



ENERGY STAR® Program Requirements for Automatic commercial ice makers

Partner Commitments

Following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacture and labeling of ENERGY STAR qualified products. The ENERGY STAR Partner must adhere to the following partner commitments:

Qualifying Products

1. Comply with current ENERGY STAR Eligibility Criteria, which define performance requirements and test procedures for automatic commercial ice makers. A list of eligible products and their corresponding Eligibility Criteria can be found at www.energystar.gov/specifications.
2. **Prior to associating the ENERGY STAR name or mark with any product**, obtain written certification of ENERGY STAR qualification from a Certification Body recognized by EPA for automatic commercial ice makers. As part of this certification process, products must be tested in a laboratory recognized by EPA to perform commercial ice maker testing. A list of EPA-recognized laboratories and Certification Bodies can be found at www.energystar.gov/testingandverification.

Using the ENERGY STAR Name and Marks

3. Comply with current ENERGY STAR Identity Guidelines, which define how the ENERGY STAR name and marks may be used. Partner is responsible for adhering to these guidelines and ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance. The ENERGY STAR Identity Guidelines are available at www.energystar.gov/logouse.
4. Use the ENERGY STAR name and marks only in association with qualified products. Partner may not refer to itself as an ENERGY STAR Partner unless at least one product is qualified and offered for sale in the U.S. and/or ENERGY STAR partner countries.
5. Provide clear and consistent labeling of ENERGY STAR qualified automatic commercial ice makers.
 - 5.1. The ENERGY STAR mark must be clearly displayed on the front of the product, in product literature (i.e., user manuals, spec sheets, etc.), and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed.
 - 5.2. It is also recommended that the mark appear on the product packaging.

Verifying Ongoing Product Qualification

6. Participate in third-party verification testing through a Certification Body recognized by EPA for automatic commercial ice makers, providing full cooperation and timely responses. EPA/DOE may also, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at the government's request.

Providing Information to EPA

7. Provide unit shipment data or other market indicators to EPA annually to assist with creation of ENERGY STAR market penetration estimates, as follows:
 - 7.1. Partner must submit the total number of ENERGY STAR qualified automatic commercial ice makers shipped in the calendar year or an equivalent measurement as agreed to in advance by EPA and Partner. Partner shall exclude shipments to organizations that rebrand and resell the shipments (unaffiliated private labelers).
 - 7.2. Partner must provide unit shipment data segmented by meaningful product characteristics (e.g., type, capacity, presence of additional functions) as prescribed by EPA.
 - 7.3. Partner must submit unit shipment data for each calendar year to EPA or an EPA-authorized third party, preferably in electronic format, no later than March 1 of the following year.

Submitted unit shipment data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner.
8. Report to EPA any attempts by recognized laboratories or Certification Bodies (CBs) to influence testing or certification results or to engage in discriminatory practices.
9. Notify EPA of a change in the designated responsible party or contacts within 30 days using the My ENERGY STAR Account tool (MESA) available at www.energystar.gov/mesa.

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures, and should keep EPA informed on the progress of these efforts:

- Provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.
- Consider energy efficiency improvements in company facilities and pursue benchmarking buildings through the ENERGY STAR Buildings program.
- Purchase ENERGY STAR qualified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR qualified product information to employees for use when purchasing products for their homes.
- Feature the ENERGY STAR mark(s) on Partner website and other promotional materials. If information concerning ENERGY STAR is provided on the Partner website as specified by the ENERGY STAR Web Linking Policy (available in the Partner Resources section of the ENERGY STAR website), EPA may provide links where appropriate to the Partner website.
- Ensure the power management feature is enabled on all ENERGY STAR qualified displays and computers in use in company facilities, particularly upon installation and after service is performed.
- Provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR qualified products.
- Provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, and communicate Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR website, etc. The plan may be as simple as providing a list of planned activities or milestones of which Partner would like EPA to be aware. For example, activities may include: (1) increasing the availability of ENERGY STAR qualified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrating the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) providing information to users (via the website and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products; and (4)

building awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event.

