

FOODSERVICE EQUIPMENT

fermag.com

AUGUST 2013

VOL 17 NO 8

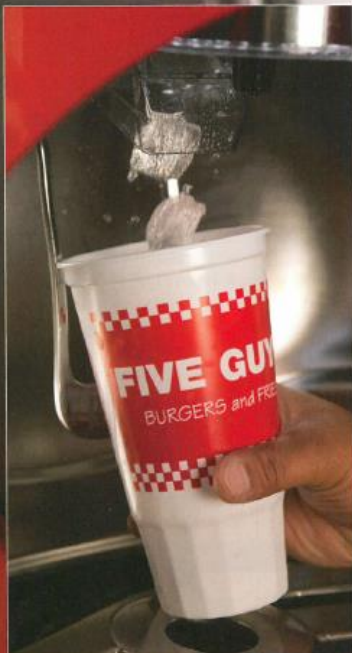
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ICE AGE 2

New Energy Star specs have spurred a slew of new ice machines that make more ice in less space with less energy and water than ever.

Hoshizaki America KM-600MAH cubers sit atop Coca-Cola Freestyle® dispensers in Five Guys Burger and Fries units. Pictured: Ken Beltran, district manager, at the new Five Guys in Joliet, Ill.

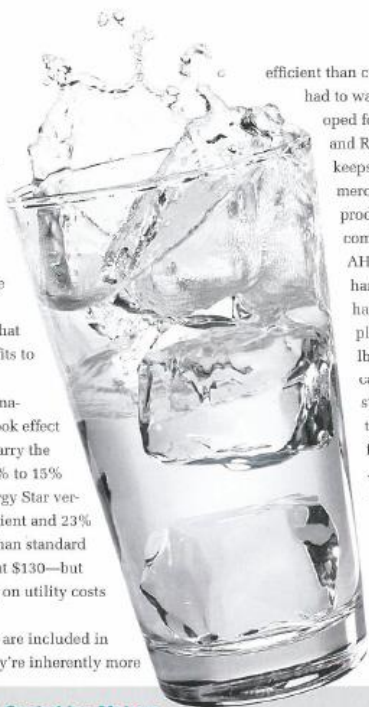
Photo by Eric Fuhran

The trap and skeet

shooters among you know how hard it can be to hit a moving target. So do a lot of equipment manufacturers. When the Energy Star program began including commercial foodservice equipment more than a decade ago, it put manufacturers on notice that it would continue to raise the bar on efficiency. That keeps the club of those who qualify somewhat exclusive, and provides big benefits to operators.

Specs for new Energy Star ice machines—Version 2.0—officially took effect last February. New models that carry the Energy Star logo are typically 10% to 15% more efficient than previous Energy Star versions, and 15% more energy efficient and 23% more water efficient on average than standard models. Annual savings run about \$130—but your results may vary depending on utility costs in your neck of the woods.

Flake and nugget ice machines are included in Version 2.0 for the first time. They're inherently more



efficient than cube ice makers, but Energy Star had to wait until a test method was developed for the Air-Conditioning, Heating and Refrigeration Institute (AHRI) which keeps performance specs on all commercial ice machines. These machines produce a softer type of ice, so to compare their efficiency to cubers, AHRI needed a way to field-test hardness. While chewable nugget ice has become more popular in many places, cubers in the 400-lb. to 600-lb. capacity range—they usually carry a 600-series designation—are still the most common machines out there. We'll focus on what to look for in these cube ice makers for this article. Then, in the accompanying Gallery, we've invited makers to share their latest cubers, and capacities will vary.

There are two sets of numbers operators need to look at: production under ideal conditions, which are 70°F ambient air and 50°F incoming water; and

more realistic, less-than-ideal conditions, which are 90°F ambient temp and 70°F water. Production numbers on the chart on page 24 are based on 90°F/70°F, not 70°F/50°F, so operators can compare production numbers when the machine is really working hard in a hot kitchen.

Cube ice still predominates because it can be used in so many applications. Manufacturers offer models that make cubes in a range of sizes. The more surface area ice has, the more it displaces liquid volume and the more quickly heat transfers to the ice, which also means it melts faster. Smaller sized cubes (more of which fit in the space of larger cubes) offer faster cooling properties and higher displacement, but melt more quickly than larger cubes. Larger cubes often are used in bars and cocktail lounges because they melt more slowly and offer the elegant appearance operators want.

