



Flue gas at
cement plant

Flue Gas Flow Measurement in Large Duct

Application Note Case Study ANCS009

To comply with local environmental regulations a major cement manufacturer needed to measure flue gas being discharged from the process.

Problem

The flue is a large, rectangular duct with gas temperatures that are very high temperature, up to 752 °F [400 °C]. The flue gas could be dirty. The ambient installation location is outdoors and continuously dusty. A previously tried single-point flow meter was inaccurate.

Flow Conditions

- Duct dimensions (I.D.): 71 " x 102 " [1,8m x 2,6m]
- Flow rate: 1,470 SCFM to 147,000 SCFM [2 500 NCMH to 250 000 NCMH]
- Temperature: 25 °C to 400 °C [77 °F to 752 °F]
- Pressure: 750 mm to 760 mm Hg (abs) 14.3 psig to 14.6 psig [~0,99 bar to 1,01 bar]
- Media composition: Air, 5 components; mole (volume) percentage
 - Sulfur dioxide (SO₂): 0.070 %
 - Nitrogen dioxide (NO₂): 0.040 %
 - Carbon monoxide (CO): 0.069 %
 - Oxygen: 0.002 %
 - Air: 99.819 %
- Straight run: Limited; 90 ° and 180 ° bends in duct runs

Solution

Install a multi-point averaging, constant power technology thermal flow meter suitable for high temperature service. The customer installed an FCI Model MT91 meter with a single mast probe with six (6) measurement points to give an averaged flow measurement across the rectangular duct. The MT91 probe assembly is 316L stainless steel and has a temperature service range up to 454 °C [850 °F]. The instrument is calibrated at actual installation conditions and includes extended temperature compensation.

FCI Model MT91-MxH

Benefits

- Achieve compliance with local environmental regulation for reporting flue gas emissions.
- No changes to flue design or duct work are required.
- MT91 proves to provide accurate reading of mass flow rate and totalized flow in the duct.
- Rugged packaging ensures long service life in extreme installation conditions.