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DUBAI WORLD TRADE CENTRE

Why Products Do Not Perform as Rated

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Air Movement and Control Association (AMCA) International, Inc,



Outline



Introduction to AMCA

What is a product rating?

How products are tested

Manufacturer lab

Independent lab

3rd-Party Certified Ratings

How installations impact products

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This is AMCA



The Air Movement and Control Association Mission:

To advance the health, growth, and integrity of the air systems industry.



Advocacy



Certification



Engagement

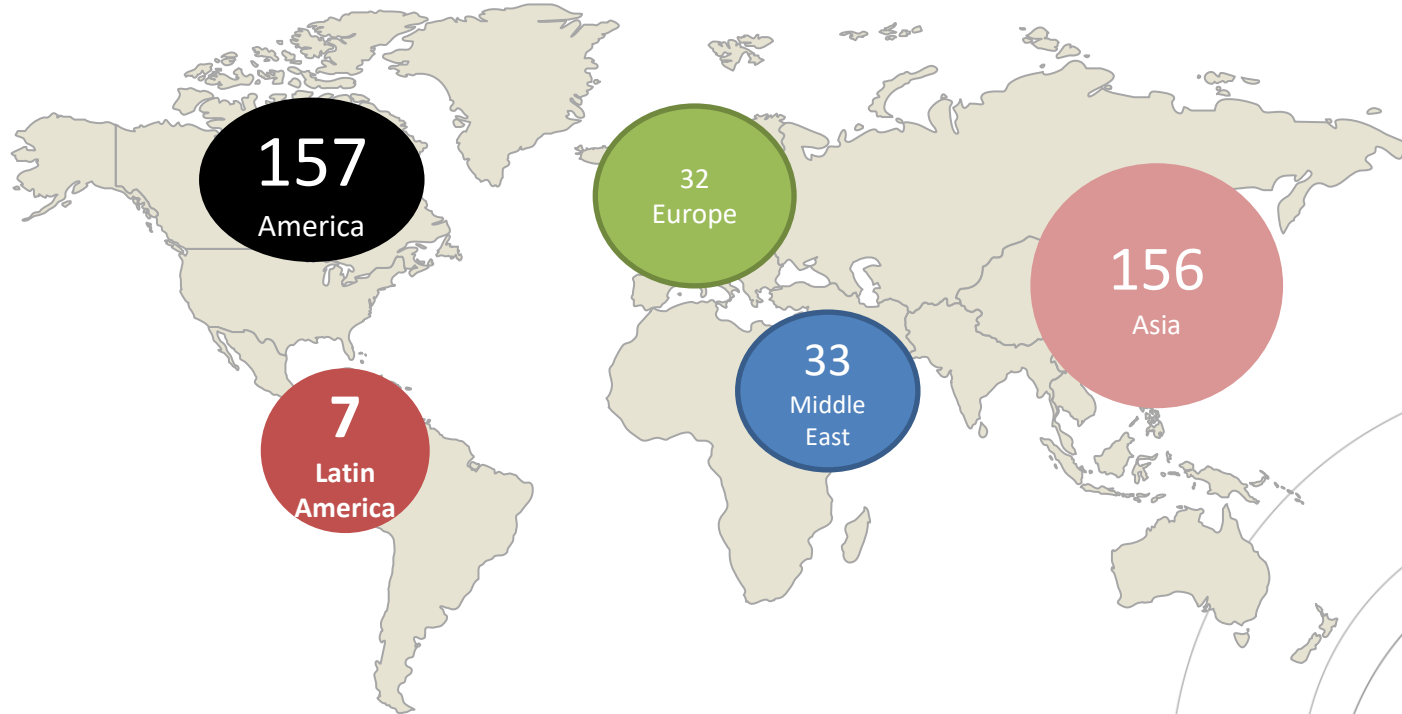
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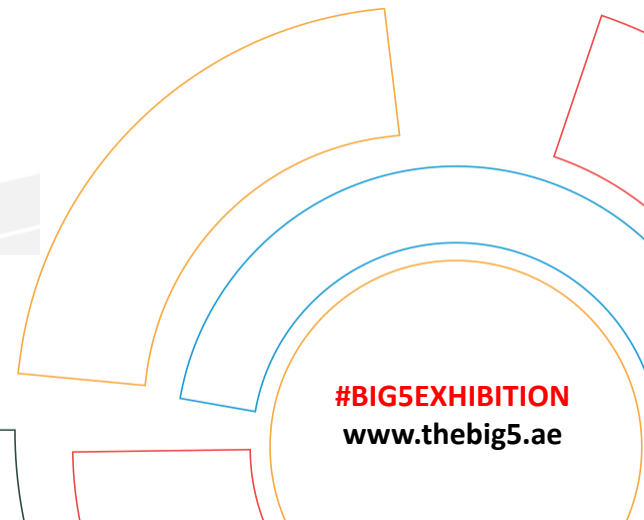


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AMCA Scope of Products



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AMCA Value Chain

What AMCA provides members and the industry



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What is a Product Rating?