Form And Function

Depending on the manufacturer, ice makers deliver full- or half-size cubes and full- or half-size dice, which are smaller than individual cubes. Look for both the shape and size cubes you'll use most. If you use most of your ice in soft drinks, for example, you might want smaller cubes that nestle closer together (cooling drinks faster and also displacing more liquid for greater profit). Smaller cubes also

blend more easily for smoothies. If the bulk of your ice use is in cocktails, larger individual cubes may suit you better. An ice crusher can work for those times you want crushed ice for a special drink.

Cube ice machines make ice in two different ways. In most cases, a reservoir fills with enough filtered water to make a batch. That water continuously circulates over the evaporator plate, comprised of cube-shape compartments, freezing a little at a time until the plate is full of ice. The machine cycles into a "harvest" mode, and the cubes fall out of the evaporator plate into the bin or dispenser chamber. Some models make ice in "slabs," meaning there are weak bridges of ice between cubes, which break when the

slab drops into the bin. Others freeze ice into individual, unconnected cubes. Individual cube machines typically make colder, harder ice.

Pure water freezes more quickly than water containing impurities, which means that minerals and other dissolved solids flow back into the reservoir, and eventually must be purged. Cube machines, as a result, always use more water than what's actually converted to ice.

One manufacturer uses a horizontal evaporator plate (another just debuted a unit stateside with a horizontal plate, see Gallery); water sprays into it from below and accumulates into large, square cubes. The company says the design results in even fewer impurities in the cubes and therefore colder, harder cubes. Another manufacturer uses a stainless evaporator which it claims results in colder, harder cubes, as well. On most models you'll find vertical, nickel-plated copper evaporators that work just fine (and



When water flows over evaporator plates, like this model from Manitowoc Ice, water impurities are pushed out as the water freezes layer by layer.

which produce the cube slabs mentioned). If the bridges fail to break when the slab drops, you can easily knock slabs apart with an ice wand or rake. If you experience too-thick bridges on a regular basis, the issue can be rectified with a machine adjustment to the harvest cycle.

Cool It

The most common ice machines on the market, and what we're addressing here, are self-contained, air-cooled units. That is, the compressor, condenser and evaporator are all contained in one fixture. These units throw off heat. Because of that they need room to breathe and should be located where there's good air circulation. Many models

ENERGY STAR Specs For Air-Cooled Ice Makers

Equipment Type	Applicable Ice Harvest Rate Range (lb. ice/24 hr.)	Energy Consumption Rate (kWh/100 lb. ice)	Potable Water Use (gal./100 lb. ice)
IMH	200 ≤ H ≤ 1600	≤ 37.72 * H - 0.298	≤ 20.0
RCU	400 ≤ H ≤ 1600	≤ 22.95 * H - 0.258 + 1.00	≤ 20.0
	1600 ≤ H ≤ 4000	≤ -0.00011 * H + 4.60	≤ 20.0
SCU	50 ≤ H ≤ 450	≤ 48.66 * H - 0.326 + 0.08	≤ 25.0

(IMH: Ice-Making Head, RCU: Remote Condensing Unit, SCU: Self-Contained Unit.)

You can get a complete list of ice machines that meet ENERGY STAR's Version 2.0 specs at this link http://downloads.energystar.gov/bi/qplist/Commercial_Ice_Machines_Product_List.pdf. To find out how any individual ice machine performs in terms of energy and water usage, AHRI has a searchable directory at <http://www.ahridirectory.org/ahridirectory/pages/acim/defaultSearch.aspx>.

have easily accessible and removable air filters that help prevent the compressor fan and condenser coils from getting dirty, both of which will cause machines to run hotter. The filters should be cleaned on a regular basis. One maker says its oversized condenser makes the machine run cooler than others and provides a heat transfer efficient enough to eliminate the need for an air filter. The condenser has to be clean, of course, but there's no need to change an air filter. And it has several self-contained models that discharge air from the top of the machine instead of the sides, letting you squeeze the machine into a narrower spot.

