



1650 N Elston Ave • Chicago, IL. 60642 • (773) 235-0200 • Fax (773) 235-0269 • E-mail: howeinfo@howecorp.com

6/2/11

Comments to the following DOE Proposed Rules:

10 CFR Part 431

[Docket No. EERE-2010-BT-TP-0036]

RIN 1904-AC38

Energy Efficiency Program for Certain Commercial and Industrial Equipment: Test Procedures for Automatic Commercial Ice Makers

Submitted by: Mary C. Howe, President, Howe Corporation, Chicago, IL 60642
mchowe@howecorp.com

Item 1 – DOE also requests comment on the proposal that the use of amended test procedure be required upon the effective date of any test procedure final rule, 30 days after publication in the Federal Register.

In the case of the addition of continuous production remote condenser ACIM's, the outside testing agencies and manufacturers that would conduct the tests are not yet set up to test remote ACIM's. When the proposed rules add products not previously covered or contain substantial changes that would require changes in test facilities, enough time must be given for the manufacturers and outside agencies to adapt their testing facilities to be able to conduct the test procedures.

Item 2 – DOE requests comment on updating the referenced industry test procedures to the most current version.

Again, when the proposed rules add products not previously covered, enough time must be given for the manufacturers and outside agencies to adapt their testing facilities to be able to conduct the test procedures.

In addition, automatically adopting updated test procedures would eliminate the ability for small manufacturers to comment on the test procedures. Please note that on the ASHRAE committee that established ASHRAE Standard 29-2009, there were several larger manufacturers of ACIM's represented, and, to the best of our knowledge, the smaller manufacturers were not represented.

To automatically adopt test procedures without guaranteeing the input of small manufacturers into those test procedures gives larger manufacturers an unfair market advantage.

Item 3 – DOE requests comment on expanding the capacity range from 50 to 2,500 pounds of ice per 24 hours to 50 to 4,000 pounds of ice per 24 hours. DOE requests comment on providing test methods for continuous type ice makers.

We agree with the test procedures proposed in ASHRAE Standard 29-2009 *provided* that the proposed Ice Quality Adjustment Factor for scaling the energy consumption values of ACIM's is included. Without the Ice Quality Adjustment Factor, the test procedures proposed are meaningless.

Howe Corporation also submits that only the most commonly sold of the remote condensing unit models in each productive capacity be tested. The ice quality adjustment factor and energy consumption of that unit would be applied to all similar units of the same productive capacity.

Item 4 – DOE requests comment on the proposed method to normalize energy and condenser water consumption to 32°F water with no water content for continuous type ice makers.

There is an error in the above as it appears in both the Federal register (page 18433 and page 18443) and the slide presentation for the public meeting. The above should read “DOE requests comment on the proposed method to normalize energy and condenser water consumption to 32°F **ice** with no water content for continuous type ice makers.”

Not using the Ice Quality Adjustment Factor proposed by the DOE would subvert the intention of the Proposed Rule by allowing for inaccurate reporting of ice production and energy usage.

We agree with the most current test procedure *provided* that the proposed Ice Quality Adjustment Factor for scaling the energy consumption values of ACIM’s is included.

Without the calculation for normalizing energy and condenser water consumption as proposed by the DOE located on 18433 of the Federal Register, it is impossible to standardize the energy consumption and ratings for automatic commercial ice makers. The calculation is necessary to establish the ratings. Without the calculation proposed by the DOE, manufacturers will be allowed to continue to game the system and vastly understate the energy consumption of their products.

The IQAF must be determined in order to calculate the scaled energy consumption values. “DOE understands that the percentage of liquid water in the product of continuous ice makers is directly related to the measured energy consumption of these machines” .-Pg. 18432

Although it was stated several times at the Public Meeting that “there is some value in chilled water”. In reality, 32°F ice has 144 times the cooling effect of 32°F water.

In the Public Meeting for the Proposed Rules, it was commented by several stakeholder’s (Page 43 of the Public Meeting transcript) that “this test procedure could be adapted to...incorporate sub-cooled ice with a calorimetry constant of greater than one”. This should have been stated “...incorporate sub-cooled ice with a calorimetry constant of less than one”. Howe Corporation respectfully submits that sub-cooled ice would provide a calorimetry constant of less than one. A calorimetry constant of greater than one would reflect more water, less ice.

