HOWE CORPORATION

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February 10, 2012

Via Email and USPS

United States Environmental Protection Agency
ENERGY STAR Product Specification Development
1200 Pennsylvania Ave. NW (6202J)
Washington, DC 20460

Re: Submission of Written Comments from Howe Corporation
ENERGY STAR® Program Requirements-Product Specification for Automatic Commercial Ice Makers
Draft Test Method – Rev. Jan-2012

Dear Sirs,

Please find attached the Submission of Written Comments from Howe Corporation addressing the Product Specification for Automatic Commercial Ice Makers which includes the comments and two exhibits.

We appreciate your time and consideration of our comments. If you have any questions, please contact me at your convenience.

Respectfully submitted,

Mary C. Howe
President
Howe Corporation

ENERGY STAR® Program Requirements-Product Specification for Automatic Commercial Ice Makers
Draft Test Method – Rev. Jan-2012

Howe Corporation submits these comments in response to EPA's January 20, 2012, requests for comment on Draft ENERGY STAR® Test Method and Final Draft Specification Method and our participation in EPA's February 1, 2012, Webinar. Howe Corporation is a 100 year old family-owned, woman-owned manufacturer of industrial refrigeration equipment located in Chicago, Illinois. Its customers include some of the largest retail and industrial companies in the United States including Wal-Mart, Safeway, Kraft, and many more. Howe and its key personnel are members of ASHRAE, RETA, IIAR, ASME and other trade organizations.

Howe urges EPA to include Remote to Rack style Automatic Commercial Ice Makers (ACIMs) designed for connection to a remote parallel compressor rack in the ENERGY STAR®program to insure that the most energy efficient ACIMs available on the market today are considered by prospective purchasers when evaluating their options and selecting an ACIM product. Furthermore, as described below, Howe believes that the appropriate methodology can be used to fairly and accurately assess the energy consumption of this type of unit, consistent with ENERGY STAR® program guidelines, thereby making it an appropriate product for inclusion in the ENERGY STAR® program.

Howe Corporation believes that it is essential to include remote to rack style ACIMs designed for connection to remote parallel compressor rack systems within the ENERGY STAR® Program for the following reasons:

- RCU style Automatic Commercial Ice Makers (ACIMs) designed for connection to a remote parallel compressor rack (Remote to Rack ACIMs) are the most energy efficient ACIMs available today. Howe's independent test data[1] which compares a Howe RCU style ACIM to a competitive IMH with near equal rated capacity supports this claim. Tests were conducted in May, 2011 using side-by-side "Model 1000" ACIMs under the standard rating conditions established in the governing Standards AHRI 810-2007 and ASHRAE 29-2009. As demonstrated in the chart below, the Howe RCU style ACIM is nearly twenty percent more energy efficient than the IMH (self contained) ACIM.

Make	Style	Measured Ice Capacity	Measured Ice Hardness, %	kWh/100lb Ice, Corrected for Hardness
Howe	RCU	1011	98	4.7
Competitor	IMH	820	69	5.6

[1] *Howe conducted this in-house testing as groundwork to understand the applicable test procedures in ASHRAE 29-2009 and AHRI- 810-2007 (as later adopted by the DOE in the Final Rule EERE-2010-BT-TP-0036-0019) as part of an on-going study of the performance of its own and other currently available ACIMs.*

- By including the remote to rack ACIMs, the marketplace has the choice of selecting ENERGY STAR® rated ACIMs designed for connection to remote parallel compressor rack systems that have design TD's as low as 10°F, which are more efficient than all other types of ACIMs (see Exhibit A- Explanation of Energy Efficiency of Field Erected Remote Parallel Compressor Rack Systems attached). The Remote to Rack ACIM is simply the ice maker portion of a standard RCU unit. Instead of connecting the ACIM to the remote condensing unit, the ACIM is connected to the more efficient parallel compressor rack.

