

ANSI/ASHRAE Standard 29-2009
(Supersedes ANSI/ASHRAE 29-1988 [RA 2005])



ASHRAE STANDARD

Method of Testing Automatic Ice Makers

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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 www.ashrae.org.

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FOREWORD

First published in 1988 and reaffirmed in 1999 and 2005, Standard 29 has been significantly revised in this latest edition. The primary change is to clarify the status of Annex A (formerly Appendix A). This previously informative appendix described several possible methods of calorimetry testing, but in this revision, it has been changed to a normative annex and modified to specify a single mandatory method of testing. In addition, the descriptions of laboratory testing equipment have been updated in the body of the standard, and editorial improvements have been made throughout.

In Memoriam

The members of SPC 29 are saddened by the passing of Michael Martin, the chair of our project committee, shortly before this revised standard was published. Michael was a good friend and a determined leader of our efforts. Over the years, few ASHRAE members volunteered to take on more challenges than Michael did. It has been a pleasure working with him, and we will miss him.

1. PURPOSE

This standard prescribes a method of testing automatic ice makers by

- a. specifying procedures to be used when testing automatic ice makers,
- b. establishing the types of equipment to which the provisions of the standard apply,
- c. defining terms describing the equipment covered and terms related to testing,
- d. specifying the type of instrumentation and test apparatus required in testing,
- e. specifying a uniform method for calculation of results, and
- f. specifying data and results to be recorded.

2. SCOPE

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

3. DEFINITIONS

automatic ice maker: a factory-made assembly 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. The

automatic ice maker may be composed of one or more sections for shipping purposes.

batch-type ice maker: an ice maker having alternate freezing and harvesting periods. Also referred to as a *cube-type ice maker*.

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

dump water: the water drainage from an ice maker to control the clarity of ice or to prevent scaling.

pure ice: ice made by using water with less than 5 ppm of solids concentration.

4. CLASSIFICATION

4.1 Method of Rejecting Heat

- 4.1.1 Water-cooled condenser
- 4.1.2 Air-cooled condenser

4.2 Type of Ice Harvested

- 4.2.1 Ice in irregular shapes of chips, flakes, ribbons, or wafers
- 4.2.2 Uniformly shaped ice of not over 56 g (2 oz)

5. INSTRUMENTS AND APPARATUS

5.1 Test Room

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

5.1.2 Air Circulation. With the ice maker 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 0.25 m/s (50 fpm).

5.2 Temperature-Measuring Instruments

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

5.2.2 Accuracy and readability each shall be within $\pm 0.56^\circ\text{C}$ (1.0°F). In no case shall the smallest scale division of the temperature-measuring instrument exceed 1.1°C (2°F).

5.2.3 Where accuracy greater than $\pm 0.56^\circ\text{C}$ (1.0°F) 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.

5.3 Electrical Instruments

5.3.1 Accuracy and readability shall each be within $\pm 2.0\%$ of the quantity measured.

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

5.4 Water Flow-Measuring Instruments

5.4.1 Flow shall be measured by one or more of the following methods and have an accuracy and a readability each of $\pm 2.0\%$ of the quantity measured: