

ANSI/AMCA Standard 214-21

Test Procedure for Calculating Fan Energy Index (FEI) for Commercial and Industrial Fans and Blowers

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Air Movement and Control Association International

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AMCA Publications

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Foreword

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ANSI.)

The purpose of AMCA Standard 214, Test Procedure for Calculating Fan Energy Index (FEI) for Commercial and Industrial Fans and Blowers, is to aid federal and state rulemaking efforts to establish energy-efficiency standards for commercial and industrial fans and blowers, providing a consistent method of calculating FEI across the many different options or circumstances that exist in the fan market (fans sold without motors and drives, fans sold with unregulated motors or regulated motors, etc.).

An expressed difficulty in establishing an FEI-based fan regulation is having to work with four AMCA standards and publications: ANSI/AMCA Standard 207, Fan System Efficiency and Fan System Input Power Calculation; ANSI/AMCA Standard 208, Calculation of the Fan Energy Index; ANSI/AMCA Standard 210/ASHRAE Standard 51, Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; and AMCA Publication 211, Certified Ratings Program Product Rating Manual for Fan Air Performance. AMCA Standard 214 consolidates these documents.

AMCA Standard 214 primarily is for fans that are tested alone or with motors and drives; it does not apply to fans tested embedded inside of other equipment. AMCA Standard 214 covers most fan types and sizes.

For fans that already have been tested for rating using test procedures referenced in this document, no new testing is required for applying this standard. Fan manufacturers may be required to update their internal data-collection, calculation, and documentation systems to acquire the data necessary for the calculation of FEI.

AMCA Standard 214 covers only calculation of FEI and fan electrical power (FEP). It does not cover labeling, compliance filing, surveillance, and other regulatory processes.

Presenting FEI values to the market may also require fan manufacturers to modify fan-selection software and printed materials.

Calculations in AMCA Standard 214 may require fan manufacturers to collect additional information from prospective buyers, such as drive (transmission) configuration and expected motor selection.

Compliance with AMCA Standard 214 requires fan manufacturers to assemble product data not historically presented to the market, such as fan outlet area, fan total pressure, and fan category.

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Test Procedure for Calculating Fan Energy Index (FEI) for Commercial and Industrial Fans and Blowers

1. Scope

This standard applies to fans where air is used as the test gas with the following exceptions:

- Ceiling fans
- Cross-flow fans
- Air Curtain Units

2. References (Normative)

The following referenced documents are required for the application of this document. For dated references only the edition cited applies. For undated references, the latest edition of the referenced document applies.

AHRI Standard 1210 (I-P/2019), Performance Rating of Variable Frequency Drives

ANSI/AMCA Standard 210-16/ASHRAE 51-16, Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating

ANSI/AMCA Standard 230-15, Laboratory Methods of Testing Air Circulating Fans for Rating and Certification

ANSI/AMCA Standard 250-12, Laboratory Methods of Testing Jet Tunnel Fans for Performance

ANSI/AMCA Standard 260-20, Laboratory Methods of Testing Induced Flow Fans for Rating

ANSI/AMCA Standard 99-2016, Standards Handbook

ANSI/ASHRAE Standard 222-2016, Standard Method of Test for Electrical Power Drive Systems

CAN/CSA C747-09, Energy efficiency test methods for small motors

CAN/CSA C838-13, Energy efficiency test methods for three-phase variable frequency drive systems

IEEE 112-2017, Standard Test Procedure for Polyphase Induction Motors and Generators

ISO 5801:2017, Fans – Performance testing using standardized airways

ISO 13350:2015, Fans – Performance testing of jet fans

10 CFR 431.25, Energy conservation standards and effective dates

3. Definitions

3.1 Absolute pressure

The pressure if the datum pressure is absolute zero. It is always positive.

3.2 Axial impeller

An impeller (propeller) with a number of blades extending radially from a central hub in which airflow through the impeller is axial in direction; that is, airflow enters and exits the impeller parallel to the shaft axis with a fan flow angle less than or equal to 20 degrees. Blades can be either single thickness or airfoil shaped.