

AMCA Standard 803-02 (R2008)

Industrial Process Power Generation Fans: Site Performance Test Standard



**AIR MOVEMENT AND CONTROL
ASSOCIATION INTERNATIONAL, INC.**

The International Authority on Air System Components

AMCA STANDARD 803-02 (R2008)

Industrial Process / Power Generation Fans: Site Performance Test Standard



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Arlington Heights, IL 60004-1893**

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Authority

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RELATED AMCA STANDARDS

For Air Performance:

ANSI/AMCA Standard 210 *Laboratory Method of Testing Fans for Aerodynamic Performance Rating*

For Sound:

AMCA Standard 300 *Reverberant Room Method for Sound Testing of Fans*

AMCA Standard 301 *Methods for Calculating Fan Sound Ratings from Laboratory Test Data*

AMCA Standard 320 *Laboratory Methods of Sound Testing of Fans Using Sound Intensity*

For Balance and Vibration:

ANSI/AMCA Standard 204 *Balance Quality and Vibration Levels for Fans*

Industrial Process / Power Generation Series:

AMCA Publication 801 *Industrial Process/Power Generation Fans: Specification Guidelines*

AMCA Publication 802 *Industrial Process/Power Generation Fans: Establishing Performance Using Laboratory Models*

AMCA Standard 803 *Industrial Process/Power Generation Fans: Site Performance Test Standard*

Fan Application Manual:

AMCA Publication 200 *Air Systems*

AMCA Publication 201 *Fans and Systems*

AMCA Publication 202 *Troubleshooting*

AMCA Publication 203 *Field Performance Measurement of Fan Systems*

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Industrial Process / Power Generation Fans: Site Performance Test Standard

1. Purpose

This standard establishes uniform methods to be used in measuring the aerodynamic performance of industrial process or power generation fans under actual operating conditions on the site. The standard also defines rules for converting the measured performance to other specified operating conditions.

This standard is also intended to produce results comparable to those obtained in a laboratory test of a fan in accordance with ANSI/AMCA 210 *Laboratory Methods of Testing Fans for Aerodynamic Performance Rating*. Fans in systems which have unstable operating characteristics or have distorted flow profiles at the inlet of the fan may not be suitable for testing in accordance with this standard.

The object of a performance test on a fan installed in its system generally falls into one of the following categories:

a) General Fan and System Evaluation

The purpose for conducting this type of an on-site test is to evaluate the performance of the fan in its system as a basis for future modifications to the fan or system.

b) Acceptance Tests

An on-site test specified as part of the sales agreement for the purpose of verifying the quoted fan performance.

c) Proof of Performance Test

This type of on-site test is conducted as a result of a complaint that the fan or system is not performing as intended.

This standard defines the quantities which need to be measured to establish fan performance, the personnel, the location of the measurement points, the calculation of results, the degree of uncertainty, the measurement methods and instrumentation which are to be used. Limits on the types of fans and systems which may be regarded as meeting the requirements of this test standard are also defined.

2. Scope

The term **on-site test**, as used in this standard, is a test conducted for the purpose of determining the aerodynamic performance of a fan when operating in the system for which it was intended.

2.1 Acceptable fans

This standard may be used as the basis for testing all types of centrifugal, axial, and mixed flow fans in ducted installations. The ducting may be on either the inlet side of the fan, the outlet side of the fan, or both.

The term **fan** encompasses all types of air or gas moving devices including blowers and exhausters, having one or more stages, but without interstage cooling. Circulating fans such as ceiling fans and desk fans, and positive displacement machines are not within the scope of this standard.

Sound tests, vibration tests, and mechanical tests of all types are not within the scope of this standard.

2.2 Acceptable installations

The performance of a fan when installed in a system is dependent not only on the fan, but also on the system, and on the interaction of one with the other. The effect of the system of the fan performance is known as "System Effect."

Assuming that the fan is rated and manufactured correctly, the three most common causes of deficient performance of the fan and system combination are:

- Improper inlet and/or outlet connections
- Non-uniform inlet flow
- Swirl at the fan inlet

These conditions alter the aerodynamic characteristics of the fan so that its flow potential is not fully realized. The conditions will occur when the connections to the fan inlet and/or outlet are poorly designed or installed. One bad connection can reduce the fan's actual performance to a point far below its rated performance.

This standard defines minimum requirements for flow velocity profiles at the measurement stations and duct geometry requirements which will result in insignificant system effects. Any installation which does not fall within the defined limitations is regarded