The same issue is present in slide 26 that was presented at the Public Meeting on this NOPR. The last lines of the slide should be corrected to read –

1.0 for solid ice

<1.0 for subcooled ice

>1.0 for ice with liquid water constant

Item 5 – DOE requests comments or data related to the impact of ice storage bin effectiveness on the energy and water consumption of automatic commercial ice makers.

Ice storage bins are ultimately specified by the end-user, not by the manufacturer. One productive capacity of automatic commercial ice machine (pounds of ice produced in 24 hours) is available with a wide variety of sizes of ice storage bins as required by the end-user. The ice storage bin selection will vary for many reasons. Two examples of these end user considerations are the availability of adequate storage capacity for peak usage period and floor area constraints.

Ice storage bins are often sold separately from the automatic commercial ice makers themselves. There are numerous small manufacturers that manufacturer only ice storage bins, not ice machines. Often automatic commercial ice makers purchased from one manufacturer are then mounted on ice storage bins purchased from another manufacturer. To include a test procedure of ice storage bins as a part of the test procedure for ice making equipment would limit the availability of ice storage bins from outside manufacturers and jeopardize the existence of these small manufacturers.

Howe feels that ice storage bin efficiencies are outside the scope of this Proposed Rule. There are far too many combinations of ice storage bins and ACIM's. The cost of testing all possible combinations would be excessively burdensome and costly for all manufacturers.

Howe Corporation suggests that if an ice storage bin effectiveness test procedure is established is it established separate from the ACIM test procedures.

Item 6 – DOE requests comment on the proposal to require testing of all remote condensing ice makers with a dedicated remote condensing unit and reporting of ice-making mechanism, compressor, and condenser energy use.

Howe Corporation manufactures four different productive capacity units covered under the Proposed Rules for continuous production ACIM's – 1000, 2000, 3000, and 4000 pounds of ice per 24 hours. Howe Corporation offers these units in a vast array of refrigerants including halocarbons, glycol, and natural refrigerants such as CO2 and ammonia, direct expansion, flooded or re-circulated evaporators, freshwater and seawater ice, a variety of voltages and many other options to be used specifically with field-built refrigeration systems. In all, Howe Corporation offers their customers **124** possible configurations of equipment that would be covered under the Proposed Rules.

Using DOE calculations of the cost of testing, the cost to Howe Corporation would range from \$620,000 to \$930,000 in the first year. This amount vastly exceeds what would be reasonable for a small manufacturer. As these units are designed solely for use with field-built refrigeration systems, there are no condensing units available with which to test the bulk of the options. That would leave Howe

Corporation and other small manufacturers with the choice of discontinuing models thus decreasing sales and/or going bankrupt.

Therefore Howe Corporation respectfully submits that each manufacturer test **only** the most commonly sold of the remote ACIM models in each productive capacity be tested. The ice quality adjustment factor and energy consumption of that unit would be applied to all similar remote ice makers of the same productive capacity.

For example, the most commonly sold remote Howe ice maker in a 2000 pound productive capacity is a unit using R404a refrigerant and 230v/3/60. Howe would test the ice machine and condensing unit (compressor and condenser) to determine the ice quality and energy usage of this model. Those energy consumption ratings could be applied to all ACIM's of the same productive capacity. If a specific remote condensing unit for a given productive capacity is not offered by a manufacturer, the ratings for a comparable self-contained ACIM should be used.

Item 7 – DOE requests comment on the proposal to allow for optional test procedure for modulating capacity automatic commercial ice makers.

Howe Corporation is unaware of existence of such equipment. We suggest that if such equipment were to become available, the stakeholders address the issue at that time.

Item 8 – DOE requests comment on its proposal to incorporate AHRI Standard 810-2007, with reference to ASHRAE Standard 29-2009 as the method of test, without specification or clarification of the calculation for energy consumption rate.

Without the calculation for normalizing energy and condenser water consumption as proposed by the DOE (located on 18433 of the Federal Register), it is impossible to standardize the energy consumption and ratings for automatic commercial ice makers. The calculation is necessary to establish the ratings. Without the calculation proposed by the DOE, manufacturers will be allowed to vastly understate the energy consumption of their products.

Item 9 – DOE requests comment on its determination that an additional test procedure to quantify energy use during non-ice-making periods is not justified.