But many models give you the option of placing the condenser on the roof of your building, keeping heat and noise out of your kitchen or storage area. Some models even let



you remote the compressor, leaving behind only a small ice-making head that you can mount on top of an ice bin or soda dispensing station.

These narrower ice-making heads typically make as much or more ice per day as older, larger units because they're more efficient. New 22-in. heads now produce the equivalent of what older 30-in. machines made. Several self-contained units also have slimmed down, producing as much ice in a 30-in. profile as an old 36-in. machine.

Locating both compressor and condenser on the roof lets you put the ice-making head in a dining area without adding heat or noise. You also save on HVAC costs to keep

Scotsman's Vari-Smart Ultrasonic Bin Level Control (bin sensor on right) lets you vary the amount of ice in the bin depending on your demand or shifts ice making to times when utility rates are cheaper.

the dining area at a comfortable temperature. Manufacturers estimate the additional equipment and installation cost is about 25% to 30% higher to remote the compressor and condenser than simply installing a self-contained unit, but most operators see a payback in 18 to 24 months in lower utility bills because there's lower draw on the overall HVAC system.

A third cooling option is a unit that's water-cooled, again offered on many models. Water transfers heat more efficiently than air, which makes these ice machines more energy efficient than air cooled. The water you use to cool these units ends up going down the drain, however, and municipalities across the country are banning their use unless they're on a closed-circuit loop. Most of these systems



employ a water tower for storing water used as coolant. Typically, only very large facilities such as hospitals, hotels, casinos and schools using multiple ice machines in a number of locations find water-cooled machines on closed-loop systems cost-effective.

Plain V. Fancy

Advances in electronics and digital technology have added a number of bells and whistles to some models. Some operators find the benefits they provide worth the extra cost. For others, a stripped-down machine that consistently produces ice day in and day out is all they need. We'll give you an idea of some of the options available and let you decide which you think are worth pursuing.

Programmability. Programmable models let you determine the best times to produce ice for your operation. If

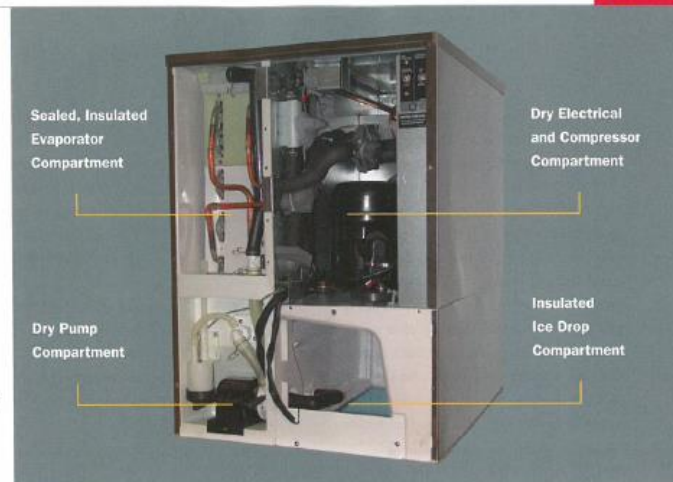
your peak demand days are on weekends, for example, you can program your machine to produce continuously on those days and produce less on others. Digital control over production cycles also lets you shift demand load on your electric bill. Since many utilities give you a price break if you shift electric usage to nighttime hours, you can program your machine to make enough ice at night to get you through the next day, saving money. To be fair, makers of basic machines say you can purchase an inexpensive off-the-shelf timer that will allow you to do essentially the same thing.

Load shifting may only make sense in states such as California, where utilities offer incentives to do so, but Don Fisher at PG&E's Food Service Technology Center (FSTC) in San Ramon, Calif., says in those areas, the benefits can be huge. A study FSTC conducted two years ago concluded that typical savings of load shifting in states like California would be a few hundred dollars a year. (You can find the study here: www.fishnick.com/publications/fieldstudies/Ice_Machine_Upgrade_Load_Shifting_Field_Study.pdf)

Water quality sensor. Some digital models have a sensor that measures total dissolved solids in the water in the machine's reservoir. When water quality is poor, more water is needed to purge the residue at the end of a cycle. Conversely, less is needed when the sensor determines a lower level of TDS. The feature reduces scale build-up letting you go longer between cleanings.