Air Movement Products:

- A statement of pressure performance and power vs airflow at a given speed at standard inlet air density or other specified density

Air Control Products:

- Data generated from tested products used to derive the published information

Who Verifies? 3rd Party Certification Bodies

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How are the Ratings Developed



Testing to industry-recognized performance standards

- Lab at manufacturer's facility
- 3rd-Party independent lab



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Things to Keep in Mind



Read statements next to performance data to understand how products were tested

- Installation Setup
- Appurtenances
- Nominal Speed
- Transmission Losses

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Benefits of Participating in a 3rd Party Certification Program



Differentiation

Certified products are differentiated based on quality, acceptance, and perception

Quality

Plays an active role in monitoring product performance

Specification

Specifier may require certification

Support

Markings provides known independent 3rd party certification and validation of certification

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Installation Impacts Products



Many factors can play a role in how a product performs

- Design-phase problems (small equipment rooms = system effect)
- Incorrect sizing, selection (fan rated with static pressure but applied in a total-pressure situation)
- Contractor substitutions (often less expensive (smaller fan, for example))
- Design was changed but not the product specification (value engineering, for example)
- Installer had to work around unforeseen obstacles (ducts routed around obstructions; objects installed with less clearance for louver airflow)
- Installer quality issues (leaky ducts, incorrect wiring, upside down louvers, etc.)

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What issues do you see?



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What issues do you see?



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What issues do you see?



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Fan Law and How They Impact You



Example: Fan operating at 1000 RPM, 3000 CFM, 0.5" wg SP, 0.5BHP

Tenant asks for more air flow. Tech determines an increase of 10% in speed will meet their needs

Fan Law #1

CFM varies directly with RPM

Fan Law #2

SP varies with the square of the RPM

Fan Law #3

HP varies with the cube of the RPM

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Fan Law #1



$$CFM_1/CFM_2 = RPM_1/RPM_2$$

OR

$$CFM_2 = (RPM_2/RPM_1) \times CFM_1$$

Original points of operation

Fan operating at 1000 RPM, 3000 CFM, 0.5" wg SP, 0.5BHP

Fan Law #1

CFM varies directly with RPM

$$CFM_2 = (1100/1000) \times 3000 = 3300$$

10% increase

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Fan Law #2



$$SP_1/SP_2 = (RPM_1/RPM_2)^2$$

OR

$$SP_2 = (RPM_2/RPM_1)^2 \times SP_1$$

Original points of operation

Fan operating at 1000 RPM, 3000 CFM, 0.5" wg SP, 0.5BHP

Fan Law #2

SP varies with the square of the RPM

$$SP_2 = (1100/1000)^2 \times 0.5 = .605" \text{ wg}$$

21% increase in static pressure

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Fan Law #3



$$HP_1/HP_2 = (RPM_1/RPM_2)^3$$

OR

$$HP_2 = (RPM_2/RPM_1)^3 \times HP_1$$

Original points of operation

Fan operating at 1000 RPM, 3000 CFM, 0.5" wg SP, 0.5BHP

Fan Law #3

HP varies with the cube of the RPM

$$HP_2 = (1100/1000)^3 \times 0.5 = .6655 \text{ BHP}$$

33% increase in horsepower

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Something to Remember



Seemingly small requests can have a large impact on entire system

Can shorten the life of product

Make the assessment - pay now to implement the correct products
or pay later in costly repairs

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Conclusion

Checklist for increasing confidence in product performance

- ✓ Tested in accordance with a consensus-based standard
- ✓ Tested in an accredited manufacturer laboratory or at a third-party testing laboratory
- ✓ Rating independently verified by a third party
- ✓ Purchased product is what was specified, not substituted
- ✓ Installation was per original design; not installed in a compromised design or installation
- ✓ System commissioning - design, specification, installation, operation all undergo quality assurance
- ✓ Product certification – not just tested in accordance to



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