Howe Corporation has no comment.

Item 10 – DOE requests comment on its decision not to measure potable water used in making ice.

Since DOE is updating the references to AHRI and ASHRAE Standard 29-2009 the following comments with respect to Potable Water Use Rate should be emphasized despite DOE's lack of jurisdictional

authority. AHRI Section 1.-Purpose- The purpose of this standard is to establish for Automatic Commercial Ice-Makers (ACIM): definitions; test requirements; rating requirements; minimum data requirements for Published Ratings; marking and nameplate data; and conformance conditions. 1.1.1 Intent-This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users. This is precisely why potable water use rate and air cooled condenser heat rejected to air conditioned spaces must be published. This data will be used by professional engineers to design domestic water and HVAC systems.

AHRI Standard 810-2007 includes detailed definitions 3.2 Dump or Purge Water and 3.3 Harvest Water. The statement that this only applies to batch type ACIMs is not completely accurate. One of the stakeholders modular flakers feature the Clean Cycle design, which keeps the evaporator barrel clean by performing a 15-minute flush every 12 hours. DOE states on Pg.18433 third paragraph, "The measured value of the potable water used in making ice will not be multiplied by the calorimeter constant because all of the potable water is still used to produce usable product for continuous type ice makers." This is also not completely accurate. The stakeholder is silent with respect to this potable water consumption in their published literature. This should be included in the proposed amendment.

AHRI 5.2.2 Values of Standard Ratings shall include: 5.2.2.3 Potable Water Use Rate-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 lbs. of ice, as determined in 5.2.2.1stated in multiples of 0.1. This Values of Standard Ratings language should apply to Continuous Type ACIMs.

Item 11 – DOE requests additional data that would support evaluation of the need for a standardized water hardness test.

Howe Corporation acknowledges that some ice makers will see a variance ice maker productive capacity and energy usage due to variations in water hardness.

Item 12 – DOE requests comment on testing units at the highest water consumption purge setting.

In order to standardize energy consumption and water usage, it is necessary to test at the highest purge setting. Energy usage increases as the purge setting increases.

Item 13 – DOE seeks comments on its estimated cost of testing due to new requirements of testing presented in this NOPR. Specifically, DOE seeks comment on the additional costs of testing on small manufacturers.

The costs of testing for small manufacturers as estimated in the NOPR are greatly understated for the following reasons:

1. Small manufacturers would like to have a standardized testing and reporting procedure to qualify their equipment under the Energy Star program. However, the number of units covered by the NOPR is greatly underestimated. The NOPR assumes the number of units to be tested as a self-contained air-cooled, self-contained water-cooled and a remote unit for each productive

capacity of continuous production automatic commercial ice machine. As currently written, the NOPR would cover over 100 different models for Howe Corporation alone.

2. Small manufacturers build custom equipment. Where a large manufacturer or assembler of ACIM's might offer a couple variations of a particular productive capacity ice machine, a small manufacturer would offer many variations of a particular productive capacity. Under Item 6, we discussed that the actual cost of testing all variations of the Howe automatic commercial ice machines covered under this proposed rule would bankrupt the company. It is essential that the DOE better define models as productive capacity.
3. Small manufacturers often do not have test facilities capable of testing their equipment as defined by this NOPR. The cost of building adequate test facilities or sending the equipment for outside testing is not covered in the DOE cost estimates.
4. We can find no test facility currently offering testing of ACIM's for all refrigerants offered by small manufacturers for remote ACIM's designed for use with field-built refrigeration systems. Many refrigerant options, including refrigerants that have low global warming effect, are not offered by the largest manufacturers so testing these ice machines falls entirely on the small manufacturers. Rather than eliminate the Energy Star eligibility of these ice makers used with field built systems, allow the manufacturer to extend the IQAF and energy usage across similar ice makers of the same productive capacity. By testing one remote ice maker per productive capacity and applying IQAF and energy usage to similar remote ice makers, manufacturers would be encouraged to use environmentally friendly refrigerants, instead of being forced to eliminate them.
5. Due to location of their facilities and building code restrictions, Howe and several other small manufacturers would be unable to install test facilities for numerous models that are designed for use with field-built refrigeration systems, such as ammonia.
6. Continuous production ice makers with productive capacities greater than 2,500 pounds of ice per 24 hours are commonly available only in remote ACIM configurations. These are manufactured primarily by the smallest manufacturers. The DOE should understand that including these capacities under the Proposed Rules will put the weight of additional testing primarily on the backs of the smallest manufacturers.

