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standalone vs. embedded fan definitions

Additional submitted attachment is included below.

September 18, 2017

California Energy Commission
Docket Unit, MS-4
Re: Docket No. 17-AAER-06
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Docket No. 17-AAER-06 – Commercial and Industrial Fans & Blowers

Dear Mr. Galdamez:

ebm-papst Inc appreciates the opportunity to make additional contributions to this rulemaking process.
ebm-papst responses to the July 19th workshop:

1. We are opposing a cfm-per-watt metric for fans tested per AMCA 210. This metric would be suitable only if all fans were rated at the very same pressure. That happens to be the case with circulation fans that are tested per AMCA 230.
   However, the FEI metric per AMCA 208 accommodates all fans universally.

2. Slide 22 commented about product development trends. We wish to point out a few of our comments from June 16th again:
   2.1. EC fan motors are max tech presently.
   http://www.ebmpapst.com/en/products/centrifugal-fans/radipac/radipac_new_dimensions/radipac_new_dimensions.php
   2.2. Airside improvements still provide very high improvement potential: Diffusers, guide vanes.
   http://axiblade.en.ebmpapst.com/_gfx/three60/ebm_papst_Axiblade_360Grad_Panorama.html
   2.3. Advanced electronic fan catalogs (fan selection software) assist with selecting the most suitable fan size, fan type, and fan quantity (in case of fan arrays) even when considering annual bin hours.
   http://www.ebmpapst.com/en/products/product_search/ebm_papst_fanscout/fanscout.html
   2.4. Low sound is as important as low power.
   http://www.ebmpapst.com/en/products/product-news/flowgrid/flowgrid.html

3. Slide 22 also inquired about necessary developments: We believe that fan selection software and catalogs displaying FEP and FEI will support MEPS for fans.

4. Major contributors to to inefficient energy consumption in fans and bllowers:
   4.1. Fan selection point is far away from the fan's peak efficiency point. - The fan is typically chosen too small.
   4.2. Fan belt losses when not using direct drive.
   4.3. Wide impeller tip clearance, short inlet bells, sharp-edge orifice opening
   4.4. Use of shaded pole motors instead of at least permanent split capacitor motors.
   4.5. Use of large 1-phase induction motors rather than 3-phase induction motors.
   4.6. Use of air-over rated induction motors (that are unregulated) instead of regulated induction motors.
   4.7. Speed-control by means of voltage control (such as triac, tapped motor windings, step-down transformers) instead of variable frequency drives or EC motors.

5. Energy saving features for slide 24:
   5.1. Energy-efficient drive train:

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5.1.1. Permanent magnet electronically commutated motors
5.1.2. Direct drive rather than belt or gear drive
5.1.3. Motor size matched to the fan load

5.2. Airside:
5.2.1. Better fan selection, also considering bin hours and options to vary fan quantity
5.2.2. More advanced impeller designs
5.2.3. More advanced fan housing design
5.2.4. Use of diffuser for static pressure regain
5.2.5. Use of guide vanes

6. Are all control features energy saving ones? (Slide 27)
No, some suboptimal control methods are::
6.1. A variable frequency drive installed just to reach super-synchronous speed.
6.2. Dampers
6.3. Motor speed controls of the triac type
6.4. Multi-speed induction motors

Responses to July 19th invitation for proposals for efficiency standards or measures

We rely on several trade organizations to generally represent our interests during this rulemaking process. However, we wish to point out that the delineation of standalone fans, embedded fans, and replacement fans is important. We are concerned that regulatory burden of a given product (e.g. a fan component or a fan sub-assembly) could differ dependent on its geographic origin or on the supply chain.

Description of case:	**Worst case**
A small California-based OEM buying fan components for manufacturing air-curtains, power roof ventilators, or any equipment type exempt from fan regulation.	Availability of fans for embedding becomes limited to compliant FEI levels. Burden for certification and labeling.
Large, vertically integrated OEM fabricating in California all fan components that are embedded in its equipment.	Unrestricted freedom to employ inefficient fans. No limitation of design duty point selection. .
A vertically integrated company owning a feeder factory for fans outside of California and an equipment assembly plant in California.	Availability of fans for embedding becomes limited to compliant FEI levels. Burden for certification and labeling.
A California-based fan manufacturer	Only FEI compliant fans, labelled and certified may be brought into commerce.
A fan distributor in California	Only FEI compliant fans, labelled and certified may be supplied into California.

Therefore we are slightly refining our previously proposed definitions for standalone fans and for embedded fans today in the attachment.

Best regards

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Standalone fan

A complete fan unit that is (a) designed for field installation in commercial or industrial field settings, that is (b) designed for field installation in a residence subject to building code inspection, or that (c) carries a comprehensive safety agency approval indicating its suitability for installation and operation by untrained persons. Standalone fans do not include provisions for air conditioning, air filtration, air mixing, air treatment, or heating. Standalone fans consist of a configuration that is testable for air performance per any of the AMCA series of standards 210 through 260. Examples include power roof ventilators, side-wall exhaust fans, whole house fans, inline fans, ceiling fans, jet tunnel fans, and induced flow fans as part of a laboratory exhaust.

Motorized panel fan including housing and fan guard

Motorized plenum fan including inlet bell, plate for separation of suction and pressure side, and mounting structure.

Embedded fan

Not testable in a AMCA 210-configuration

A fan firmly attached to or entirely integrated in an appliance or a surrounding piece of equipment, each of which is regulated for minimum energy performance in many cases. Comprehensive safety agency approvals of an embedded fan are conditional on the product in which this fan is embedded. Embedded fans by themselves are not testable in an AMCA 210 air performance test due to missing a missing structure or housing.
Examples of embedded fans include supply fans in air handling units, plenum fans in central station air handlers, condenser fans in heat rejection equipment, tangential blowers in air curtain units, and induced or forced draft combustion blowers in boilers or furnaces.

Motorized axial impeller without housing and mounting structure

Motorized plenum fan without mounting structure, inlet bell, and inlet plate

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