AIRFLOW SCIENCES CORPORATION

The Airflow Update®

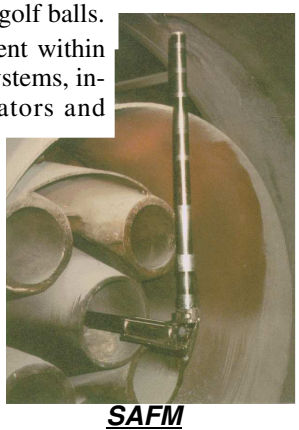
Spring 2001

Fabrication of Specialty Test Equipment

For 25 years Airflow Sciences has been developing specialized testing equipment for the power, food processing, automotive, and other industries. The range of applications is extreme:

- Flow visualization (video/photo) to analyze cereal production in a puffing tower
- Air velocity measurement to evaluate fresh egg pasturization.
- Extractive coal sampling and video flow visualization inside an operating coal pulverizer.
- Lab scale simulation of pet food drying.
- Online measurement of hot oil in a snack food fryer.
- Flow characterization of coffee roasters.
- Velocity measurement and lift/drag determination of rotating golf balls.
- Air flow assessment within particle capture systems, including precipitators and cyclones.

3-d velocity probe



SAFM
Secondary Air Flow Measurement

Airflow has recently expanded its machine shop and laboratory in order to provide additional capabilities to its customers. We will continue to offer laboratory and field testing services to solve your complex flow problems, but will now provide both standard and custom testing hardware for our clients who perform their own experimental testing.

In January 2001, Airflow Sciences delivered production versions of two of our most technically-advanced measurement devices for electric power plants:

Advanced Coal Flow Measurement (ACFM)
This high-tech particulate sampling system offers the power plant engineer an accurate, easy-to-operate measurement system.

Secondary Air Flow Measurement (SAFM)
A customized velocity probe that allows accurate characterization of burner air flow entering a boiler.

ACFM
Advanced Coal Flow Measurement

Laboratory scale pet food dryer

For further information on ASC's design and fabrication of testing equipment, visit our website at **www.airflowsciences.com.**

The Inside Story

Airflow is happy to announce the arrival of two new prospective engineers to the world. Sophia Franklin was born in October 2000. Sophia is the second child of proud parents Jeff and Jennifer. Abby Johnson, born in February 2001, is Rich and Lorraine's fourth child and the first Airflow baby of the "real" New Millennium.

On the business side, most of our current customers know how busy we have been for the past year. We are pleased to report that our office expansion was completed in January 2001, nearly doubling our office space. This complements our laboratory and machine shop expansion which was completed in October 2000. As we add several new staff members in the coming months, we will be poised to accommodate an increased level of flow modeling, field testing, and lab testing.

If you have any flow, heat transfer, or mass transfer issues you're dealing with, feel free to give us a call at 734-464-8900.

ASC Patented Flow Mixing Device Tested

Many industrial processes require controlled incoming flow temperatures in order to operate efficienty. ASC has examined a wide range of cases where two flow streams of different temperature merge. The resulting flow stream often contains significant temperature stratification which degrades the performance of downstream equipment. In some instances, this temperature stratification can also be a safety issue.

Coal pulverizers are designed to grind and dry wet coal to a fine powder prior to combustion in a furnace. Hot incoming air provides the thermal energy for drying and also the transport mechanism for coal size classification and delivery to the furnace. The inlet air temperature is controlled using a tempering air stream, as shown in Figure 1.

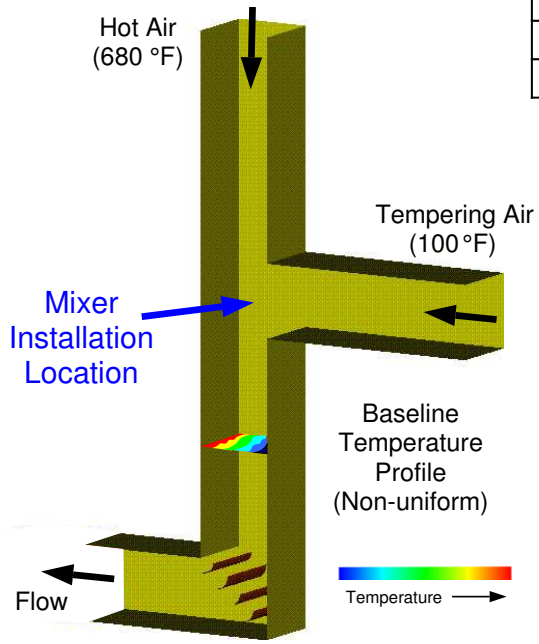


Figure 1. Typical pulverizer inlet ductwork.

Airflow Sciences designed a flow mixing device to optimally merge two streams and obtain a resultant stream of more uniform temperature. A key consideration was generating the mixing effect with minimal system pressure loss. ASC's design effort resulted in the issue of U.S. Patent Number 5,463,967.

The ASC mixer was designed using a computational fluid dynamics (CFD) model. The model helps optimize the mixer design for any specific duct system geometry.

Flow Temperature Stratification Before and After Mixing Device Installation		
Pulverizer Inlet Measurement	Before	After
Average Temperature	534 ˚F	573 ˚F
Minimum Temperature	512 ˚F	568 ˚F
Maximum Temperature	574 ˚F	581 ˚F
Maximum ΔT	58 ˚F	13 ˚F

Table 1. Flow Mixing Device Performance

The ASC mixer was recently installed in a pulverizer inlet duct at ATCO Power's Sheerness Station in Hanna, Alberta, Canada. Plant measurements prior to the installation indicated a large temperature deviation (58 ˚F) in the pulverizer inlet ductwork.

After installation of the ASC mixer, the temperature profile was re-measured. The temperature deviation was reduced considerably, to 13 ˚F, with the mixer in place. Results are shown in Table 1 and Figure 2. The additional pressure loss caused by the mixer was barely measureable at 0.1 inches of water.

If you have a process that requires controlled, uniform inlet flow, give us a call to discuss the applicability of the ASC mixer.

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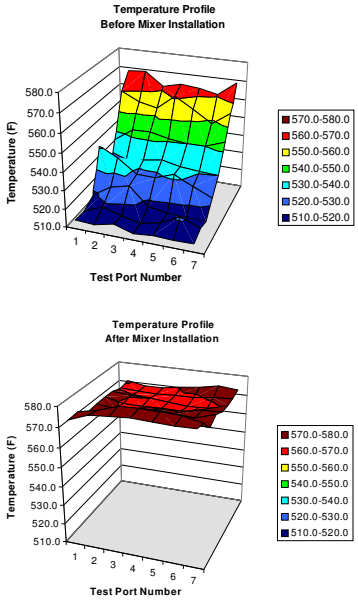

Figure 2. Measured mixer performance at Sheerness.

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