

FACT SHEET: Large Diameter Fan Performance in DOE Energy Conservation Standard

DOE finalized an energy standard for ceiling fans in January 2017. Compliance date January 2020.

What is the problem?

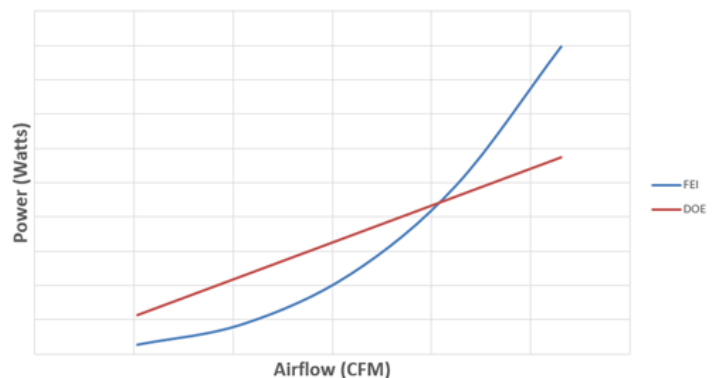
- The Final Rule established five classes of ceiling fans.
- DOE performance metric for large fans (>7 ft) is airflow (cfm) / power (watt).

Product Class	Minimum Efficiency Equation CFM/W*
Very Small-Diameter (VSD)	D ≤ 12 in.: 21 D > 12 in.: 3.16 D - 17.04
Standard	0.65 D + 38.03
Hugger	0.29 D + 34.46
High-Speed Small-Diameter (HSSD)	4.16 D + 0.02
Large Diameter	0.91 D - 30.00

* D is the ceiling fan's blade span, in inches, as determined in Appendix U.

- The Final Rule does not accurately account for different amounts of airflow at each fan diameter. Rather, it assumes that all fans of the same diameter move the same amount of air.
- But the relationship between fan performance and energy consumption is cubic. (2x performance = 8x power).
- Thus: The Final Rule creates a de facto "outer limit" or "performance max" for large diameter fans with high airflow.
- At the same time, the Final Rule allows large-diameter fans with low airflow fans to meet the minimum efficiency requirements even if they are extremely inefficient.
- Many high-performing fans will either need to be slowed down or eliminated. Some manufacturers can never introduce a new product with more air flow than current models.

Airflow & Power - Illustrative Example For a Given Diameter



- Thus, the Final Rule lessens the utility/performance of some products.

Who does this affect?

Manufacturers of ceiling fans >7 feet in diameter: Big Ass Solutions (KY), Macro Air (CA), Hunter Fans (TN), SkyBlade (MI), Fanimation (IN), Kichler (OH), Envira-North Systems (Canada).

What is the solution? Legislate a new fan performance metric to the ceiling fan energy conservation standard as follows:

SEC. 3. MODIFICATIONS TO THE CEILING FAN ENERGY CONSERVATION STANDARD

(a) Section 325(ff) of the Energy Policy and Conservation Act (42 U.S.C. 6295(ff)) is amended by adding at the end the following:

(8) No later than 30 days from enactment of this Act, the Secretary shall revise the ceiling fan energy conservation standard in 10 CFR Part 430.32, Subsection (s) as follows:

- (a) On or after January 21, 2020, large diameter fans must achieve a FEI greater than or equal to 1.00 at high speed and an FEI greater than or equal to 1.25 at 40% speed.
 - a. For purposes of this paragraph, FEI means the Fan Efficiency Index using fan total pressure as measured in accordance with ANSI/AMCA Standard 208-18 and, for the FEI calculation, the Airflow Constant (Q_0) shall be 26,500 Cubic Feet per Minute, the Pressure Constant (P_0) shall be 0.0027 inches water gauge, and the Fan Efficiency Constant (η_0) shall be 42%.

This suggested correction above would align the DOE energy conservation standard with a new metric from ANSI/AMCA Standard 208, called the Fan Efficiency Index (FEI). We believe that the suggested performance levels above would account for differing amounts of airflow at each fan diameter – thus, allowing for the highest-airflow fans a pathway to compliance – but would still eliminate products that genuinely underperform as a function of utility vs. power consumption.

This means the new metric would allow high-performing products to participate in the market while still achieving energy savings across the overall product class.

FEI is a derivative of the Fan Electrical Power (FEP) metric that was agreed upon by DOE and stakeholders in an ASRAC-negotiated term sheet as part of a separate DOE rulemaking covering commercial and industrial fans and blowers. When DOE finishes the commercial and industrial fans and blowers rulemaking, there would be consistency in metrics for large-diameter ceiling fans and commercial and industrial fans.