



ADVOCACY BRIEF

NEW FAN ENERGY INDEX (FEI) METRIC AND SCOPE FOR ENERGY CODES (JULY 2021)

Overview:

Fan Energy Index (FEI) has replaced Fan Efficiency Grade (FEG) as the metric for efficiency provisions for commercial and industrial fans and blowers in the latest editions of the model energy codes and standards and is making its way into state energy codes.

Formalized in ANSI/AMCA Standard 208-18, Calculation of the Fan Energy Index, FEI was developed after the U.S. Department of Energy in an as-yet-unfinished rulemaking concluded FEG is not an appropriate metric for a federal appliance/equipment regulation.

Fan-efficiency provisions based on FEI have been approved for the following model energy codes:

- 2021 International Energy Conservation Code (IECC)
- 2021 International Green Construction Code (IgCC)
- ANSI/ASHRAE/ICC/USGBC/IES 189.1-2020, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
- ANSI/ASHRAE/IES 90.1-2019, Energy Standard for Buildings Except Low-Rise Residential Buildings

Meanwhile, FEI is in the 2019 Florida Energy Code, the 2021 Oregon Energy Code, and advanced drafts of the California and Connecticut energy codes. Additionally, FEI has been proposed for U.S. Department of Energy and California Energy Commission fan-efficiency regulations.

This advocacy brief advises jurisdictions to replace FEG-based provisions with FEI-based provisions during their next energy-code cycles.

Basics of Fan Energy Index

FEI is a measure of the efficiency of an entire fan system—the fan, the motor, and the drive—not just the fan. FEI is calculated using data from performance tests conducted in laboratories and contained in manufacturer sizing software and product catalogs. It establishes a baseline efficiency and resulting baseline power that varies with both airflow and pressure and can be applied to most types of commercial and industrial fans and blowers. FEI establishes a “range of compliant operations,” rather than a peak-efficiency threshold. In other words, FEI optimizes fan, motor, and drive selections for the conditions under which they will operate.

Benefits

1. *Clarity for buyers and specifiers*

FEG ratings apply to a range of sizes of a particular fan model, which obscures the lower actual efficiencies of smaller fans. The FEG 67 rating, for example, covers a range of efficiencies from approximately 45% to 65%, depending on the impeller diameter. Typically, the larger the fan, the higher the efficiency. To make up for this, a sizing window must be applied by designers to nudge fan selections to larger diameters. FEI solves this problem with values that inherently track the actual efficiency of a fan.

2. *Flexible application*

When a designer inputs a fan selection or duty point, manufacturer software offers compliant fans of varying types, sizes, materials, and motor/drive combinations. These options make performing cost-benefit analyses for fans with higher FEI ratings easy.



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3. *Simpler design and enforcement*

FEG requires a sizing window of “15 percentage points from peak total efficiency.” This requires that fans be rated for total efficiency when, in fact, static-pressure ratings are more common. For every covered fan, designers must document, and code officials must check for, compliance. If the window is ignored, smaller fan sizes likely will be selected because of lower first cost, but higher energy consumption and life-cycle cost will result. FEI works for static and total efficiency and eliminates the cumbersome window.

4. *Greater energy savings*

Because it is easier to use and enforce and encourages more-efficient fan types, sizes, and motor/drive combinations, FEI saves energy over FEG.

Savings Beyond the Metric

With the reduction of the lower fan-motor limit from 5.0 HP to 1.0 HP and the removal of the exemption for powered roof and wall ventilators, the scope of covered fans in the fan-efficiency sections of the IECC and ANSI/ASHRAE/IES 90.1 was broadened. These changes will lead to fan energy savings above and beyond those resulting from the transition from FEG to FEI.

Certified Ratings

The fan-efficiency provision in the 2021 IECC requires that FEI ratings be certified by an approved third-party laboratory. AMCA International’s Certified Ratings Program covers more than 400 fan models from nearly 20 manufacturers, with more on the way. For a complete list of certified manufacturers and links to certified FEI ratings, visit www.amca.org/find-FEI.



Calls to Action

- If your jurisdiction references the IECC, consider the approach taken by Florida, which, in adopting the 2018 IECC for Florida Building Code, Energy Conservation, 7th Edition (Section C403.2.12.3), replaced the fan-efficiency section with the language in the 2021 IECC. An underline-strikeout template for doing this is available at www.amca.org/fei.
- If your jurisdiction is updating to the 2013 or 2016 edition of ANSI/ASHRAE/IES 90.1, consider swapping the fan-efficiency section with the corresponding section in the 2019 edition. An underline-strikeout template for doing this is available at www.amca.org/fei.
- View recorded webinars and download technical papers on FEI at www.amca.org/fei.
- Specify AMCA-certified FEI ratings when possible, even if not required by code, as manufacturers must exercise great care when updating their sizing/selection software to accommodate the motor and drive combinations available across fan types and sizes. AMCA-certified FEI ratings can be found at www.amca.org/find-FEI.

AMCA International would be happy to answer any questions you may have about replacing FEG with FEI. Contact AMCA Advocacy Manager Aaron Gunzner at agunzner@amca.org.

To Learn More:

- AMCA International: www.amca.org
- FEI: www.amca.org/FEI
- FEI-certified products: www.amca.org/find-FEI
- FEI training: https://bit.ly/FEI_Modules



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