

# **ANSI/AMCA Standard 207-17**

## **Fan System Efficiency and Fan System Input Power Calculation**

An American National Standard  
Approved by ANSI on April 17, 2017



## **Air Movement and Control Association International**

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## Fan System Efficiency and Fan System Input Power Calculation

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## AMCA Publications

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# Fan System Efficiency and Fan System Input Power Calculation

## 1. Purpose

This standard provides a method to estimate the input power and overall efficiency of an extended fan system.

An extended fan system is composed of a fan and an electric motor but may also include a transmission and a motor controller. While direct measurement of fan system performance is preferred, the large number of fan system configurations often makes testing impractical. This standard offers a standardized method to estimate fan system performance by modeling commonly used components. Calculations reported in accordance with this standard offers fan users a tool to compare alternative fan system configurations in a consistent and uniform manner.

This document does not provide selection guidance. Users must assure that selected components have sufficient capacity and are configured to produce the desired results.

## 2. Scope

The scope of this standard includes all electric motor driven fan systems that use a specific combination of components as defined below:

1. Fan airflow performance tested in accordance with ANSI/AMCA Standard 210 [1] ANSI/AMCA Standard 230 [2], ANSI/AMCA Standard 260 [3] or ISO Standard 5801 [4] or rated in accordance with AMCA Publication 211 [5].
2. Polyphase induction motors within the scope of EPCA [6], IEC 60034-30-1 [7], or GB 18613 [8]. Other types of motors are explicitly excluded.
3. Pulse-width modulated variable frequency drives (VFDs).
4. Mechanical power transmissions that use V-belts, synchronous belts, or flexible couplings.

## 3. Definitions and Symbols

For the purpose of this standard, the definitions, units of measure and symbols in this section apply.

Definitions for fan pressures and efficiencies are found in the standards referenced in Section 2.

### 3.1 Definitions

#### 3.1.1 Fan system

A fan product that includes all appurtenances, accessories, motors, drives and controllers necessary or applied to the fan.

#### 3.1.2 V-belt power transmission

Drive belts having a substantially trapezoidal cross section that uses sheaves (pulleys) having smooth contact surfaces. Conventional V-belts have a constant cross section along their length, while notched V-belts (also known as cogged V-belts) have slots running perpendicular to their length. The slots reduce bending resistance and offer improved efficiency over conventional V-belts. This standard does not account for this improved efficiency.

#### 3.1.3 Synchronous belt power transmission

Drive belts having a substantially rectangular cross section that contains teeth that engage corresponding teeth on the sheaves (pulleys) resulting in no-slip power transmission. These belts are sometimes called timing or toothed belts.