- Join EPA's SmartWay Transport Partnership to improve the environmental performance of the company's shipping operations. The SmartWay Transport Partnership works with freight carriers, shippers, and other stakeholders in the goods movement industry to reduce fuel consumption, greenhouse gases, and air pollution. For more information on SmartWay, visit www.epa.gov/smartway.
- Join EPA's Green Power Partnership. EPA's Green Power Partnership encourages organizations to buy green power as a way to reduce the environmental impacts associated with traditional fossil fuel-based electricity use. The partnership includes a diverse set of organizations including Fortune 500 companies, small and medium businesses, government institutions as well as a growing number of colleges and universities. For more information on Green Power, visit www.epa.gov/greenpower.



ENERGY STAR® Program Requirements Product Specification for Automatic Commercial Ice Makers

Eligibility Criteria Version 2.0

Following is the **Version 2.0** product specification for ENERGY STAR qualified Automatic Commercial Ice Makers. A product shall meet all of the identified criteria if it is to earn the ENERGY STAR.

1) Definitions: Provided below are definitions of the relevant terms in this document.

- A. Automatic Commercial 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 is an assembly that makes up to 4,000 lbs of ice per day, and may also include means for storing or dispensing ice, or both.
- B. Air-Cooled: An ice maker wherein motor driven fans or centrifugal blowers move air through the condenser to remove heat from the refrigerant.
- C. Water-Cooled: An ice maker that utilizes water running through the condenser to remove heat from the refrigerant.
- D. Batch-Type Ice Maker: An ice maker having alternate freezing and harvesting periods. This includes automatic commercial ice makers that produce cube type ice and other batch technologies. Referred to as cube type ice maker in AHRI Standard 810.
- E. Cube Type Ice: means ice that is fairly uniform, hard, solid, usually clear, and generally weighs less than two ounces (60 grams) per piece, as distinguished from flake, crushed, or fragmented ice. Note that this conflicts and takes precedence over the definition established in AHRI 810 (incorporated by reference, see § 431.133), which indicates that “cube” does not reference a specific size or shape.
- F. Continuous-Type Ice Maker: An ice maker that continually freezes and harvests ice at the same time. The following ice types are produced by continuous machines:
 - a) Flake: typically used for cooling food, commercial and industrial process cooling, and special medical and scientific cooling applications.
 - b) Nugget: typically used for cooling water and beverage drinks, and for a chewable ice with a softer consistency than cube ice.

Ice Machine Categories

- G. Ice Making Head (IMH): A model with the ice-making mechanism and the condensing unit in a single package, but with a separate ice storage bin.
- H. Remote Condensing Unit (RCU) or Split System Unit: A model in which the ice-making mechanism and condenser or condensing unit are in separate sections. This includes ice makers with and without remote compressor.

- I. Self-Contained Unit (SCU): A model in which the ice-making mechanism and storage compartment are in an integral cabinet.

Metric Definitions

- J. Energy Consumption Rate: Total energy input rate, stated in kWh/100 lb [kWh/45.0 kg] of ice, stated in multiples of 0.01. For remote condensing (but not remote compressor) automatic commercial ice makers and remote condensing and remote compressor automatic commercial ice makers, total energy consumed shall include the energy use of the ice-making mechanism, the compressor, and the remote condenser or condensing unit.
- K. Ice Harvest Rate: The gross weight of ice harvested, stated in lb/24 h [kg/24 h], stated in multiples of 1.
- L. Ice Hardness Factor: The latent heat capacity of harvested ice (Btu/lb) divided by 144 Btu/lb expressed as a percent.
- M. Potable Water Use: The amount of potable water used in making ice, which is equal to the sum of the ice harvested, Dump or Purge Water, and the Harvest Water expressed in gal/100 lb [L/45.0 kg] of ice, stated in multiples of 0.1. Alternatively, the amount of water entering the icemaker per cycle can be measured.
- N. Dump or Purge Water: The water from the ice making process that is not frozen at the end of the freeze cycle and is discharged from a batch and continuous-type Automatic Commercial Ice-Maker.
- O. Harvest Water: The water that has been collected with the ice used to measure the machine's capacity.
- P. Basic Model: All units of a given type manufactured by one manufacturer, having the same primary energy source, and which have essentially identical electrical, physical, and functional (or hydraulic) characteristics that affect energy consumption, energy efficiency, water consumption, or water efficiency.

