



Introducing the AMCA Fan Energy Waste Calculator

An AMCA International White Paper

United States Country Electricity cost per kwh: 0.1 USD

Diameter (inches): 20

Operating Speed (rpm): 2075

Testing Error (%): 24

Annual Operating Hours (hr): 1737

Energy Penalty (kwh)	Emissions Penalty (Metric Tons CO ₂)
1733	0.12

AMCA International
30 West University Dr.
Arlington Heights, IL 60004 USA

www.amca.org
Documents



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Introducing the AMCA Fan Energy Waste Calculator

ABSTRACT

To help participants in the AMCA Certified Ratings Program communicate the program's benefits to members and the industry at large, AMCA developed a web tool called the AMCA fan energy waste calculator. This calculator estimates the wasted electricity resulting from a fan operating with higher energy consumption than expected, based on its manufacturer's rating data. The implication is that it is far less likely for such energy waste to occur if the fan is AMCA-certified.

This white paper, in addition to describing how and why the calculator was developed, documents underlying assumptions, sources of data and examples of the calculator's insights.

AMCA's fan energy waste calculator determines the energy consumption of underperforming fans. In other words, it will calculate the energy used by a fan that does not deliver the rated airflow and/or air pressure at a given fan speed when that fan is tested according to internationally accepted standards.

The calculator's output includes

- annual wasted energy (in kilowatt hours)
- annual wasted energy budget (in any of the calculator's 34 pre-programmed countries' currencies, based on the country's average commercial electricity rate)
- annual unnecessary greenhouse emissions (in tons of carbon dioxide equivalent)

BACKGROUND

The creator of this calculator, the Air Movement and Control Association (AMCA) International, was founded in 1917 to promote the health, growth and integrity of the air-systems industry relevant to commercial, industrial and residential applications.

An important part of AMCA’s mission is to certify the performance ratings of fans, fire/smoke/volumetric dampers, architectural louvers and other products that are within AMCA’s scope. AMCA has been certifying products for almost 60 years. The reason the AMCA Certified Ratings Program exists is to ensure that manufacturers’ published product-performance data are accurate and based on internationally accepted standards for performance-rating tests.

Certified performance data provides confidence to a variety of professionals, such as engineers, architectural system designers and specifiers, distributors, contractors and building operators. These professionals know that an important phase of design is matching product performance ratings to the requirements of the project. Often, one or more requirements are vital to the application. Perhaps delivered airflow and air pressure are a builder’s main focus. Or maybe energy efficiency and noise reduction are essential considerations in a retrofit. And wind-driven rain penetration may be of the utmost importance in locations with extreme weather conditions.

Because options for product types, sizes and accoutrements often exist, both within a manufacturer’s product lines and between those of different manufacturers, comparing manufacturers’ ratings data also is vitally important. The only way to make such comparisons conclusive, however, is to have confidence that the ratings themselves are accurate. This is where independent evaluation through the AMCA Certified Ratings Program has its role.

AMCA FAN ENERGY WASTE CALCULATOR

But what is the benefit of the AMCA Certified Ratings Program? Does it provide a measurable benefit to its participants and the users of certified products? One way to answer that question is to think about the impact of using a non-certified product. What could be the energy, environmental and economic impacts if, say, a non-certified fan operated outside the performance expected by the manufacturer’s rating?

To help answer this question, the AMCA fan energy waste calculator estimates just one parameter of fan operations: wasted energy. It shows the resulting cascade into higher energy costs and avertable greenhouse gas emissions. Other impacts, such as increased noise, reduced time between maintenance and reduced service life, are ignored in this analysis, but such impacts do exist and could be significant.

The AMCA fan energy waste calculator can be accessed only on the AMCA website under the “Resources” tab. To use the tool, the user selects the country where the fan would operate, which automatically loads the country’s currency and average commercial electricity cost into the analysis. Use of inches or millimeters for the fan diameter also is automatically driven (Figure 1).

United States

▼

Country

Electricity cost per kwh: 0.1 USD

Figure 1. The selection of a country pre-loads the country’s currency, average commercial electricity cost (country-specific currency per kWh), and fan-diameter engineering units. All images courtesy of AMCA International.

AMCA HEADQUARTERS
LABORATORY AND TEST
STANDARDS



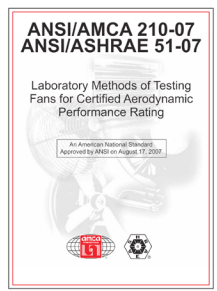
The AMCA headquarters laboratory is accredited by A2LA

Generally, fan testing for rating is conducted following standards published by AMCA, the International Standards Organization (ISO) and the Home Ventilation Institute (HVI). AMCA test standards are accredited by the American National Standards Institute (ANSI). Only test standards referenced in AMCA Publication 211¹ can be used for certification testing.

Data for the calculator were taken from centrifugal fans tested to ANSI/AMCA Standard 210, *Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating*².



AMCA Publication 211



ANSI/AMCA Standard 210