

DOCKETED

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circulation fans per AMCA 230

comfort fans for people and animals, and circulation fans in buildings where plants are grown

Additional submitted attachment is included below.



September 18, 2017

California Energy Commission
Docket Unit, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Docket No. 17-AAER-06 – Circulation Fans

Dear Mr. Galdamez:

AMCA standard 230 is the laboratory method to determine performance of circulation fans through measurement of fan thrust. Those fans have no barrier between the fan suction side and the fan exhaust side. They develop strictly air velocity and not static pressure. This is why airflow test chambers or tunnels cannot be used.

Ceiling fans are a sub-group of circulation fans. The airflow and thrust direction of ceiling fans is vertical so that AMCA standard 230 figure 1 applies. A recent summary of US DoE regulation for test procedure and MEPS was published here: <http://www.appliancedesign.com/articles/95539-fan-performance-testing>

AMCA standard 230 figures 2A through 3B apply to circulation fans with thrust in horizontal direction. BESS provides a sketch here: <http://bess.illinois.edu/helipc.html>

Horizontal-airflow circulation fans are widely used to provide comfort to people and animals, and in buildings where plants are grown. A recent magazine article describes the tremendous energy consumption associated with the increasing marijuana growing operations: <https://www.solarpowerworldonline.com/2017/08/can-solar-help-legal-marijuana-growing-industry/>

It appears that a title 24 regulation for circulation fans would provide energy savings potential that has not been addressed by the US DoE.

Two programs utilize AMCA 230 and support certification of air performance of horizontal-airflow circulation fans:
BESS Laboratory Agricultural circulating fans

- selection criteria <http://bess.illinois.edu/selcritc.html>
- product style <http://bess.illinois.edu/helipc.html>
- directory of certified products <http://bess.illinois.edu/searchc.asp>

AMCA

Certified Ratings Program - Product Rating Manual for Fan Air Performance

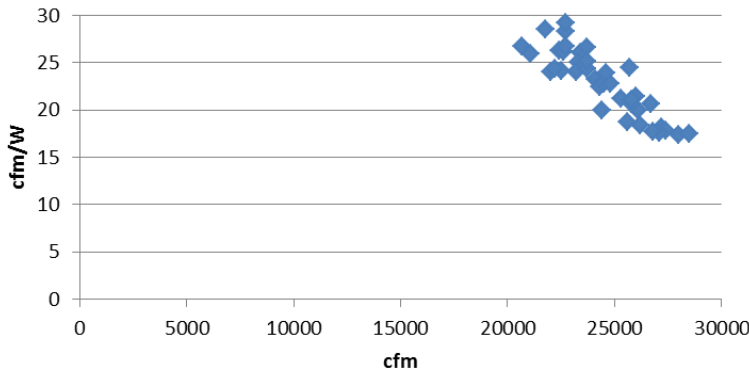
- Guideline 211
http://www.techstreet.com/amca/standards/amca-211-13-rev-9-17?product_id=1993044
- Check test tolerances in chapter 10 of AMCA 211
- directory of certified products
http://www.amca.org/certified-listed/type_company.php?pid=2&pn=Agricultural%20Fans

The energy efficiency rating for circulation fans traditionally is expressed in cfm/W. However, the forthcoming AMCA standard 208 would also permit rating circulation fans in terms of the Fan Energy Index (FEI).

An exemplary evaluation of all 52-inch diameter BESS certified circulation fans reveals this spread of efficacies:



Efficacy Ratio of 52-inch fans



ebm-papst proposes the following measures to save energy with circulation fans:

- Use of permanent magnet brushless motors (aka electronically commutated motors) for high efficiency at full speed
- Load-matching through speed control with electronically commutated motors.
- Fan discharge guide vanes
- Check-test requirements per AMCA 211
- Labelling per AMCA 211

Guide vanes

- + Excellent air throw**
– Guide vane can double the fan air throw with comparable air flow
- + Simple installation**
– Uncomplicated retrofitting of the guide vane
- + Convenient cleaning**
– Easy to detach for cleaning

air distribution without guide vane

air distribution with guide vane

Best regards
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