

AMCA Publication 600-16

Application Manual for
Airflow Measurement Stations



**AIR MOVEMENT AND CONTROL
ASSOCIATION INTERNATIONAL, INC.**

The International Authority on Air System Components

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Application Manual for Airflow Measurement Stations



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Related AMCA Documents

Related Publications

AMCA Publication 11

Damper Application Manual for Heating/ Ventilating and Air Conditioning

AMCA Publication 611

Certified Ratings Program – Product Rating Manual for Airflow Measurement Stations

Related Standards

ANSI/AMCA Standard 610

Laboratory Methods of Testing Airflow Measurement Stations for Performance Rating

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Application Manual for Airflow Measurement Stations

1. Purpose

This application guide is intended to assist designers and users with the proper application, performance considerations, selection and limitations of airflow measurement stations.

This publication provides information and important points to be considered when designing or specifying heating, ventilating and air conditioning (HVAC) and other applications in installations requiring an airflow measurement station (AMS) for use in temperatures from $-30\text{ }^{\circ}\text{C}$ to $+120\text{ }^{\circ}\text{C}$ ($-20\text{ }^{\circ}\text{F}$ to $+250\text{ }^{\circ}\text{F}$), pressures to 250 Pa (10 in. wg) and velocities to 28 m/s (5500 fpm).

2. Scope

The purpose of this document is to help avoid problems associated with misapplied or incorrectly installed AMSs. Problems may include incorrect location, inappropriate measurement range, mismatched accompanying instrumentation and an AMS incompatible with intended application.

This guide provides an overview of permanently installed AMSs and their application. This publication does not address portable devices used to measure airflow in test-and-balance applications.

It is not the intent of this manual to be used for detailed specifications; rather it serves as a guide toward understanding the various types of AMSs available and items to be considered for their proper use.

3. Definitions

3.1 Airflow

A flow of air or an air current, specifically one that passes through a dimensionally defined plane.

3.2 Airflow measurement station (AMS)

A sensing device that is used to measure the airflow rate in a system or fan appurtenance. It may consist of a single sensor or an array of sensors in permanent position in the air system. It may be supplied as a probe to be inserted into a ductwork or supplied in a casing approximating the size of the air system in which it is installed or as an air intake louver.

3.3 Static pressure

That portion of the air pressure that exists by virtue of the degree of compression or expansion.

3.4 Total pressure

The air pressure that exists by virtue of the degree of compression and rate of motion. It is the algebraic sum of the velocity pressure and the static pressure at a point. Thus if the air is at rest, the total pressure will equal the static pressure.

3.5 Airflow measurement station performance variables

3.5.1 Tested AMS airflow rate (Q_{AMS})

The AMS reported airflow rate or measurement as calculated according to the manufacturer's instructions. This calculation is based upon the output (pressure, current or voltage) of the AMS.

3.5.2 AMS differential pressure

The observed differential pressure between the high pressure output and the low pressure output of a differential pressure type AMS.

3.5.3 AMS electronic output

The observed voltage or current output of an electronic output type AMS that correlates directly and proportionately to the velocity of airflow in a duct.

3.5.4 Test AMS face area (A_{FACE})

The total cross sectional area of a louver, duct, wall or AMS opening.

3.5.5 AMS free area (A_{FREE})

The minimum area through which air can pass.

4. Principles of Operation

Proper application requires knowledge of the various types of AMSs and their principles of operation.

The airflow sensing devices used in an AMS include but are not limited to pitot types, differential pressure types, thermal dispersions, vortex shedding airflow sensors, orifice plates, fan inlets or air measurement louvers. These devices are explained as follows: