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Codes and Standards
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PRODUCT APPLICATION GUIDE
A technical bulletin for engineers, contractors and students in the air movement and control industry.

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, induced flow fans (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 induced flow fan 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 an induced flow fan's windband:

- Free inlet, free outlet, variable-exhaust system, used to measure fan discharge airflow.
- Free outlet, free 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 windband, assuming both tests are performed under the same conditions.

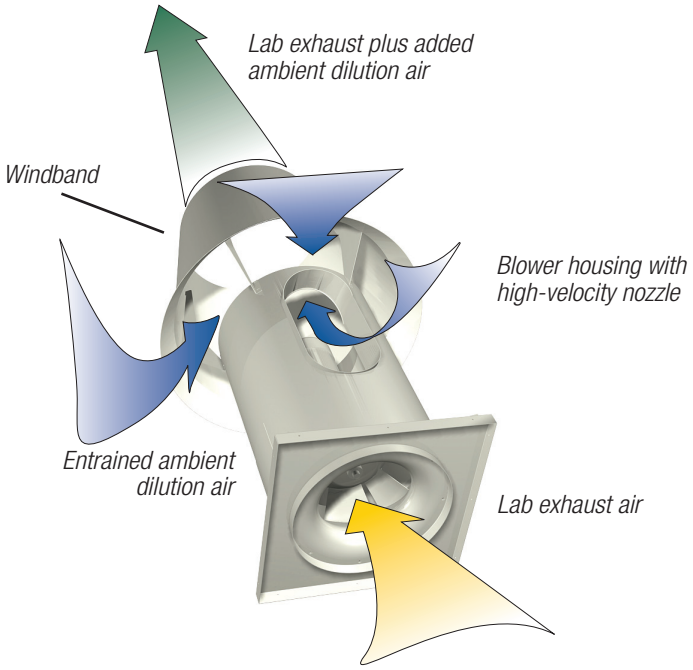

Figure 1. Inline mixed flow induced flow fan.

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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 windband exit of an induced flow fan at zero using an adjustable-performance fan (variable-exhaust system) on the leaving or exit side of an airflow measuring chamber (Figure 2).

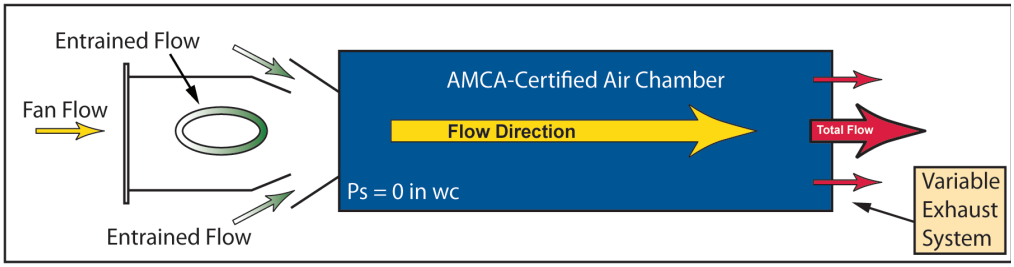

Figure 2: Measuring induced flow fan outlet airflow using ANSI/AMCA Standard 210-99.

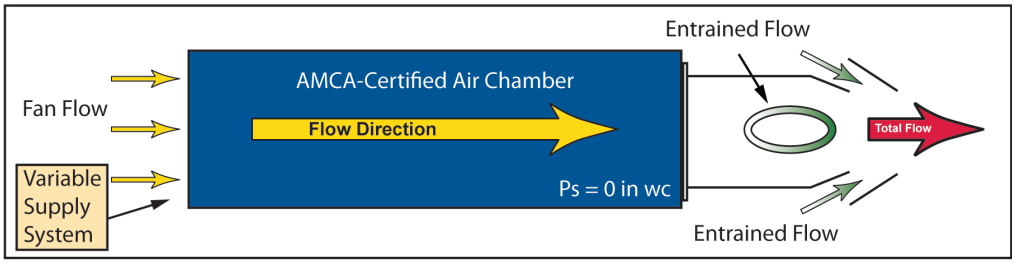

Figure 3. Measuring induced flow fan inlet airflow using ANSI/AMCA Standard 210-99.

Figure 3 illustrates the measurement of lab exhaust airflow into an induced flow fan 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).

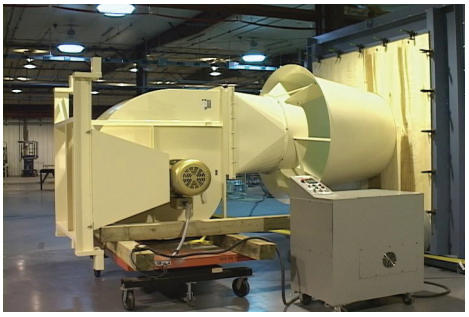

*Photo A. Induced flow fan mounted on the inlet of a test chamber in Greenheck's AMCA-accredited air chamber.**

*Photo B. Induced flow fan mounted on the outlet of a test chamber in Greenheck's AMCA-accredited air chamber.**

Photo A shows the measurement of the total flow leaving a single-width, single-inlet centrifugal induced flow fan. 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.)

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

Photo B shows a single-width, single-inlet centrifugal induced flow fan mounted on the outlet of a test chamber. Photo C shows a variable supply and exhaust system.

Conclusion

With AMCA Standard 260-07, specifying, consulting, and facility engineers finally can take advantage of AMCA-verified performance testing for induced flow fans.

** Product performance data, based on tests in an AMCA Accredited Laboratory, are not to be construed as being licensed to bear the AMCA Seal.*