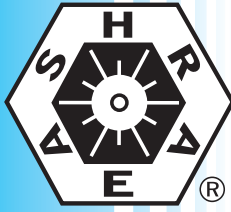


ANSI/ASHRAE Standard 70-2006
(Supersedes ANSI/ASHRAE Standard 70-1991)



ASHRAE STANDARD

Method of Testing the Performance of Air Outlets and Air Inlets

Approved by the ASHRAE Standards Committee on June 24, 2006; by the ASHRAE Board of Directors on June 29, 2006; and by the American National Standards Institute on June 30, 2006.

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ISSN 1041-2336



www.ansi.org

**American Society of Heating, Refrigerating
and Air-Conditioning Engineers, Inc.**

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NOTE

When addenda, interpretations, or errata to this standard have been approved, they can be downloaded free of charge from the ASHRAE Web site at <http://www.ashrae.org>.

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FOREWORD

This standard was first published in 1972 and revised in 1991. This current edition of the standard updates the 1991 edition by covering a broader range of air-device types and sizes, by specifying commercially available test instruments that have increased accuracy, by defining test facilities and installation procedures to better reflect the device under investigation at its intended application, and by clarifying methods of calculating test data so they apply to the broader range of air devices now available in the market.

1. PURPOSE

The purpose of this standard is to define laboratory methods of testing air outlets and air inlets used to terminate ducted and unducted systems for distribution and return of building air.

2. SCOPE

2.1 This standard includes the specifications for test instruments, facilities, installations, and procedures and methods of calculation for determining aerodynamic performance and sound generation of air outlets and air inlets.

2.2 The test methods in this standard apply to both isothermal and non-isothermal conditions.

3. DEFINITIONS

The following terms are defined as they are used in this standard. For definitions of all other terms, refer to *ASHRAE Terminology of Heating, Ventilation, Air Conditioning, & Refrigeration*.

air inlet: a device through which air is removed or returned from a conditioned space. Grilles, registers, diffusers, and slots may be used as air inlets.

air outlet: a device or opening through which air is discharged into a conditioned space. In this standard, all accessories, connecting duct adapters, or other mounting airways may be considered part of the outlet device being tested and, when they are so considered, shall be reported as a unit or assembly. Some specific outlet designations are defined below.

grille: a louvered or perforated face over an opening.

register: a combination grille and damper assembly.

diffuser: an outlet designed to distribute air in varying directions and planes.

slot: a long, narrow air outlet, generally one for which the aspect ratio is greater than 10:1.

airflow rate (Q): the volume of standard air per unit of time that moves past a given plane, expressed in cubic feet per minute (cfm) or liters per second (L/s).

airstream patterns: airstream patterns are characterized by the following terms:

drop (D): the maximum distance, in ft (m), that the vertical isovel of a horizontally projected (non-isothermal) airstream drops below the centerline of the outlet for the terminal velocity of interest (see Figure 1a).

envelope: the boundary surface of points of equal terminal velocity that describe the air diffusion profile. Envelope is also referred to as *isovel* (see Figure 1b).

rise: the maximum distance, in ft (m), that the vertical isovel of a horizontally projected (non-isothermal) airstream rises above the centerline of the outlet for the terminal velocity of interest (see Figure 1c).

spread: the distance, in ft (m), measured parallel or perpendicular to the mounting plane of the outlet between the extremes of the terminal velocity envelope (see Figure 1d).

terminal velocity (V_t): an arbitrarily specified air velocity that is the highest sustained velocity in the mixed airstream from an air outlet.

throw: the distance, in ft (m), from the center of the outlet perpendicular to a point in the mixed airstream where the velocity has been reduced to a specified terminal velocity (see Figure 1b).

area factor (A_k): a calculated area, in ft² (m²), of an air outlet or air inlet determined from the airflow rate (Q) divided by the discharge or intake velocity (V_k).

$$A_k = \frac{Q}{V_k} \quad (3-1)$$

aspect ratio: the ratio of the nominal length to width of a rectangular outlet.

core area: the area of a register or grille pertaining to its frame or border, whichever is less (see Figure 1e).

discharge or intake velocity (V_k): the air velocity, in fpm (m/s), determined from measurements taken with a specified instrument at specified locations and with a specified orientation on the air outlet or air inlet.

equivalent diameter (D_e): the diameter of a circular-duct equivalent that will have a cross-sectional area that is equal to that of a particular square or rectangular duct. The equivalent diameter is calculated by the following equation:

$$D_e = \sqrt{\frac{4 \times A}{\pi}} \quad (3-2)$$

face area: the area, in ft² (m²), of the exposed surface of an air outlet or air inlet (see Figure 1e).

free area: the total minimum area, in ft² (m²), of the openings in an air outlet or air inlet through which air is able to pass. Free