

(Reaffirmation of ANSI/ASHRAE 41.2-1987 with minor editorial changes)

# ASHRAE<sup>®</sup> STANDARD

AN AMERICAN NATIONAL STANDARD

## Standard Methods for Laboratory Airflow Measurement

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REFRIGERATING AND  
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This is a preview of "ANSI/ASHRAE 41.2-198...". [Click here to purchase the full version from the ANSI store.](#)

(This foreword is not part of this standard but is included for information purposes only.)

## FOREWORD

This standard provides recommended practices for airflow measurements as well as measurement procedures for use in the preparation of other ASHRAE standards. Therefore, it meets the ASHRAE standard classification of method of measurement or test.

The standard was initiated by the ASHRAE Standards Committee to provide ASHRAE members with several alternatives for laboratory airflow measurements. The standard was developed by a diversified panel of five voting and four nonvoting members using the *ANSI/AMCA Standard 210-85*, *ANSI/ASHRAE Standard 51-1985*, *Laboratory Methods of Testing Fans for Rating*, as a reference document.

### 1. PURPOSE

1.1 The purpose of this standard is to set forth recommended practices for airflow measurements and to provide adequate and consistent measurement procedures for use in the preparation of other ASHRAE standards.

### 2. SCOPE

2.1 The procedures described herein are intended for use in testing air-moving, air-handling, and air-distribution equipment and components. The particular method(s) used shall be determined by the operating tolerances, instrument accuracies, and instrument precision required to achieve the objectives of the product test.

2.2 The recommendations herein include consideration of density effects on accurate measurement of flow rates.

2.3 The procedures in this standard are intended primarily for use in laboratory testing of heating, ventilating, air-conditioning, and refrigerating components and equipment and do not necessarily apply to field testing of installed equipment and systems.

2.4 The procedures in this standard are intended for application only to flow measurements of air at pressures to the measuring equipment not exceeding 100 in. of water (25 kPa) gage.

2.5 Not included are procedures for testing fans, blowers, exhausters, compressors, and other air-moving devices whose principal function is to produce a stream of moving air, which fall within the scope of *ANSI/ASHRAE Standard 51-1985*, *ANSI/AMCA Standard 210-85*.<sup>1</sup>

### 3. DEFINITIONS

**diameter, equivalent:** the diameter of a circle having the same area as the rectangular cross section.

**diameter, hydraulic:** four times the flow area divided by the perimeter of the solid boundary in contact with the fluid.

**shall and should:** the word "shall" is to be understood as a requirement, the word "should" as a recommendation.

**transducer:** a device that changes one form of physical quantity to another. In the measurement field, transducers are generally used to sense a variety of measurands, such as line voltage, current, power, pressure, temperature, etc., and convert these to a common output signal for transmission to a controlling, indicating, or recording instrument.

**uncertainty, maximum:** the maximum difference between the true value of the quantity measured and the observed value.

**uncertainty, random:** an uncertainty that causes readings to take random values on either side of some mean value. Measurements may be precise or imprecise depending on how well an instrument can reproduce subsequent readings of an instrument's unchanged input.

**uncertainty, systematic:** an uncertainty that persists and cannot be considered as due entirely to chance. Systematic errors can be corrected by calibration.

### 4. CLASSIFICATIONS

4.1 **General** The practices and procedures covered in this standard range from relatively simple applications of measuring the flow rate of a single stream of air brought to the measuring device (which performs its function and then discharges the stream to the atmosphere) to fairly complex systems designed to measure two or more streams entering and/or leaving a product, take leakage and/or ventilation within the product into account, and return the main and leakage streams to the product.

4.2 **Products** Air-conditioning, heating, ventilating, and refrigerating products for which airflow measurements are required may be classified by their relationship within a complete heating, ventilating, air-conditioning, or refrigerating system.

4.2.1 **Unitary Equipment** This covers products in which the intended functions of heating, humidifying, cooling, dehumidifying, and means for air moving of one or more streams of air, such as conditioned or refrigerated air, are carried out in a factory-assembled package or packages designed by the manufacturer to be used together. These products may be supplemented by one or more duct systems plus fans, registers, grilles, filters, and other accessories as required to form the complete heating, ventilating, air-conditioning, or refrigerating system. Some examples are:

- a. unitary air conditioners,
- b. unitary heat pumps,
- c. room air conditioners,
- d. packaged terminal air conditioners and heat pumps,
- e. central forced-circulation warm-air furnaces.