It is essential that manufacturers making remote automatic commercial ice machines be allowed to test the most commonly sold remote ice maker configuration (ice maker, compressor, and condenser) for each productive capacity of ACIM. Those energy consumption ratings should be applied to similar remote ACIM's of the same productive capacity. If a specific remote condensing unit (compressor and condenser) for a given productive capacity is not offered by a manufacturer, the ratings for a self-contained ACIM of the same productive capacity should be used.

The design application engineers currently use the published manufacturer's data for saturated evaporator temperature and refrigeration capacity requirements in designing field-erected refrigeration

systems. The manufacturer's data typically represents the most commonly sold remote ice maker (ice maker, compressor, and condenser).

Item 14 – DOE seeks comment on its reasoning that the proposed test procedure changes would not have a significant impact on a substantial number of small entities.

There are three manufacturers of automatic commercial ice machines that are substantial larger than the vast majority of US manufacturers of ACIM's. 75% of the small US manufacturers of ice makers have under 50 employees. Due to the reasons outlined under Item 13, the most significant impact is borne by the small manufacturers who outnumber the largest three manufacturers.

The DOE should be aware that due to inclusion in the committees formed to develop the AHRI and ASHRAE Standards referenced in this proposed rule, the largest manufacturers were afforded role in the formulation of the ASHRAE and AHRI Standards.

Additional comments by Howe Corporation on the NOPR

Ice Quality vs. Ice Hardness

Howe Corporation respectfully submits that the use of "ice hardness" used in the AHRI Standard to replace the proposed "ice quality" used in the ASHRAE standard is confusing and a misstatement. The very stakeholders that are now objecting to use of "ice quality" have been using the term for decades.

Ice hardness will be confused with water hardness. Ice quality is understood by the end-users of ice machines to be the percentage of ice produced by the ice machines. Changing the phrase "ice quality" is an effort on the part of several stakeholders to confuse the engineers/specifiers/end-users of ice machines.

The rules should use language that is easily understood by the public.

Quantification of Actual Energy Use

The majority of air-cooled self-contained ACIMs are located within air conditioned spaces e.g. motels/hotels, restaurants, bars, retail food markets, institutional, and airports. The air cooled condenser rejected heat is the sum of the heat removed at the evaporator, heat related to suction-cooled hermetic and semi-hermetic compressors and the fan/motor efficiency related heat. This total heat of rejection of the Automatic Commercial Ice Maker should be tested and published so that consulting engineers can accurately calculate the sensible heat gain to the air conditioned space.

As an example a 970 pound per 24 hour output ACIM located in a 70° F space supplied with 50° F water adds the Total Rejected Heat of 8,450 BTUH to the space which must be removed by the building cooling

system. The Energy Consumption of this ACIM is 3.8 KWH/100 lbs. ice. The Energy consumed by the building cooling system to remove this sensible internal heat gain to the conditioned space is estimated to be .85 KWH or 22% of the energy consumed by the ACIM. Obviously, no intermediate cooling is required if this heat is rejected directly to outdoor air. The four examples of these applications are water cooled condensers, remote air cooled condensers, remote dedicated split condensing units or if the ice machine is field connected to a remote compressor rack (field-built refrigeration system) that serves other evaporators throughout the building.

Summary of Comments by Howe Corporation

Howe Corporation respectfully requests consideration of the following for the Proposed Rules:

As Howe and other small manufacturers would like to have their equipment eligible under the Energy Star programs, it is necessary to apply standard and procedures. Howe and other small manufacturers offer only or primarily remote ACIM's and to test all possible remote ice maker configurations would be excessively burdensome. Therefore, Howe requests that the most commonly sold remote ice maker configuration (ice maker, compressor and condenser) for each productive capacity be tested and the results for energy consumption and ice quality be applied to all similar units of that same productive capacity.

Additionally, it is essential for the Ice Quality Adjustment Factor as proposed by the DOE be applied. As the energy consumption calculations of automatic commercial ice machines are based on ice production, it is necessary that the actual amount of ice be used in the energy usage calculation.