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AMCA Standard 205, Energy Efficiency Rating for Fans

Introduction

AMCA Standard 205, Energy Efficiency Rating for Fans, is a standard referenced by major energy efficiency and green construction codes and standards, such as 2012 International Green Construction Code (IgCC) and ANSI/ASHRAE/IES Standard 90.1-2013, Energy Standard for Buildings Except Low-Rise Residential Buildings, etc. This article will discuss the basics of fan energy efficiency rating and the future development of AMCA Standard 205.

Key Features of AMCA 205

AMCA 205 has two major parts. First, it defines a new fan efficiency metric - fan efficiency grade (FEG). It was realized by the industry that a fan energy efficiency threshold would be difficult to define as efficiency depends on fan diameter and other factors. For example, many types of fans with a diameter less than 20 inch cannot meet the 65% efficiency requirement. The new FEG metric is a dimensionless index calculated based on fan-rating test data. As shown in Figure 1, each FEG band contains a range of fan diameters and their corresponding efficiencies.

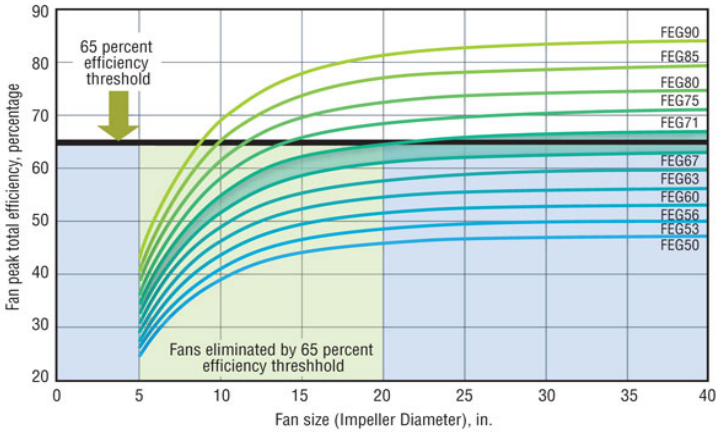

Figure 1: Fan-efficiency grades (FEG) defined by AMCA Standard 205.

Second, AMCA 205 stipulates that fans should be sized and selected to operate within 15% points of the fan's rated peak total efficiency. In order to reduce fan energy consumption, rightsizing fans is equally important as regulating the fan FEG level.

AMCA 205 helps regulators to develop enforceable fan requirements in the model codes and standards based on two-part fan-efficiency provisions: the minimum fan aerodynamic efficiency requirement and the sizing/selection window of the fan operating point relative to the fan's rated peak total efficiency.

The coverage scope and exemptions are also included in these provisions. Exemptions are provided to exclude fan sizes and types where the current AMCA 205 efficiency requirement or selection approach is not applicable.

Table 1 summarizes the efficiency provisions in the four model codes and standards. More Details of the fan size, sizing / selection window requirements and exceptions can be found in the reference website. One may notice that these first-generation provisions are not as stringent as some would expect. The Second-generation fan-efficiency requirements will be developed based on the industry feedback from the first-generation codes and standards.

Model Code / Standard	Basis	Scope of Coverage	Fan Size	Maximum FEG	Sizing/ Selection Window	Certified FEG & Energy Label required	Exemptions
2012 IgCC	AMCA 205-10	Bldgs <25,000 sqft, stand-alone supply, return & exhaust fans	> 1 hp	71	10% points	No	None
2013 ASHRAE 90.1	ANSI/AMCA 205-12	Bldgs other than low-rise residential bldgs.	> 5 hp	67	15% points	No	Yes
2014 ASHRAE 189.1	ANSI/AMCA 205-12	Bldgs other than low-rise residential bldgs.	> 5 hp	67	10% points	No	Yes
2015 IECC	ANSI/AMCA 205-12	Bldgs other than low-rise residential bldgs.	> 5 hp	67	15% points	Yes	Yes
2015 IgCC (proposed)	ANSI/AMCA 205-12	Bldgs < 25,000 sqft	> 5 hp	67	10% points	Yes	Yes

Table 1: Summary of Fan Efficiency Provisions in Model Codes & Standards

Future Development of AMCA 205 & FEG Requirements

The second-generation requirements are expected to be more complex and ultimately more stringent. A significant change will be the establishment of different categories or types of fans, and an independent, minimum FEG and selection range will be applied for each type of fans.

For example, centrifugal fans will have a higher FEG requirement than axial fans. Sizing/selection windows could also be customized to fan types. As an example, tighter windows could be adopted for fan types with flat efficiency curves and wider windows could be used for fan types with steep efficiency curves. Sizing and selection windows will be established by fan total pressure for some fan types while static pressure will be used for fans with outlet ducts (such as powered roof ventilators) that can convert velocity pressure to overcome static-pressure losses.

Also, new metrics, such as a minimum wire-to-air efficiency, could be defined for fans with integrated motors and drives.

These changes will eventually eliminate all or most of the exemptions and increase the fan energy savings.

Detailed information can be found in the reference article listed below.

Reference:

1. http://hpac.com/iaq-amp-ventilation/association-solutions-hvac-fan-efficiency-codes-and-standards-pressure