Self-diagnostics. Many digital models have indicator lights and on-screen messages to alert you when it's time to change air or water filters, and clean or de-lime the machine. The diagnostics boards in these machines also help service technicians pinpoint problems if the machine goes down for some reason.

Bin level sensors. Several models offer an ice sensing feature that tells the machine when the ice bin is full. Some use an acoustical sensor, others a temperature sensor. On



An inside look at an ice maker from Hoshizaki. Insulation and sealing keep dry operating components from wet processes and storage.

cubes can stick together over time and result in what one ice machine repair specialist refers to as an ice cave, one that even an ice wand or rake can't break up.

Data communications. Some units let you monitor their performance and diagnostics remotely, so you can see which units need cleaning or service and compare their efficiency. This can be a useful tool for scheduling routine maintenance or service calls if you have multiple machines in one large facility or machines in multiple stores. One manufacturer now puts a QR code on its ice makers; you can use an app on your smart phone to access the unit's serial number, warranty information, service record and other critical information.

Maintenance Is Key

Most problems you'll encounter with ice machines are water-related. Poor water quality can cause ice machines to underperform, produce ice that tastes bad and ultimately fail if you don't take the proper steps.

Manufacturers recommend that you filter your water.

Carbon filters remove chlorine and other contaminants that cause unwanted flavors and odors. Other types of filters can help reduce TDS to prevent scale build-up.

When you filter chlorine out of the water to make ice, however, bacteria and other microbes have the perfect environment in which to flourish. While most ice makers now incorporate anti-microbial parts in the design, slime, mold and mildew can build up quickly inside ice makers and bins if they're not cleaned and sanitized regularly. If you have baking functions in your units, position the ice maker as far from air-borne yeasts as possible (and away from cooking equipment too, for that matter.)

Some models offer an automatic cleaning cycle. At selected intervals the cleaning cycle washes out the machine

with an acidic solution to remove dirt and lime scale. The cycle runs sanitizing solution through the machine, rinses it thoroughly, and puts the machine back into service, ready for the next ice-making cycle. The cleaning cycle can be operated manually, too.

Follow your manufacturer's cleaning and sanitizing recommendations carefully. Or for more information on setting up a cleaning and maintenance schedule, visit the "Ice Machine Education and Information" at <http://www.icemachinesplus.com/ice-expert-center>.



MODEL COMPARISON

Make/Model	Hoshizaki* KM-600MAH	Ice-O-Matic* ICEO606A	Kold-Draft GT561AHK	Manitowoc* Indigo 606	Maxx Ice MIM600	Scotsman* C0630MA
Evap. Type	Vertical	Vertical	Horizontal	Vertical	Vertical	Vertical
Capacity (90°F/70°F)	503 lb.	506 lb.	453 lb.	490 lb. dice 555 lb. half-dice	497 lb.	528 lb.
Water Gal./100 lb.	19.7	19.5	20.4	20.0	16.1	19.1
kWh/100 lb.	5.7	5.0	6.19	5.41 dice 5.29 half-dice	5.93	6.0
Cube Styles (cube sizes in inches)	Crescent (individual, not slab) 1 ¹ / ₂ x 1 ¹ / ₂ x 1 ¹ / ₈	Full & Half Cube 7 ⁷ / ₈ square 7 ⁷ / ₈ x 7 ⁷ / ₈ x 3 ³ / ₈	Full & Half Cube (individual, not slab) 1 ¹ / ₄ square 1 ¹ / ₄ x 3 ³ / ₈ x 1 ¹ / ₄	Rhomboid Dice & Half Dice 7 ⁷ / ₈ square 3 ³ / ₈ x 1 ¹ / ₈ x 7 ⁷ / ₈	Cube 3 ³ / ₄ x 1 x 3 ³ / ₄	Med. Cube & Sm. Cube 7 ⁷ / ₈ square 7 ⁷ / ₈ x 7 ⁷ / ₈ x 3 ³ / ₈
Electrical	115-220V/ 60/1	208-230V/ 60/1	115V/60/1	208-230V/ 60/1	220V/60/1, 220V/50/1	208-230V/ 60/1
Dimensions (W x D x H)	22 x 27 ³ / ₈ x 37	30 x 24 x 20	30 x 25 ⁷ / ₁₀ x 30 ⁷ / ₁₀	30 x 24 ¹ / ₂ x 21 ¹ / ₂	30 x 24 x 21	30 x 24 x 23
Warranty P-Parts L-Labor	3 yr. P/L; 5 yr. P/L on evap.; 5 yr. P on compressor, condenser coil	3 yr. P/L; 5 yr. P on evap. and compressor, 7 yr. available on evap.	3 yr. P/L; 5 yr. P on evap. and compressor	3 yr. P/L; 5 yr. P/L on evap.; 5 yrs. P on compressor	3 yr. P/L; 5 yr. P on evap. and compressor	3 yr. P/L; 5 yr. P/L on evap.; 5 yr. P on compressor, condenser

