

High Efficiency Specifications for Commercial Ice Makers

Effective Date 07/01/2011

Efficiency Requirements for Qualifying Products

Air Cooled Machines

Level	Corresponding Base Specification	Equipment Type	Ice Harvest Rate (H) (lbs of ice/day)	Energy Use Limit (kWh/100lbs of ice)	Potable Water Use Limit (gal/100lbs of ice)
Tier 1	ENERGY STAR / Former CEE Tier 2 (pre-7/1/2011)	Cube Type Machines Only: Ice-Making Head	<450	9.23 - 0.0077H	≤25
			≥450	6.20 - 0.0010H	≤25
		Cube Type Machines Only: Remote- Condensing without remote compressor	<1000	8.05 - 0.0035H	≤25
			≥1000	4.64	≤25
		Cube Type Machines Only: Remote- Condensing with remote compressor	<934	8.05 - 0.0035H	≤25
			≥934	4.82	≤25
		Cube Type Machines Only: Self-Contained	<175	16.7 - 0.0436H	≤35
			≥175	9.11	≤35
Tier 2	Approximately 10% More Efficient than Average Performance	Cube and Nugget Type Ice Machines	<175	14 - 0.0347H	≤30
			≥175 and <450	9.6 - 0.0098H	≤20
			≥450 and <1000	5.9 - 0.0016H	≤20
			≥1000	4.5 - 0.0002H	≤20
		Flake Type Ice Machines	<1000	6.5 - 0.0033H	≤20
			≥1000	3.2	≤20

Water Cooled Machines

Level	Corresponding Base Specification	Equipment Type	Ice Harvest Rate (H) (lbs of ice/day)	Energy Use Limit (kWh/100lbs ice)	Potable Water Use Limit (gal/100lbs of ice)
Tier 1	Former CEE Tier 2 (pre-7/1/2011)	Cube Type Machines Only: Ice-Making Head	<500	7.02 - 0.0049H	≤25
			≥500 and <1436	5.13 - 0.0010H	≤25
			≥1436	3.68	≤25
		Cube Type Machines Only: Self-Contained	<200	10.6 - 0.0177H	≤35
			≥200	7.07	≤35
Tier 2	Approximately 10% More Efficient than Average Performance	Cube and Nugget Type Ice Machines	<175	10.6 - 0.0241H	≤30
			≥175 and <450	7.1 - 0.0062H	≤20
			≥450 and <1000	4.7 - 0.0011H	≤20
			≥1000	3.7 - 0.0002H	≤20
		Flake Type Ice Machines	<1000	4.8 - 0.0017H	≤20
			≥1000	3.1	≤20

* H = Ice harvest rate (lbs of ice/day) at the following test conditions: Ambient temperature 90°F; water inlet temperature 70°F; water inlet pressure .30 ± 3 psig. .

Note: Water-cooled ice machines must be installed using a closed loop system or a system with a remote evaporative condenser, i.e. cooling tower, to meet CEE qualifications. Units installed on once-through or pass through cooling systems do not meet the requirements of this specification.

Definitions

A. Ice Machine: A factory-made assembly (not necessarily shipped in one package) including 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 no less than 50.0 lbs [22.7 kg.] of ice per day and up to 4,000.0 lbs [1814.4 kg.] of ice per day at Standard Ratings Conditions, as defined in Section 5.2.1 of AHRI Standard 810-2007, and may also include means for storing or dispensing ice, or both.

B. 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.

- C. 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.
- D. Self-Contained (SCU): A model in which the ice-making mechanism and storage compartment are in an integral cabinet.
- E. Air-Cooled: An ice machine wherein motor driven fans or centrifugal blowers move air through the condenser to remove heat from the refrigerant.
- F. Water-Cooled: An ice machine wherein water is used to remove heat from the refrigerant.
- G. Cube Type Ice Machine: An ice machine that has alternate freezing and harvesting periods. The word “cube” is not a reference to a specific shape or size.
- H. Continuous Type Ice Machine: An ice machine that continually freezes and harvests ice at the same time.
- I. Flake Type Ice Machine: A type of continuous ice machine. Flake ice machines produce ice continuously, usually in a barrel-shaped evaporator. An auger inside the evaporator scrapes ice off the sides into a storage bin.
- J. Nugget Type Ice Machine: A type of continuous ice machine. Nugget ice machines use the same process as flake machines to make ice but compress the ice flakes into nuggets.
- K. Ice Harvest Rate: The gross weight of ice harvested, stated in multiples of 1, as calculated using AHRI Test Method 810-2007 at the following test conditions: Ambient temperature 90°F; water inlet temperature 70°F; water inlet pressure $.30 \pm 3$ psig.
- L. Energy Consumption Rate: Total energy input rate, stated in kWh/100 lb [kWh/45.0 kg] of ice as determined in AHRI 810-2007 5.2.2.1, stated in multiples of 0.1. For Split System Ice-Makers, total power input shall include condenser fan power.
- M. Potable Water Consumption Rate: The amount of potable water used in making ice, including Dump Water, stated in gal/100 lb of ice, as determined in AHRI 810-2007 5.2.2.1, stated in multiples of 0.1.

Referenced Standards Organizations

- N. AHRI: Air-Conditioning, Heating and Refrigeration Institute

Product Eligibility

- O. Included Products: All cube and continuous type ice machines meeting the definition of an Ice Machine as specified herein are eligible for qualification, with the exception of products listed in Section P below.
- P. Excluded Products: Ice machines that also dispense chilled water are not eligible for qualification. Water-cooled ice machines installed on once-through or pass-through cooling systems are not eligible for qualification.

Test Methods and Reporting

In measuring energy and water consumption, the following test standard must be used:

- Air-Conditioning, Heating and Refrigeration Institute (AHRI) Standard 810-2007, *Performance Rating of Automatic Commercial Ice-Makers*.

Product Qualification

CEE will accept test reports reviewed by AHRI or Natural Resources Canada. CEE plans to extract data from the AHRI Directory of Certified Product Performance (<http://www.ahridirectory.org/ahriDirectory/pages/home.aspx>). Manufacturers should submit product information directly to AHRI. Manufacturers listing products with Natural Resources Canada but not AHRI should notify CEE of such occurrences to ensure listing on the CEE qualified products list.

Future Specification Revisions

CEE reserves the right to revise this specification as appropriate. CEE plans to consider revisions to the Tier 1 levels upon finalization of new ENERGY STAR performance levels, which are expected in late 2011.