

POWER GENERATION SECONDARY AIR FOR LOW NO_x BURNERS



*The Kurz K-Bar 2000B
Multi-Point Insertion
Mass Flow Meter system
replaces conventional
Venturi/Dp systems
to eliminate the pressure
loss and increase the
air flow capacity required for
proper operation
of Low NO_x burners*



complex technology
MADE SIMPLE

Power Generation: Coal Fired Boilers Secondary Air Flow for Low NOx Burners



Secondary Air Flow Overview

The need for accurate, repeatable & reliable combustion air measurements in power generation plants is critical to efficient operation and safety throughout the entire facility and processes. Accurate secondary air flow measurement to the burners is critical for maintaining the proper air to fuel ratio, resulting in more complete and stable combustion, better performance and lower emissions. Coal-fired power plant applications pose a number of challenges to obtaining these critical flow measurements including large ducts, limited metering runs, poor velocity and temperature profiles, vibration and high temperatures.



Customer Application and Performance Issues

A large EP&C firm in the Northeast had a contract to install Low Nox burners at a Coal Fired Power Plant in the Southeast. The Power Generating Station had two 650 Megawatt coal-fired boilers in operation. In order to help meet increasing electricity demands, the company planned an expansion that would add a third unit to the facility. However, environmental regulations required that the emissions from the existing plant be lowered before the new plant could be built. The first phase of expansion consisted of upgrading Unit 1 and 2 Boilers with Low NOx burners to reduce their emissions.

The challenge for the EP&C firm was that Low NOx burners need a higher air pressure/flow in order to operate effectively and achieve lower emissions. But in this application, the secondary air ducts were originally built with Venturi/Dp air flow measurement systems. The original Venturis were used to create a pressure drop which is then measured by a Dp transmitter to calculate the secondary air flow rate to the burners. Therefore, the EP&C firm needed to remove the Venturis so that the new Low NOx burners would have sufficient pressure/flow to operate properly. Once the Venturis were removed the EP&C firm had the challenge of finding a technology to measure the low pressure, low velocity and high temperature secondary air flow. The Kurz Thermal Mass flow metering system was the only technology that would operate in this application.

Benefits of the Kurz Solution

- *Virtually no pressure loss*
- *Reduced Emissions from proper Low NOx Burners performance*
- *Extremely Low Maintenance even Under Harsh Operating Conditions*
- *Accurate, Repeatable and Reliable readings in Low Velocity, High Turndown applications*

The Kurz Solution

The key to achieving Low NOx burner performance and lower emissions was to remove the Venturi/Dp system and install Kurz Multi-Point K-Bar 2000B Velocity Probes and Adam 155 Flow Computer/Transmitter measurement system. With the secondary air ducts measuring 13' high by 21' wide, each system consisted of (4) K-Bar 2000B Probes each with (4) velocity sensors to provide a (16) sensor velocity array, equally spaced across the duct, for a total of (16) velocity sensor readings.



Performance Results with the Kurz Solution

Due to the outstanding low velocity performance of the Kurz thermal mass sensors, the scope of the project was expanded to include Thermal Mass flow meter solutions for Main Primary Air and Tempering Air ducts along with the Primary Air to the mills, Auxiliary Air and the Seal Air on the Pulverizer Ball Mills. A total of 200 Kurz thermal mass flow sensors were installed throughout the entire facility.

As a result of the Kurz K-Bar 2000B Multi-Point System in this application, the plant was able to:

- Remove the Venturis and eliminate the system pressure drop
- Improve Measurement Accuracy, Repeatability, Turndown and confidence in the Air Flow Measurement
- Obtain the proper Air to Fuel Ratio required for proper operation of the Lo Nox burner
- Eliminate maintenance time required to keep the Venturi/Dp system operating properly
- Lower the plant emissions and pursue approval to build Unit 3



About Kurz Instruments

Kurz Instruments has maintained a reputation for designing and manufacturing Thermal Mass Flow Transmitters for industrial air and gas flow applications. For more than 30 years, our entire team has provided solutions to our customers most demanding and difficult applications. Kurz products are used in a wide variety of industrial applications including combustion air, aeration air flow and digester gas, nuclear power plants, pump protection, flare stack monitoring and compressed air, to name only a few.



TOP: The Venturi section of the secondary air duct

CENTER: The new duct section where the Venturis were removed to eliminate the pressure drop for proper operation of the Low Nox burners

BOTTOM: The Kurz K-Bar 2000B Probes installed at the base of the secondary air duct

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