2) Scope:

- A. Included Products: Products that meet the definition of an Automatic Commercial Ice Maker as specified herein that are air-cooled batch or continuous type, and of IMH, RCU, or SCU design, are eligible for ENERGY STAR qualification, with the exception of products listed in Section 2.B. Air-cooled RCU units designed for connection to remote rack compressors that are alternately sold (with the same model number) with a dedicated remote condensing unit are also eligible for ENERGY STAR qualification.
- B. Excluded Products: Water cooled ice makers, ice and water dispensing systems, and air-cooled RCU units that are designed only for connection to remote rack compressors are not eligible for ENERGY STAR qualification.

3) Qualification Criteria:

- A. Measure the energy use and potable water use of each covered product by conducting the test procedure set forth in Section 4. Compare the Energy Use and the measured Potable Water Use values to the ENERGY STAR minimum values presented in Tables 1 and 2.

- B. Energy Consumption Rate: The Energy Consumption Rate requirement is a function of harvest rate in the form of $L = A * H^a - b$, where L is the energy consumption rate requirement level, H is the ice harvest rate for the system under evaluation, A is a coefficient, a is an exponent, and b is a constant.

Table 1: ENERGY STAR Requirements for Air-Cooled Batch-Type Ice Makers			
Equipment Type	Applicable Ice Harvest Rate Range (lbs of ice/24 hrs)	Energy Consumption Rate (kWh/100 lbs ice)	Potable Water Use (gal/100 lbs ice)
IMH	$200 \leq H \leq 1600$	$\leq 37.72 * H^{-0.298}$	≤ 20.0
RCU	$400 \leq H \leq 1600$	$\leq 22.95 * H^{-0.258} + 1.00$	≤ 20.0
	$1600 \leq H \leq 4000$	$\leq -0.00011 * H + 4.60$	≤ 20.0
SCU	$50 \leq H \leq 450$	$\leq 48.66 * H^{-0.326} + 0.08$	≤ 25.0

Table 2: ENERGY STAR Requirements for Air-Cooled Continuous-Type Ice Makers		
Equipment Type	Energy Consumption Rate (kWh/100 lbs ice)	Potable Water Use (gal/100 lbs ice)
IMH	$\leq 9.18 * H^{-0.057}$	≤ 15.0
RCU	$\leq 6.00 * H^{-0.162} + 3.50$	≤ 15.0
SCU	$\leq 59.45 * H^{-0.349} + 0.08$	≤ 15.0

C. Significant Digits and Rounding:

- a. All calculations shall be carried out with directly measured (unrounded) values.
- b. Unless otherwise specified, compliance with specification limits shall be evaluated using directly measured or calculated values without any benefit from rounding.
- c. Directly measured or calculated values that are submitted for reporting on the ENERGY STAR website shall be rounded to 0.01 for energy consumption rate and 0.1 for potable water use.