- Additionally, Remote to Rack ACIM's do not reject additional heat load into air conditioned space. For example, a given IMH (self-contained) model ACIM rejects to the building air conditioning load an additional 43% of the reported ice machine energy consumption[2]. Conversely, due to design, Remote to Rack ACIMs do not have this negative characteristic because all the heat removed from the water to make ice is rejected via the rack system condenser which is located outdoors.

- Based on Howe's experience with its customers, the supermarket industry is extremely energy conscious and prefers to purchase ENERGY STAR® qualified ACIMs. This preference is for many reasons including energy consumption and its associated costs, LEED Certification of facilities, and participation in the ENERGY STAR® GreenChill program. LEED energy modeling and prescriptive Compliance Paths also are based on ENERGY STAR® ratings.In addition, presently only Remote to Rack ACIMs are available for use with natural refrigerants. The industry is migrating away from HFC refrigerants to natural refrigerants due to, in part, the information and support provided by various EPA programs.

- The view of the marketplace is that only the most energy efficient products are ENERGY STAR®qualified.Not including the Remote to Rack ACIMs will provide an unintended incentive for supermarkets and other industrial and commercial customers to purchase ACIMs that consume more energy than Remote to Rack ACIMs. As you know and encourage, manufacturers use their Energy Star qualifications in the marketing of their products (see Exhibit B attached). To not provide this opportunity for Remote to Rack ACIM's is contrary to the ENERGY STAR® program mission and mandate.

- There are at least four manufacturers of remote to rack or remote condenser ACIMs including Scotsman and Hoshizaki. Howe is the highest volume, but not the only, manufacturer of Remote to Rack ACIMs to the supermarket industry. Howe supplies Remote to Rack ACIMs to large, national supermarket chains such as Supervalu, Safeway, Wal-Mart, The Fresh Market, Whole Foods, and many others.These forward thinking supermarket companies are expending a great deal of effort, time, and money to meet and exceed the energy efficiency requirements of today

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[2] *Based on published date of a total power consumption of 42.2 kWD and 134.7kBTUD to produce ice and total heat rejection factor (HRF) of 1.36. Total heat rejected = 134.7 x 1.36 = 183.2 kBTUD, or 18.3 kWh using a minimum 10 BTUW as a minimum of building central air system. 18.3/42.2=0.43 or 43%*

and the future. Again, to incent them to purchase less energy efficient equipment by exclusion of the Remote to Rack ACIMs simply contradicts the basic ENERGY STAR® objective of providing technical information and tools consumer's need to choose energy efficient solutions.

- Many ACIM manufacturers do not offer Remote to Rack ACIMs, sell few Remote to Rack ACIMs, or sell alternate products of lower energy efficiency but higher profit margins than their Remote to Rack ACIMs and therefore have little to no interest in including them in the ENERGY STAR® program. Many manufacturers would like to see Remote to Rack ACIMs excluded from the ENERGY STAR® program for competitive reasons only. These are not legitimate reasons to exclude Remote to Rack ACIM's from ENERGY STAR®, especially due to the superior energy efficiency of Remote to Rack ACIMs.

Howe Corporation agrees with the proposed test method to rate Remote to Rack ACIM's by using the data provided by the least efficient, comparable RCU(Remote Condensing Unit)ACIM. This test method is the most simple and straightforward way to rate for Remote to Rack ACIMs since the Remote to Rack ACIM is simply the ice maker portion of a standard RCU unit.

- To alleviate concerns from the stakeholder's that manufacturers could "game" the system by testing remote ACIMs with high efficiency, non-standard condensing units, Howe proposes that only Remote to Rack ACIMs that can alternately be purchased from the manufacturer as an RCU with a standard appropriate sized (or Right Sized) remote condensing unit be included under the program.

