STANDARD

ANSI/ASHRAE Standard 130-2016
(Supersedes ANSI/ASHRAE Standard 130-2008)

Laboratory Methods of Testing Air Terminal Units

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ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

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a. interpretation of the contents of this Standard,
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c. offering constructive criticism for improving the Standard, or
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NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

First published in 1996 and reaffirmed in 2006, Standard 130 specifies instrumentation, test installation methods, and procedures for determining the capacity and related performance in a laboratory controlled environment of constant-volume and variable-volume air terminal units. The standard is classified as an ASHRAE standard method of measurement. This standard is required for compliance with AHRI Standard 880.

The 2016 revision of the standard includes updates and revisions to all parts of the standard, including its title, purpose, and scope. It updates definitions, redefines airflow sensor performance testing, and adds a method to determine terminal-unit total pressure loss coefficients and the relationship between terminal-unit casing leakage and pressure.

1. PURPOSE

The standard specifies instrumentation, test installation methods, and procedures for measuring the capacity and related performance of constant-volume, variable-volume, and modulating integral diffuser air terminals.

2. SCOPE

2.1 The methods of test in this standard apply to air control devices used in air distribution systems. These devices provide control of air volume with or without temperature by one or more of the following means and may or may not include a fan:

a. Fixed or adjustable directional vanes (i.e., bypass terminal)
b. Pressure-dependent volume dampers or valves (including air induction nozzles and dampers)
c. Pressure-independent volume dampers or valves (including air induction nozzles and dampers)
d. Integral heat exchanger
e. On/off fan control
f. Variable-speed fan control
g. Modulating integral diffuser terminals

2.2 This standard covers test methods for use in determining the following performance characteristics:

a. Sound power
b. Temperature mixing and stratification
c. Minimum operating pressure
d. Air leakage
e. Induced airflow
f. Fan airflow
g. Fan motor electrical power
h. Condensation
i. Airflow sensor performance

2.3 This standard shall not be used for field testing.

3. DEFINITIONS AND SYMBOLS

3.1 Definitions

accuracy: degree of conformity of an indicated value to an accepted standard value, or true value. The degree of inaccuracy is known as "total measurement error" and is the sum of bias error and precision error.

acoustically isolated duct: ductwork for which, in all frequency bands of interest, the breakout sound level is at least 10 dB less than the transmitted sound level of the terminal unit under test. Refer to Informative Appendix G for a detail of an acoustically isolated duct.

air terminal unit: device that automatically modulates the volume of air delivered to or removed from a defined space.

amplification factor (F): ratio of sensor output (p_{sensor}) to velocity pressure (p_v) as defined by Equation 1:

$$F = \frac{p_{sensor}}{p_v} \quad (1)$$

where

F = amplification factor, dimensionless

P_{sensor} = sensor output, in. of water (Pa)

p_v = velocity pressure at sensor location, in. of water (Pa)

Example: a sensor with a reading of 1.0 in. of water (250 Pa) pressure at a velocity pressure of 0.43 in. of water (108 Pa) has an amplification factor of 2.3.

bias error: difference between the true value to be measured and the indicated value from the measuring system that persists and is usually due to the particular instrument or technique of measurement.

bypass terminal unit: a terminal unit, typically having more than one outlet, that uses a method of volume modulation whereby airflow is varied by distributing the volume required to meet the space requirements, the balance of supply/exhaust air being diverted away from the space.

discharge sound power level: sound power that is transmitted from the terminal outlet.

dual-duct terminal unit: air terminal that mixes varying portions of two independent sources of primary air.

equivalent diameter: diameter of a circular-duct equivalent that has a cross-sectional area equal to a particular rectangular duct. Equivalent diameter is calculated by the following equation:

$$D_e = \left(\frac{4A}{\pi}\right)^{0.5} \quad (2)$$

exhaust sound power level: sound power that is transmitted from an exhaust terminal inlet back to the room (counter to the airflow).

exhaust terminal unit: terminal unit for regulating exhaust or return airflow.