

Dust Measurement in Reinforced Concrete Stacks

Reliable dust measurement despite local condensation



In reinforced concrete stacks, condensation can form where the dust sensor passes through the thick stack wall, interfering with measurement. Correct installation helps keep moisture away from the sensing probe and maintain reliable operation.



The Challenge

Reinforced concrete stacks are used in power generation and other industrial applications, and their thick walls can create a specific measurement challenge. Because concrete is a poor heat conductor, the sensor mounting point through the stack wall may be significantly cooler than the flue gas, allowing moisture to condense around the probe because of the local temperature difference.

This problem was encountered during installation of a Sintrol S305 on a coal-fired power plant stack in Asia. Inspection found moisture and wet dust around the sensor mounting point and on the probe. The RCC wall at the measurement point was approximately 500 mm thick.



The Solution

Sintrol developed a case-specific installation accessory that formed an airtight protective cage around the sensor probe through the thickness of the concrete wall. The arrangement isolated the probe from condensation forming in the cooler wall penetration while leaving the sensing section exposed to the flue-gas flow inside the stack.

The solution prevented local condensation from affecting the sensing probe, without the need for purge air. This allowed reliable particulate measurement to continue under the existing stack conditions.



Results

Reliable dust measurement maintained despite of local condensation.

The monitor operated reliably at a dust concentration of approximately 35-40 mg/m³, with the measurement signal not affected by droplets forming around the sensor mounting point.

- ➔ Local condensation prevented from interfering with the sensor probe
- ➔ No purge air required for the solution
- ➔ Stable particulate measurement at approximately 35-40 mg/m³
- ➔ Long-term operation in a 500 mm-thick reinforced concrete stack wall

Today's Sintrol solution

Official stack emissions measurement: S305QAL / S305QAL Ex is Sintrol's current QAL1-certified particulate stack monitor for official emissions measurement in combustion plants. It is certified according to EN 15267-3.

Dry-gas stacks with local condensation risk: Where condensation forms locally around the sensor mounting point, the installation design needs to prevent moisture from reaching the sensing probe. In this case, the challenge was solved with a purpose-built protective arrangement.

Wet or condensing flue gas: Where the flue gas itself is wet, condensing or below the dew point with water droplets, EXO QAL provides extractive optical particulate measurement. Its heated sampling probe conditions the sample above the water and acid dew points before measurement, removing the influence of moisture and liquid droplets.

Process and non-regulatory measurement: For stack or duct applications where QAL1-certified official emissions measurement is not required, S304 / S304 Ex provides continuous particulate measurement for process control and emissions monitoring.

How it works

S305QAL uses Sintrol's Inductive Electrification measurement principle. In RCC stacks, reliable measurement also depends on installation design, because local condensation at the mounting point must be kept away from the sensing probe. Where the flue gas itself is wet or condensing, EXO QAL uses an extractive measurement approach instead. A heated sampling probe extracts and conditions the gas sample above the water and acid dew points before particulate concentration is measured using optical forward-scattering technology.



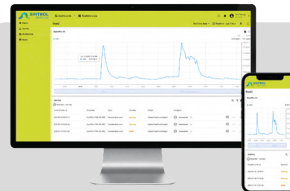
S305QAL / S305QAL Ex

Official emissions measurement



EXO QAL

Wet gas monitoring



DustCloud

Centralized access to trends and alerts