5) **Test Requirements:**

- A. Units shall be selected for testing per the sampling requirements defined in 10 CFR § 429.45, which references 10 CFR § 429.11.
- B. When testing commercial ice makers, the following test methods shall be used to determine ENERGY STAR qualification:

Table 3: Test Methods for ENERGY STAR Qualification	
ENERGY STAR Requirement	Test Method Reference
Energy Consumption Rate (kWh/100 lbs ice)	ENERGY STAR Program Requirements - Product Specification for Automatic Commercial Ice Makers Test Method Version 2.0
Potable Water Use (gal/100 lbs ice)	

- 6) **Effective Date:** The ENERGY STAR Automatic Commercial Ice Maker specification shall take effect on **February 1, 2013**. To qualify for ENERGY STAR a product model shall meet the ENERGY STAR specification in effect on the model's date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.
- 7) **Future Specification Revisions:** EPA reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions. In the event of a specification revision, please note that the ENERGY STAR qualification is not automatically granted for the life of a product model.



ENERGY STAR® Program Requirements Product Specification for Automatic Commercial Ice Makers

Test Method Version 2.0

1 OVERVIEW

The following test method shall be used for determining product compliance with requirements in the ENERGY STAR Eligibility Criteria for Automatic Commercial Ice Makers (ACIM).

2 APPLICABILITY

ENERGY STAR test requirements are dependent upon the feature set of the product under evaluation. The following guidelines shall be used to determine the applicability of each section of this document:

2.1 Included Products

- A) All sections of this test method apply to all products covered in the scope defined in ENERGY STAR Eligibility Criteria for Automatic Commercial Ice Makers:
 - 1) Air-cooled batch and continuous type, Ice Making Head (IMH), Remote Condensing Units (RCU) with dedicated condensing units, and Self-contained Units (SCU).
 - 2) Air-cooled RCU units designed for connection to remote rack compressors that are alternately sold (with the same model number) with a dedicated remote condensing unit.

2.2 Excluded Products

- A) The following products are not included in the scope defined in ENERGY STAR Eligibility Criteria for Automatic Commercial Ice Makers:
 - 1) Air-cooled RCU units that are designed only for connection to remote rack compressors.

3 DEFINITIONS

Unless otherwise specified, all terms used in this document are consistent with the definitions in the ENERGY STAR Eligibility Criteria for Automatic Commercial Ice Makers.

- Variable Purge Setting: A setting that allows for the increase or decrease of purge water used during ice making to accommodate for different water hardness levels.

4 TEST CONDUCT

4.1 ENERGY STAR Guidance for Implementation of 10 Code of Federal Regulations (CFR) Part 431, Subpart H

- A) Testing of RCUs designed for connection to remote rack compressors that are alternately sold (with the same model number) with a dedicated remote condensing unit:

- 1) Unit under test (UUT) shall be tested using the least efficient dedicated remote condensing unit with which it is normally sold.

B) Purge Setting:

All variable purge settings shall be set in accordance with AHRI Standard 810-2007, *Performance Rating of Automatic Commercial Ice-Makers*.

5 TEST CONDITIONS

Unless otherwise specified within this Test Method, the test conditions for all portions of this method shall be in accordance with 10 CFR Part 431 Subpart H.

6 UNIT UNDER TEST (UUT) SETUP AND INITIALIZATION

6.1 Test Setup and Instrumentation

- A) Unless otherwise specified within this Test Method, the test setup and instrumentation for all portions of this method shall be in accordance with the following:

- 1) 10 CFR Part 431 Subpart H.

7 TEST METHOD

When testing Automatic Commercial Ice Makers, the following test method(s) shall be used to determine ENERGY STAR qualification:

Table 1: Test Methods for ENERGY STAR Qualification	
ENERGY STAR Requirement	Test Method Reference
Energy Consumption Rate (kWh/100 lbs ice)	10 CFR Part 431 Subpart H, with the guidance included in Section 4.1 .
Potable Water Use (gal/100 lbs ice)	AHRI Standard 810-2007, <i>Performance Rating of Automatic Commercial Ice Makers</i> with the guidance included in Section 4.1

8 REFERENCES

- A) AHRI 810-2007 with Addendum 1. Performance Rating of Automatic Commercial Ice-Makers. March 2011.
- B) 10 CFR Part 431 Subpart H, Automatic Commercial Ice Makers. 77 FR 1591. January 11, 2012.