- There is no benefit for manufacturers to attempt to use an undersized condensing unit to test/rate ACIMs designed for connection to remote rack systems as ice hardness values and productive capacity are a part of the energy consumption rate (expressed in kWh/100 pounds of ice adjusted for ice hardness). An undersized condensing unit would not provide the maximum ice capacity or ice hardness values for the ACIM so using an undersized condensing unit would negatively affect the energy consumption rate. An oversized condensing unit would have a higher power requirements, therefore using an oversized condensing unit would have negative impact on the energy consumption rate.

- The EPA requires third-party testing by an EPA recognized Certified Body (CB) for qualification to this specification. The DOE can audit a manufacturer's records. Therefore only the manufacturer's standard offered equipment will be tested, recorded, verified and reported as such. The burden of proof is a part of the EPA programs and DOE regulations. These regulations and programs are designed so any attempt to circumvent the system is difficult if not impossible and would come at great risk to the manufacturer for very little reward.

- Howe sells Remote to Rack ACIMs and Howe also sells RCU ACIMs. The remote condensing units sized for each model (productive capacity) are not the most efficient or the least efficient models available in the marketplace, but are appropriately sized, reliable, affordable remote

condensing units. To be able to sell the RCU ACIMs competitively, these units have to be affordable. Howe and other manufacturers are not in the time consuming, expensive, and dangerous business of designing ways to circumvent the system, but are in the business of building and selling ACIMs. Using the least efficient RCU ACIM data for each corresponding Remote to Rack ACIM model will yield reliable data as each manufacturer needs to offer a competitively priced unit. Basically, Howe recommends testing be restricted to the least efficient condensing units that are sold as part of the standard RCU models.

- Howe understands the reasoning behind the "least efficient" approach to testing products for qualification under the ENERGY STAR® program. However, when selecting a condensing unit to be sold with a specific ACIM, the manufacturer views the condensing unit as it does any other component part of the ACIM. To test the ACIM with the least efficient condensing unit available in the marketplace would be similar to asking the manufacturer to test any other component part (motor, pump, controls, etc.) of the ACIM with the least efficient available in the marketplace rather than what is a standard component. In the case of a IMH (self-contained) ACIM, the manufacturer is not required to search out and test the least efficient compressor and condenser available in the marketplace. Howe does not believe that is the intent of the definition of "least efficient" and understands it to be the least efficient RCU model or configuration offered by the producer. As Howe understands the "least efficient" approach in ENERGY STAR® programs, using the lowest efficiency condensing unit available in the marketplace to rate Remote to Rack ACIMs would create undue burden on the manufacturer and result in energy consumption values that would communicate to the marketplace that Remote to Rack ACIMs are the *least* efficient available, which is the opposite of reality.

- Howe recommends using each manufacturer's least efficient RCU rating as determined under the DOE Final Rule EERE-2010-BT-TP-0036-0019for each model (productive capacity) ACIM for the correlating Remote to Rack ACIM.

- It was suggested by one of the stakeholders during the Webinar, to use some unknown, minimum EER value as a threshold for selecting condensing units to test/rate RCUs designed for connection to remote rack systems. However, at this time, most condensing unit manufacturers do not publish these values nor do the manufacturers of IMH(self-contained) ACIMs or Remote Condenser ACIMs. An appropriate sized (right sized), current standard condensing unit offered by the manufacturer will provide the most reliable energy consumption values, as well as provide correlation to the true RCU ice machine models. Attempting to set a minimum EER level would single out the Remote to Rack ACIM units creating an undue and disproportionate burden on the Remote to Rack ACIM manufacturer,would require additional research to determine the factors, and a change to or a new program regulating condensing unit manufacturers.

- As there is a reasonable and reliable alternative test method, Howe Corporation agrees with the DOE that the alternate method of measuring refrigerant flow would cause undue burden on

stakeholders and testing agencies in determining performance ratings for RCU style ACIMs designed for connection to remote rack systems and would require additional research to determine default factors.

- Howe remote ACIMs use an evaporator pressure regulator (EPR) whether connected to a remote parallel compressor rack or to a remote condensing unit.

