Interpretation IC 51-1999-1 of
ANSI/ASHRAE Standard 51-1999/AMCA Standard 210-1999
Laboratory Methods for Testing Fans for Aerodynamic Performance Rating

February 18, 2000

Request from: Mr. Prasad Bhatt, Cert-Aire Technical Services, Ltd., 1288 Industrial Drive, Lake in the Hills, IL 60102

Reference: This request refers to ANSI/ ASHRAE 51-1999/AMCA 210-1999, Sub-clause 6.3.3

Background: The second paragraph of 6.3.3 reads:

"When a measuring plane is located downstream of the settling means, the settling means is provided to insure a substantially uniform flow ahead of the measuring plane. In this case, the maximum velocity at a distance 0.1M downstream of the screen shall not exceed the average velocity by more than 25% unless the maximum velocity is less than 400 feet per minute."

Interpretation No. 1: Requestor's letter opines that this check is required at the design airflow (400 fpm x cross sectional area of the chamber) rating of the chamber.

Question No. 1: Is Interpretation No. 1 correct?

Answer: No.

Comment: The requirement must be met at all airflows used during the test.

Interpretation No. 2: Requestor's letter opines that this check is not required at intermediate air quantities if the check passes at the design airflow rating of the chamber.

Question No.2: Is Interpretation No. 2 correct?

Answer: No.

Comment: The check is required at all airflows used during the test.

Question No. 3: If the answer to Question No. 2 is NO and intermediate air quantity check is required, must more than one combination of nozzles be checked?

Answer: Yes.

Comment: Any combination of nozzles used during the test must be checked.

Interpretation No. 3: Requestor's letter opines that 30 points spaced in accordance with the log Tchebycheff rule for rectangular ducts (1993 ASHRAE Handbook, Figure 6, page 13.15) is adequate for this check.

Question No. 4: Is Interpretation No. 3 correct?

Answer: Yes.

Interpretation No. 4: Requestor's letter opines that an Electronic Air Velocity Indicator with an accuracy of ±3% (of reading) or ±10 fpm, whichever is greater, meets the requirements of this standard.

Question No. 5: Is interpretation No.4 correct?

Answer: Provided calibration records are in order.

Interpretation No. 5: Requestor's letter states that the local velocity at each point in the measurement fluctuates and opines that the velocity to be recorded is the average velocity, not the maximum velocity.

Question No. 6: Is Interpretation No.5 correct?

Answer: Yes.

Comment: All local velocities have to be averaged in time as described in 6.2.1.2 of the standard.

Interpretation No. 6: Requestor's letter opines that the check is done with the control fan only (without a test fan).

Question No. 7: Is Interpretation No. 6 correct?

Answer: No.

Comment: The requirements must be met with the test fan operating. The control fan may or may not be operating.

Interpretation No. 7: Requestor's letter opines that the average velocity in 6.3.3 is that calculated by $V\ (fpm) = Q\ (cfm) / A\ (cross\ sectional\ area\ of\ chamber,\ ft^2)$

Question No. 8: Is Interpretation No.7 correct?

Answer: Yes.

General Comment: The standard is written to cover the requirements for a test. Since a test must cover a range of airflow rates, any requirement predicated on airflow rate, such as average velocity

or maximum velocity, must be met for the full range of airflow rates. For instance, if there are eight determinations made during a test, the requirement must be satisfied for each determination. Any test utilizing equipment based on Figures 9, 10, 11 or 15 must meet the requirements of the paragraph cited in this interpretation at any and all airflow rates being measured. There is no single design airflow rate for the apparatus according to this standard. The maximum velocity referred to in sub-clause 6.3.3 is the maximum of the various readings across the face of the settling means during a determination.