ADVOCACY BRIEF

NEW FAN EFFICIENCY METRIC SAVES ENERGY, EASES COMPLIANCE

Topic: Fan Energy Index (FEI) replaces Fan Efficiency Grade (FEG) in ASHRAE 90.1 and IECC.
Audience: Engineers, code officials, contractors, and manufacturers.
Call to Action: Replaces Fan Efficiency Grade (FEG) with Fan Energy Index (FEI) in state energy codes and specify AMCA-certified FEI ratings for covered products.
More Information: amca.org/fei; amca.org/certify
Contact: Michael Ivanovich, senior director, global affairs, **mivanovich@amca.org; +1 (708) 714-6619**

ABOUT FEI

The 2019 edition of ANSI/ASHRAE/IES 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings (ASHRAE 90.1), adopts a new fan efficiency metric, Fan Energy Index (FEI). FEI replaces the Fan Efficiency Grade (FEG) used in the 2013 and 2016 editions of Standard 90.1. FEI also is replacing FEG in the 2020 edition of ANSI/ASHRAE/USGBC/IES 189.1, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings (ASHRAE 189.1), and the 2021 editions of the International Energy Conservation Code (IECC) and International Green Construction Code (IgCC).
As shown below, FEI is a ratio of a reference fan's electrical input power (FEP_{ref}) to the electrical input power of a fan being considered by regulators for compliance or by a designer for an application (FEP_{actual})

$$FEI = \frac{\text{Reference Fan Electrical Input Power}}{\text{Actual Fan Electrical Input Power}}$$

$$FEI = \frac{FEP_{ref}}{FEP_{actual}}$$

FEI was developed in response to federal direction by the U.S Department of Energy, which began an effort to regulate fans in 2011. The rulemaking has been suspended since 2016; however, a public negotiation among industry stakeholders under the Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) recommended to DOE that FEP be used as the preferred metric for a federal efficiency standard for commercial and industrial fans and blowers. FEI was recommended as a metric for marketing purposes.

For model building energy codes and standards, AMCA and other stakeholders believed that the FEI metric was ideally suited for replacing FEG in energy codes and standards, and, starting with the 2019 edition of ASHRAE 90.1, all model energy codes and standards have made the switch.

FEI SAVES MORE ENERGY

FEI beats FEG for saving energy because it is a system-level metric that includes the efficiency impacts of motors and drives, and it mathematically was derived to encourage right-sizing. FEG ratings for a fan model remain unchanged across fan sizes, types and models. This in turn allows for easy use with all fans and fan sizes resulting in more energy efficient fan selections and application. Also, FEI allows ratings based on static efficiency, not just total efficiency, allowing engineers to base fan selections on the pressure-type most useful to the application (*total pressure for ducted applications; static pressure for unducted applications*).

ADVOCACY BRIEF

NEW FAN EFFICIENCY METRIC SAVES ENERGY, EASES COMPLIANCE

ENERGY SAVINGS BEYOND THE METRIC

In addition to changing metrics, the fan-efficiency sections of 90.1-2019 and IECC-2021 have changes that will save additional energy. The most significant is that the scope limit was reduced from 5 HP (3.7 kW) nameplate motor output power to 1 HP (0.75 kW). Also, there no longer is an exemption for powered-roof ventilators (PRVs).

AMCA CERTIFIES FEI RATINGS

The AMCA Certified Ratings Program is certifying manufacturers' FEI ratings for specific fan models, and sizing/selection software that supports FEI ratings. Because multiple fan models and motor/drive combinations can lead to compliant FEI-rated fan selections, manufacturer software is the most efficient way to access FEI ratings for design projects. Code compliance can be accomplished by comparing fan submittal documents with the energy code requirement.

FEI BENEFITS EVERYONE

Simpler enforcement:

Because there is no sizing/selection window requiring fans to be sized within 15 percentage points of peak total efficiency, code officials need only to check submittals and labels for FEI ratings and the engineer's selected duty point.

Clarity for buyers and specifiers:

FEI ratings are true to the electrical power consumption of the selected fans, inclusive of motors and drives.

Flexible application:

For given duty points and FEI code requirements, manufacturer software may offer compliant fans of different types, sizes, motors and drives. Engineers can then apply other project requirements, such as size, acoustics, budget, and availability for the fan selection.

Extended lifecycle benefits:

The FEI metric and other changes to the fan efficiency sections in ASHRAE 90.1 and IECC Fans will save energy by right-sizing fans, increase designer flexibility and ease compliance checking. Right-sizing fans increases service life and improves acoustics, resulting in additional benefits to building owners and occupants.

CALL TO ACTION

- **Code officials:** Adopt the ASHRAE 90.1-2019 or IECC-2021 fan-efficiency sections in state energy codes and municipal or government codes, even if adopting earlier editions.
- **Designers:** Learn how to use FEI for designs and specify AMCA-certified FEI-rated fans where practicable.

RESOURCES

- For online FEI training modules, peer-reviewed technical papers describing FEI, PowerPoints, and other resources, visit **amca.org/fei**.
- For links to AMCA-certified manufacturer software supporting FEI, visit **amca.org/certify** and search by license type: FEI.

For more information on AMCA Certified Ratings Programs and membership benefits, visit our website.

amca.org

STAND FOR A HIGHER STANDARD