ANSI/ASHRAE Standard 29-1988 (RA 2005)
Reaffirmation of ANSI/ASHRAE Standard 29-1988 (RA 99)

ASHRAE STANDARD

Methods of Testing Automatic Ice Makers

This standard was approved by the ASHRAE Standards Committee on January 23, 1999, and reaffirmed June 25, 2005; by the ASHRAE Board of Directors on January 27, 1999, and reaffirmed June 30, 2005; and by the American National Standards Institute on October 14, 1999, and reaffirmed July 1, 2005.

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 copies may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in US and Canada).

ISSN 1041-2336

Approved American National Standard
ANSI

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

ASHRAE Standard Project Committee 29-1988 (RA 2005)
Cognizant TC: TC 10.2, Automatic Icemaking Plants and Skating Rinks

Jeff J. Anselmino, *Chair**
Robert A. Essig*
Mark W. Paquette*
Edward C. Potthoff*
John Schlafter*
Ken Schneider*
Michael W. Woodford*
Dong Tian-Lu*

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

ASHRAE STANDARDS COMMITTEE 2004-2005

Dean S. Borges, *Chair*
Richard D. Hermans, *Vice-Chair*
Donald B. Bivens
Paul W. Cabot
Hugh F. Crowther
Brian P. Dougherty
Hakim Elmahdy
Matt R. Hargan
Roger L. Hedrick
John F. Hogan
Frank E. Jakob
Stephen D. Kennedy
David E. Knebel
Merle F. McBride
Mark P. Modera
Cyrus H. Nasseri
Davor Novosel
George Reeves
John Sabelli
Stephen V. Santoro
Gideon Shavit
David R. Tree
James E. Woods
Michael F. Beda, *BOD ExO*
William A. Harrison, *CO*

Claire B. Ramspeck, *Manager of Standards*

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (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,
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 29-1988 (RA 2005)
Methods of Testing Automatic Ice Makers

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.

1. PURPOSE AND SCOPE

1.1 Purpose

The purposes of this standard are:

1.1.1 To specify methods and procedures to be used when testing automatic ice makers.

1.1.2 To establish the types of equipment to which the provisions of the standard apply.

1.1.3 To define terms describing the equipment covered and terms related to testing.

1.1.4 To specify type of instrumentation and test apparatus required in testing.

1.1.5 To specify a uniform method for calculation of results.

1.1.6 To specify data and results to be recorded.

1.2 Scope

1.2.1 This standard prescribes the methods of testing automatic ice makers.

1.2.2 The automatic ice maker may comprise one or more sections for shipping purposes.

1.2.3 This standard does not include automatic ice makers installed in household refrigerators, combination refrigerator-freezers, and household freezers.

2. DEFINITIONS

automatic ice-maker: a factory-made assembly (not necessarily shipped in one package) consisting of a condensing unit and ice-making section operating as an integrated unit, with means for making and harvesting ice. It may also include means for storing or dispensing ice, or both.

batch-type: an ice maker having alternate freezing and harvesting periods.

blow-down: the dissipation of a certain fraction of water to control the clarity of ice or to prevent scaling.

continuous type: an icemaker that continually freezes and harvests ice at the same time.

3. CLASSIFICATION

3.1 Method of Rejecting Heat

3.1.1 Water-cooled condenser.

3.1.2 Air-cooled condenser.

3.2 Type of Ice Harvested

3.2.1 Ice in irregular shapes of chips, flakes, ribbons, or wafers, as well as uniformly shaped ice of not over approximately 2 oz (56 g).

4. INSTRUMENTS AND APPARATUS

4.1 Test Room

4.1.1 Ambient Temperature. With the ice maker under test at rest, the vertical ambient temperature gradient in any foot (meter) of vertical distance from 2 in. (51 mm) above the floor or supporting platform to a height of 7 ft (2.1 m) or to a height of 1 ft (0.3 m) above the top of the cabinet, whichever is greater, shall not exceed 0.5°F per ft (0.91°C per meter).

4.1.2 Air Circulation. With the ice maker under test at rest, ambient air movement, created by any source external to the unit, shall not impinge upon the air inlet openings with a velocity greater than 50 fpm (0.25 m/s).

4.2 Temperature-Measuring Instruments

4.2.1 Types. Temperature shall be measured with instruments of any type having the specified accuracies at the temperatures of use.

4.2.2 Accuracy and readability each shall be within ±1.0°F. (In no case shall the smallest scale division of the temperature-measuring instrument exceed 2°F [1.1°C].)

4.2.3 Where an accuracy closer than ±1.0ºF (0.56°C) is specified, the instrument shall be calibrated by comparison with a certified standard in the range of use or shall itself be certified as to accuracy.

4.3 Electrical Instruments

4.3.1 Accuracy and readability each shall be within ±2.0% of the quantity measured.

4.3.2 Input power shall be measured with an integrating watt-hour meter graduated to 0.01 kWh.

4.4 Water Flow-Measuring Instruments

4.4.1 Flow shall be measured by one or more of the following methods having an accuracy and readability each of ±2.0% of quantity measured:

(a) Liquid quantity, measuring either mass or volume.

(b) Integrating type liquid flowmeter.

4.5 Ice-Weighing Instruments

4.5.1 Unless otherwise specified, ice made by the ice maker under test shall be weighed on an instrument having an accuracy and readability each of ±1.0% of the quantity measured.

4.5.2 The intercepted ice sample shall be obtained and weighed in one of the following containers of predetermined mass (insulated if desired):

(a) Perforated pan, bucket, or wire basket.

(b) Nonperforated pan or bucket.

5. TEST METHODS

5.1 The specified voltage shall be measured at the ice maker service connection, with the ice maker in operation, and shall not vary more than ±2% during the test.

5.2 The temperature of the supply water within conduit shall be measured within 8 in. (203 mm) of the machine by inserting the temperature-measuring instrument directly within the water stream or within a well inserted into the conduit. Water temperature shall be maintained within ±1°F (0.56°C) of the specified temperature.

5.3 For an air-cooled ice maker, ambient temperature shall be measured at a minimum of two places, with the measuring devices centered 1 ft (0.3 m) from the air inlet. Where more than one inlet is provided, a temperature-measuring instrument shall be located at each inlet and the average temperature recorded.