ANSI/ASHRAE Standard 113-2009
(Supersedes ANSI/ASHRAE Standard 113-2005)

ASHRAE STANDARD

Method of Testing for Room Air Diffusion

Approved by the ASHRAE Standards Committee on June 20, 2009; by the ASHRAE Board of Directors on June 24, 2009; and by the American National Standards Institute on June 25, 2009.

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ISSN 1041-2336

Approved American National Standard
ANSI
www.ansi.org

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
1791 Tullie Circle NE, Atlanta, GA 30329
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CONTENTS

ANSI/ASHRAE Standard 113-2009
Method of Testing for Room Air Diffusion

NOTE

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FOREWORD

This is a revision of Standard 113-2005. This standard was prepared under the auspices of the American Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE). It may be used, in whole or in part, by an association or government agency with due credit to ASHRAE. Adherence is strictly on a voluntary basis and merely in the interest of obtaining uniform standards throughout the industry. This version updates the references section, informative appendices, and superscript references cited in the text.

1. PURPOSE

The purpose of this standard is to define a repeatable method of testing the steady-state air diffusion performance of an air distribution system in occupied zones of building spaces. This method is based on air velocity and air temperature distributions at specified heating or cooling loads and operating conditions.

2. SCOPE

2.1 This standard specifies equipment and procedures for measuring air speed and air temperature in occupied zones of building spaces.

2.2 This standard applies to furnished or unfurnished spaces (actual or mock-up), with or without occupants.

2.3 This standard applies to air distribution systems, including systems in which:

(a) air outlets are located inside, inside and outside, or outside of the occupied zone and

(b) local air velocities in the occupied zone that are or are not under control by individual occupants.

2.4 This standard does not cover:

(a) rating of individual air outlets and inlets or

(b) naturally ventilated building spaces.

3. DEFINITIONS

***air delivery rate* (Q/A):** the air volume flow rate per unit area of the entire floor space being conditioned.

air diffusion: the introduction of air into a building space for the purpose of providing acceptable velocity and temperature distribution in the occupied zone.

air diffusion performance index (ADPI): a single number rating of the air diffusion performance of a mixing system at specified supply air conditions and space cooling load. ADPI is based on air speed and effective draft temperature (see Section B.1 in Appendix B).

air distribution: the delivery of air through ducts or plenums.

air outlet: any device for supplying air to a space, such as a diffuser, a grille, or a register.

air inlet: any device through which air is removed from a conditioned space.

***air temperature* (t):** the temperature of the air measured at a test point.

***average air outlet speed*, (V_o):** the time-averaged speed of the air from each individual supply air outlet.

***average supply air outlet temperature* (t_{dc}):** the average value of the individual corrected supply air outlet temperatures, measured at the same time as each of the test position measurements.

***average test zone air temperature* (t_a):** the average of all corrected air temperatures within the test zone (see Section A.2 in Appendix A).

clear zone: When outlets are placed within or near the test zone, a clear zone is defined as the space around the outlet within which long-term occupancy is not recommended.

control temperature: the temperature at the location of the test zone controlling device (e.g., a room thermostat).

***corrected air temperature* (t_{acn}):** the temperature at a test point, *n*, corrected for room temperature swing (see Section A.1 in Appendix A).

design temperature: the specified desired temperature of the test zone.

displacement ventilation (DV) system: a type of air distribution system, used only for cooling purposes, in which air at a temperature below room temperature is supplied to the floor level at a low discharge velocity [<100 fpm (0.5m/s)] and is returned near ceiling level. Thermal plumes that develop over heat sources in the room drive the overall floor-to-ceiling air motion, producing a stratified environment with cooler and fresher air near the floor and warmer and less fresh air near the ceiling (see Section B.2 in Appendix B).

draft: an unwanted local cooling of the body caused by air movement.

draft rating index (DR): an index that establishes a quantitative prediction of the percentage of occupants dissatisfied due to draft.

***effective draft temperature* (θ):** a calculated temperature difference that combines air temperature difference and measured air speed at each test point (see Section A.3 in Appendix A).

interior zone: any space not affected by exterior loads.

mixing system: a type of air distribution system in which conditioned air is delivered to the space at a velocity sufficient to promote complete mixing of supply air with room air, thereby maintaining the entire volume of air in the space at a relatively uniform temperature, humidity, and air-quality condition. A conventional overhead air distribution, which supplies and returns air at ceiling level, is an example of a mixing system.

occupied zone: the portion of the test space that is normally occupied. The occupied zone is typically defined as encompassing all space from the floor level to 6 ft (1.83 m) above the floor. ANSI/ASHRAE Standard 55-2004[1] also limits it by excluding the space from the wall to 2 ft (0.61 m) away from any wall, and