CONTENTS
ANSI/ASHRAE Standard 70-2023
Method of Testing the Performance of Air Outlets and Air Inlets

NOTE

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(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

ASHRAE Standard 70 was first published in 1972 and was revised in 1991 and again in 2006. This 2023 edition of the standard updates the 2006 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 that they apply to the broader range of air devices now available in the market, including displacement ventilation and underfloor outlets.

Additions and changes to this standard include the following:

- *Definitions and test methods were added for displacement ventilation.*
- *A test procedure was added for air outlets in underfloor applications.*
- *References were updated in Appendix A.*
- *New Informative Appendix E was added for displacement ventilation draft risk assessment for air outlets.*
- *New Normative Appendix F was added for rotating vane anemometer flow measuring systems.*

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* [1].

adjacent (clear) zone: a horizontal distance from a displacement diffuser such that the conditions within this boundary may result in local thermal discomfort (Figure 7). (***Informative Note:*** Local thermal discomfort for a displacement diffuser often occurs at the ankle level [4 in. (0.35 m) above the floor] when air speed exceeds 40 ft/min [0.2 m/s].)

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 as follows.

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 litres 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 1).

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 2).

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 3).