



STANDARD

ANSI/ASHRAE Standard 16-1983 (RA 2014)
(Reaffirmation of ANSI/ASHRAE Standard 16-1983)

Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners

Approved by the ASHRAE Standards Committee on October 18, 1998, and reaffirmed on June 28, 2014; by the ASHRAE Board of Directors on January 27, 1999, and reaffirmed on July 2, 2014; and by the American National Standards Institute on October 20, 1998, and reaffirmed on July 3, 2014.

ASHRAE Standards are scheduled to be updated on a five-year cycle; the date following the standard number is the year of ASHRAE Board of Directors approval. The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

© 2014 ASHRAE

ISSN 1041-2336



ASHRAE Standard Project Committee 16
Cognizant TC: TC 8.11, Unitary and Room Air Conditioners and Heat Pumps
SPLS Liaison: Janice Peterson

Earl J. Gmoser, *Chair**
Robert J. Evans*
Charles W. Lester, Jr.*
Robert W. Miller*

Gerald C. Smith*
George E. Stocking*
John T. Weizeorick*

*Denotes members of voting status when the document was approved for publication

ASHRAE STANDARDS COMMITTEE 2013–2014

William F. Walter, *Chair*
Richard L. Hall, *Vice-Chair*
Karim Amrane
Joseph R. Anderson
James Dale Aswegan
Charles S. Barnaby
Steven F. Bruning
John A. Clark
Waller S. Clements

David R. Conover
John F. Dunlap
James W. Earley, Jr.
Steven J. Emmerich
Julie M. Ferguson
Krishnan Gowri
Cecily M. Grzywacz
Rita M. Harrold
Adam W. Hinge
Debra H. Kennoy

Malcolm D. Knight
Rick A. Larson
Mark P. Modera
Cyrus H. Nasser
Janice C. Peterson
Heather L. Platt
Douglas T. Reindl
Julia A. Keen, *BOD ExO*
Thomas E. Werkema, Jr., *CO*

Stephanie C. Reiniche, *Manager of Standards*

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 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 16-1983 (RA 2014), Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners

SECTION	PAGE
Foreword.....	2
1 Scope and Purpose	2
2 Definitions	2
3 Basis of Testing for Rating.....	3
4 Calorimeters	3
5 Instruments	6
6 Cooling Capacity Test.....	6
7 Airflow Measurements	8
8 References	10

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.

© 2014 ASHRAE

1791 Tullie Circle NE · Atlanta, GA 30329 · www.ashrae.org · All rights reserved.

ASHRAE is a registered trademark of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
ANSI is a registered trademark of the American National Standards Institute.

(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

This standard prescribes a method of testing for obtaining cooling capacity and airflow quantity for rating room air conditioners and packaged terminal air conditioners.

The standard originally evolved from the American Society of Refrigerating Engineers' (ASRE) Circular 13-42, Standard Methods of Rating and Testing Air Conditioning Equipment, and ASRE Standard 16-56, was first issued as ASHRAE Standard 16-1961, Method of Testing for Rating Room Air Conditioners, with revisions in 1969 and 1983.

The 1983 standard was approved by the ASHRAE Standards Committee on September 16, 1983; by the ASHRAE Board of Directors on December 1, 1983; and by the American National Standards Institute on February 24, 1984.

The standard was reaffirmed with minor editorial changes by the Standards Committee on January 31, 1988 and October 18, 1998. The ASHRAE Board of Directors approved the reaffirmation on June 30, 1988 and on January 27, 1999 and the American National Standards Institute on June 30, 1988 and October 20, 1998.

This is a reaffirmation of Standard 16-1983 (RA 1999). This standard was prepared under the auspices of the American Heating Refrigerating and Air-Conditioning Engineers (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 interests of obtaining uniform standards throughout the industry.

This 2014 version of the reaffirmation has no updates included other than a revised foreword and Standards Committee roster. A revised version of this standard will be released for public review in the near future.

1. SCOPE AND PURPOSE

1.1 Scope

1.1.1 This standard prescribes a method of testing for obtaining cooling capacity and airflow quantity for rating room air conditioners and packaged terminal air conditioners.

1.1.2 For purposes of this standard:

- (a) A room air conditioner is defined as an encased assembly designed as a unit, primarily for mounting in a window or through the wall or as a console. It is designed primarily to provide free delivery of conditioned air to an enclosed space, room, or zone. It includes a prime source of refrigeration and dehumidification and means for circulating and cleaning air and may also include means for heating and ventilating.
- (b) A packaged terminal air conditioner is a factory selected combination of heating and cooling

components, assemblies, or sections, intended to serve an individual room or zone.

1.1.3 Room conditioners employing water-cooled condensers are included in this standard.

1.1.4 This standard does not prescribe methods of testing for obtaining heating capacity (see ASHRAE Standard 58-1986).¹

1.2 Purpose

The purpose of this standard is to

- (a) establish a uniform method of testing for obtaining rating data,
- (b) specify types of test equipment for performing such tests,
- (c) specify data required and calculations to be used, and
- (d) list and define the terms used in testing.

1.3 Method of Using This Standard

1.3.1 Determine whether this standard is applicable by review of Sections 1 and 2.

1.3.2 Select the type of room calorimeter from Section 4, the instrumentation from Section 5, and the airflow measuring equipment from Section 7. Instruments other than those described in these sections may be used provided the accuracy is within the limits defined herein. Such acceptable alternatives shall be limited to those described in the *1997 ASHRAE Handbook—Fundamentals*, chapter on measurements and instruments.²

1.3.3 Test and calculate ratings in accordance with appropriate methods in Sections 6 and 7.

2. DEFINITIONS

Accuracy of readings: where percentage limits of readings are given herein, the reference basis is the magnitude of the greater quantity measured and not the scale of instrument.

Evaporative equilibrium of a wet-bulb thermometer: the condition obtained when the wetted wick surrounding the temperature-sensing bulb has reached a state of constant temperature. When the temperature-sensing bulb and wick are exposed to air at velocities of approximately 1000 fpm (5 m/s), the temperature indicated by the thermometer may be considered a true wet-bulb temperature.

Exhaust airflow of an air conditioner: the amount of room air delivered to the outside directly through the unit.

Free delivery type air conditioner: takes in air and discharges it directly to the space to be treated without external elements that impose air resistance.

Leakage airflow: the amount of air interchanged between the room side and outdoor side through a unit as a result of construction features or faulty sealing techniques.

Net latent cooling effect: the total useful capacity of the air conditioner for removing water vapor from the space to be conditioned.

Net sensible cooling effect: the difference between the net total cooling effect and the dehumidifying effect.