STANDARD

ANSI/ASHRAE Standard 200-2015

Methods of Testing Chilled Beams

Approved by ASHRAE on February 27, 2015, and by the American National Standards Institute on March 2, 2015.

 ISSN 1041-2336

Approved American National Standard
ANSI
www.ansi.org

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus Standard developed under the auspices of ASHRAE. *Consensus* is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this Standard as an ANS, as "substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution." Compliance with this Standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

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

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Senior Manager of Standards of ASHRAE should be contacted for

a. interpretation of the contents of this Standard,
b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard, or
d. permission to reprint portions of the Standard.

DISCLAIMER

ASHRAE uses its best efforts to promulgate Standards and Guidelines for the benefit of the public in light of available information and accepted industry practices. However, ASHRAE does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with ASHRAE's Standards or Guidelines or that any tests conducted under its Standards or Guidelines will be nonhazardous or free from risk.

ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS

ASHRAE Standards and Guidelines are established to assist industry and the public by offering a uniform method of testing for rating purposes, by suggesting safe practices in designing and installing equipment, by providing proper definitions of this equipment, and by providing other information that may serve to guide the industry. The creation of ASHRAE Standards and Guidelines is determined by the need for them, and conformance to them is completely voluntary.

In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.

CONTENTS

ANSI/ASHRAE Standard 200-2015, Methods of Testing Chilled Beams

NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE Web site 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

ASHRAE Standard 200 was written at the request of the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) to provide test instrumentation and facilities, installation methods, and procedures for determining the capacity and related performance of chilled beams. Procedures provided in this standard apply to active chilled beams.

This standard was prepared in cooperation with the AHRI Chilled Beams Section, and it is referenced in AHRI Standards 1240 (I-P) and 1241 (SI), Performance Rating of Active Chilled Beams, *as the method of test for the AHRI Active Chilled Beam (ACB) certification program.*

This standard was prepared by ASHRAE Standard Project Committee (SPC) 200. The cognizant technical committee is ASHRAE TC 5.3, Room Air Distribution.

1. PURPOSE

1.1 To define laboratory methods of testing chilled beams to determine performance.

2. SCOPE

2.1 Defines laboratory methods of testing chilled beams to determine performance.

2.2 Specifies test instrumentation, facilities, installation methods, and procedures for determining the performance of chilled beams.

3. DEFINITIONS AND SYMBOLS

3.1 Definitions Unless otherwise specified, refer to definitions listed on the ASHRAE Terminology website.†

active chilled beam: an air induction and diffusion device that introduces and conditions air for the purpose of temperature and/or humidity control. Primary air is delivered through a series of nozzles, which induces and conditions secondary air through a unit-mounted coil.

induced air: The flow of secondary air into a chilled beam resulting from a pressure differential within the beam and circulating through the coil.

octave band: a frequency band of sound with an upper limit that is twice the frequency of the lowest limit. The center frequency of an octave band is the geometric mean of its upper and lower limits. Table 1 shows octave bands 1 through 8.

passive chilled beam: a cooled element or coil fixed in, above, or below a ceiling that sensibly cools through natural convection using buoyancy-driven airflow. The cooling media in the coil is water.

† www.ashrae.org/resources--publications/free-resources/ashrae-terminology

TABLE 1 Octave Band Center Frequencies

Octave Band	Center Frequency, Hz
1	63
2	125
3	250
4	500
5	1000
6	2000
7	4000
8	8000

radiation shielded sensor: resistive temperature devices (RTDs) designed to measure dry-bulb air temperatures are susceptible to radiation heat transfer, and therefore the total temperature measured is the sum of the air temperature and the radiation component generated by a heat source or heat sink where present. Radiant shields must be attached to the RTD to minimize the effect of radiant heat transfer. The radiant shield must be designed such that the incoming radiation is deflected while not obstructing air currents. The maximum surface emissivity for the shield is 0.09. The shield must be made of a thin conductive film or metal with high thermal conductivity greater than 150 W/m·K. The inside of the shield must be designed to absorb incident radiation that may enter the shield through air vents, and interior emissivity must be greater than 0.75. (See Informative Annex D for more information.)

sound power: in a specified frequency band, the rate at which sound energy is radiated by a noise source, expressed in watts (W).

sound power level (L_w): ten times the logarithm to the base ten of the ratio of the *sound power* radiated by the source to a reference *sound power*, expressed in decibels (dB). The reference *sound power* used in this standard is 10 to 12 W.

sound pressure: in a specified frequency band, a fluctuating pressure superimposed on the static pressure by the presence of sound.

sound pressure level (L_p): twenty times the logarithm to the base ten of the ratio of the *sound pressure* radiated by the noise source under test to a reference *sound pressure* of 20 micropascals, expressed in decibels (dB).

3.2 Symbols

A_f	coil-free cross-sectional area perpendicular to direction of induced airflow, ft^2 (m^2)
a	empirical coefficient (different for I-P and SI units)
a'	empirical coefficient (different for I-P and SI units)
b	empirical coefficient (different for I-P and SI units)
b_s	center distance between thermal simulators (between 4 and 6 ft [1.2 and 1.8 m])
c	empirical coefficient (different for I-P and SI units)