- All Howe ACIMs are continuous type. Howe does not produce batch type ACIMs and has no knowledge of availability of remote to rack batch type ACIMs.

In summary, Howe Corporation submits the Remote to Rack ACIM's should be included for qualification under ENERGY STAR® without any further delay. As the Ice Maker portion of the Remote to Rack ACIM is the same as the RCU ACIM and the remote parallel compressor rack are more efficient than any affordable condensing unit, the rating of the least efficient, appropriately sized, commonly sold, standard offering RCU ACIM should be applied to the Remote to Rack ACIM of the same productive capacity.

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EXHIBIT A - Explanation of Energy Efficiency of Field Erected Remote Parallel Compressor Rack Systems

Contemporary Food Retail facilities are equipped with State of the Art versions of remote parallel racks of compressors primarily for energy conservation reasons but also for numerous secondary reasons. When a single compressor dedicated condensing unit is applied to a single evaporator refrigeration load the system application engineer is extremely limited in the choices of compressors that may be applied. Copeland (Emerson) compressors are the primary choice due to the extensive after market service replacement compressor distribution network they have devoted years to establish and maintain. There are only three compressor types to choose from. Sealed hermetic reciprocating, sealed hermetic scroll and semi-hermetic discuss valve reciprocating are the only choices. The compressor must be "Right" sized since over or under sizing both have ill effects on system performance.

Conversely, remote parallel compressor rack applications afford the system design engineer numerous compressor selection choices in terms of compressor Energy Efficiency Rating (EER) expressed in BTU/WATT units. Typically each of these racks contain from 2-8 individual compressors. Either all like displacement compressors may be selected or any combination of unlike displacement compressors with different EERs are connected together to deliver the total refrigeration capacity to balance with the design total refrigeration load of numerous evaporators. Furthermore there are multiple refrigeration racks in each store where like evaporator temperature loads are grouped together. Normally there are two medium temperature and one low temperature racks operating a typical 50,000 square foot store.

The final rack system design engineer choice is the selection of the remote air cooled condenser for each rack. Since each individual compressor's capacity is based on the design suction and condensing temperature the engineer must choose the minimum size condenser required to balance with the compressor selections that will deliver the net refrigeration system capacity. The suction temperature is based on the lowest connected evaporator temperature with a slight correction for piping pressure drop. The condensing temperature is dependent on the design summer outdoor ambient temperature for the geographical location of the building. A larger condenser may be selected with a lower design temperature difference between the ambient temperature and the final condensing temperature which would have a slightly higher first cost but a lower operating cost or higher EER for the life of the equipment. For example a typical 95 degree F summer design outdoor ambient temperature with 10 degree design TD would yield a condensing temperature of 105 degrees F (95+10=105). If a 15 degree F design TD or otherwise stated smaller condenser is used the resultant design condensing temperature would be 95+15=110 degrees F. Each compressor's capacity will decrease about 3% for every five degrees F of condensing temperature increase. Furthermore the compressor power input will increase with the higher condensing temperature. In essence slightly larger condensers will often allow the selection of slightly smaller displacement compressors to balance with a given refrigeration load. The final EER is the system total BTUH capacity divided by the sum of all of the compressor power inputs plus the condenser fan power inputs. There are other efficiency enhancements related to condenser fan

motor types that may be applied such as replacing standard Permanent Split Capacitor (PSC) motors with more efficient Electronically Commutated (EC) motors or the most efficient Variable Speed Electronically Commutated (VSEC) motors that will lower condenser fan power input and raise EER.

These remote parallel compressor rack efficiency enhancements are cost effective only due to the large refrigeration capacity associated with field erected central refrigeration systems.

Dedicated single compressor remote air cooled condensing units can also be purchased with EC or VSEC fan motors which would improve efficiency or increase the EER at a moderate first cost increase, but are typically not standard. Unfortunately most condensing unit manufacturers do not publish the design TD of the air cooled condensers they install on their Commercially Available Off The Shelf (CAOTS) air cooled condensing units.

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