*Energy Star Rated

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CUBER GALLERY



HOSHIZAKI AMERICA

Looking for those gorgeous, super-square cubes—the high-end looking “rocks” that dress a single-malt to perfection? Dress up all your beverages with Hoshizaki America’s newly introduced IM500SAA stackable cuber. It produces 435 lb./24 hr. of individual cubes (when air is 90°F and water supply is 70°F; up to 500 lb./24 hr. in ideal 70°F-air/50°F-water conditions) and can stack up to 3 high. Cuber measures 44-in.Wx27⁷/₈-in.Dx21³/₄-in.H. Cubes, from a horizontal evaporator, are about 1³/₄-in. square. Air-cooled unit’s air filter is accessible from front. The IM500SAA is Energy Star rated.

hoshizakiamerica.com



ICE-O-MATIC

The new ICE0926 and ICE0726 are small-footprint, high-volume (930 lb. or 810 lb.) ice machines designed for a range of 22-in. and 26-in. beverage dispensers, including freestyle touchscreen models and multiflavor heads. You can install two ice makers side-by-side on a 48-in. or 60-in. bin to provide up to 1,800 lb. of capacity and achieve ice machine redundancy. Evaporator combines a copper core for conductivity with electroless-nickel plating. Built-in antimicrobial protection prevents bacteria and slime fungus growth. Units need no air filters.

iceomatic.com



KOLD-DRAFT

The Kold-Draft GT560 has a daily production of up to 520 lb. of the company’s exclusive square cube—a mixologist favorite. Kold-Draft’s cube, formed on a horizontally positioned evaporator plate, is known for its sharp, square shape, purity, hardness and slow melt-rate. That means the ice not only looks good, but also lasts longer in storage bins, bar sinks, drinks, salad bars, bags and coolers. For durability, the GT560 features a type 300 stainless finish and rugged uni-body construction. All components are up front and easy to access.

kold-draft.com

MANITOWOC ICE

Manitowoc’s award winning Indigo line of ice machines (83 models) combine intelligent self-diagnostics, self-monitoring, easy-to-read status screens and water and energy management capabilities (including ice production scheduling during off-peak-utility hours). You can get a read on ice production, energy and water use and service history to ensure consistent, efficient performance. A USB port is provided on the control board for uploading programming commands or firmware updates using a memory stick. Historical data also can be retrieved using a memory stick from the USB port to analyze the performance of the ice machine using a laptop computer. Manitowoc service assist tool will soon be available to view this data via a web portal. Luminice Growth Inhibitor keeps bacteria, mold, yeast and more at bay.

manitowocice.com



MAXX ICE

Maxx Ice’s MIM600 air-cooled condenser model produces from 500 lb. to 700 lb. of ice per day, depending on incoming water and ambient temperatures. Stainless construction provides durability to a unit that is low-maintenance, easy to operate and easy to clean. The MIM600 produces clear ice cubes that work great for applications in restaurants, bars, hotels, grocery stores and more.

maximumfoodservice.com



SCOTSMAN ICE SYSTEMS

The Prodigy C0722 is a small-footprint, high-capacity unit that features AutoAlert indicator lights to notify operators of ice-making status and provide cleaning reminders, ensuring the machine works properly. It also features the patented WaterSense adaptive purge system that reduces scale buildup, extending time between cleanings. The optional Vari-Smart ice-level control sensor can be installed to program ice levels based on how much the operation needs over the week. The optional Smart-Board performs remote diagnostics to keep operators informed about machine performance and ultimately save on energy and maintenance.

scotsman-ice.com

