New Test Standard for Dilution Blowers

How AMCA Standard 260-07 quantifies discharge performance

For reasons of safety and health, not to mention litigation, consulting and facility engineers have long insisted on independent performance verification for fans and blowers used in general HVAC, as well as more critical applications. With their unique discharge design, however, high plume dilution blowers — used to dilute hazardous laboratory exhaust and disperse it high into the atmosphere, away from possible re-entrainment zones — fell outside the scope of Air Movement and Control Association (AMCA) International performance certification. That changed with the recent publication of AMCA Standard 260-07, *Laboratory Methods of Testing Induced Flow Fans for Rating.*

This article will discuss the basis of this new standard.

Entrained-Air Testing

The most reliable way to verify high--plume dilution blower performance is with an industry-accepted test of entrained air performed by an independent third party in an accredited (certified) laboratory. ANSI/AMCA Standard 210-99, *Laboratory Methods of Testing Fans for Aerodynamic Performance Rating*, describes two fan-test arrangements that can be used in determining the flow of entrained air through a high-plume dilution blower's wind band:

- Free inlet, ducted outlet, variable-exhaust system, used to measure fan discharge airflow.
- Free outlet, ducted inlet, variable-supply system, used to measure fan inlet airflow

Fan discharge airflow minus fan inlet airflow equals the entrained airflow through a blower's wind band, assuming both tests are performed under the same conditions.

Total outlet discharge flow is the sum of fan flow (exhaust from a laboratory) and entrained dilution airflow (Figure 1). With high-plume dilution blower assemblies designed to be installed on rooftops and discharge to the atmosphere, where static pressure is zero, total outlet discharge flow is measured by maintaining "back pressure" at the wind band exit of a dilution blower at zero using an adjustable-performance fan (variable-exhaust system) on the leaving or exit side of an airflow measuring chamber (Figure 2).

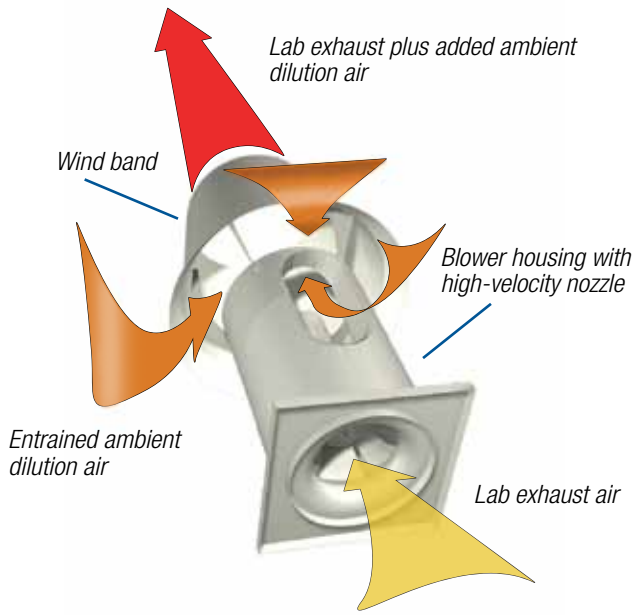

Figure 1. Inline mixed flow high plume dilution blower.

Photo A shows the measurement of the total flow leaving a single-width, single-inlet centrifugal high plume dilution blower. The blower is mounted on the inlet of a test chamber.

(AMCA Standard 260 includes a "variable-resistance box," or "throttling device," on the fan inlet for the fan-discharge-airflow test. This allows discharge performance to be determined at various exhaust system static pressures.)

Figure 3 illustrates the measurement of exhaust airflow from a high plume dilution blower mounted on the outlet of a test chamber. With a variable-supply system, static pressure at the fan inlet upstream of the dilution blower inlet is maintained at zero (free inlet).

Photo B shows a single-width, single-inlet centrifugal high-plume dilution blower mounted on the outlet of a test chamber.

Photo C shows a variable supply and exhaust system.

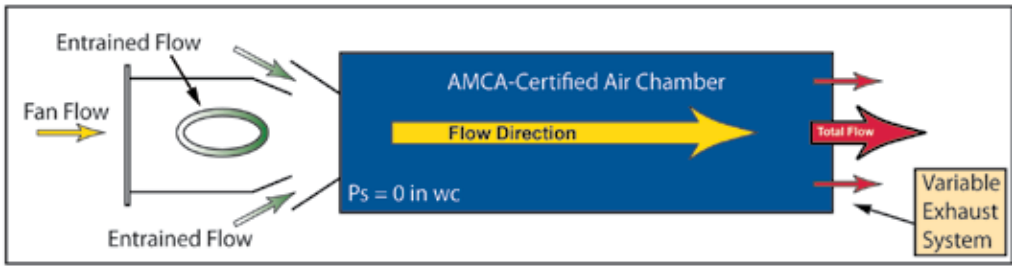

Figure 2: Measuring dilution blower outlet airflow using ANSI/AMCA Standard 210-99.

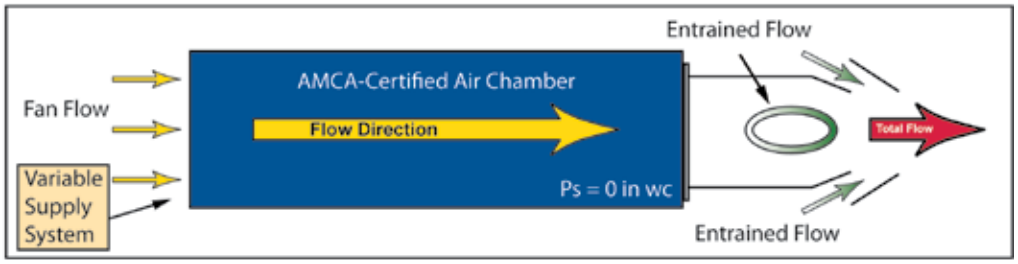

Figure 3. Measuring dilution blower inlet airflow using ANSI/AMCA Standard 210-99.

Conclusion

With AMCA Standard 260-07, specifying, consulting, and facility engineers finally can take advantage of AMCA-verified performance testing for high plume dilution blowers.

Photo A. High plume dilution blower mounted on the inlet of a test chamber in Greenheck's AMCA-accredited laboratory.

Photo B. High plume dilution blower mounted on the outlet of a test chamber in Greenheck's AMCA-accredited laboratory.

Photo C. Variable-supply and exhaust system used in an ANSI/AMCA Standard 210-99 test.