



Standard specifications

Measurement Parameters Range Units

Acid Dew point Temperature 80 - 750 °F Displayed in °F (°C optionally available)

Flue Gas Temperature 32 - 800 °F Displayed in °F (°C optionally available)

Accuracy 2.7 °F or 0.25% dew point temperature

Resolution 0.1 °F

Cabinet Cabinet Rating NEMA 4

Outputs

4-20 mA 1 Acid Dew point (optional up to 4)

RS485 MODBUS

Electrical

120 VAC 50/60 Hz Critical Power 300 VA 240 VAC optionally available

Air Requirements

Instrument Quality Air 22.5 CFM @ 40 to 60 PSIG

Ambient Conditions

Cabinet 0 to 120 °F

Flue Gas Temperature 750 °F Up to 800 °F intermittent with cooling. Not suitable for Wet Stack applications.

Process Connection

4" 150 lb 8-Bolt Flanged

Options

Z-Purge, Additional outputs, Ash Shield for particulate protection, port aspirator and others



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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
- 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
- Oil Fired Boilers
 - Control of Magnesium Injection
 - Cold End Average Temperature Control
- Steel Industry
 - Cold End Corrosion Control