Proposed Regulations for Commercial Ice-Makers

Presentation to:
California Energy Commission
Public Hearing
October 13, 2004

Docket No. 04-AAER-1
**Introduction**

**ICE-O-Matic - John Broadbent, VP Engineering**
- A leading U.S. manufacturer of ice making equipment
- Denver, CO
- Subsidiary of Enodis

**Scotsman Ice Systems - Matt Allison, VP Engineering**
- A leading U.S. manufacturer of ice making equipment
- Chicago, IL
- Subsidiary of Enodis

**Consultant – Rick Caron, CEO The Moseley Corporation**
- Former Managing Director of Arthur D. Little, Inc.
- Arthur D. Little, Inc. provided initial report to DOE entitled *Energy Savings Potential for Commercial Refrigeration Equipment*

**Enodis**
- The world’s largest manufacturer of commercial foodservice equipment
- The world’s largest manufacturer of ice machines
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Background

We are eager to collaborate with the Commission in developing a regulation to reduce overall energy used by commercial ice makers.

We believe the framework for the legislation is sound and would like to discuss improvement opportunities in the following areas:

**Insights on Categories:**

- Consideration for differing compliance requirements (Compact, Quiet and Water Cooled Machines)
- Reduce the potential of adverse economic impact

**Implementation Refinements:**

- Minor corrections and clarifications
- Reduce the potential of adverse energy impact
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Insights on Machine Categories

Cube ice machines are manufactured in standard widths:

- **22”-wide units are used when space is limited**
  
  Capacity = 200 to 560 lbs/day

- **30” units are most popular**
  
  Capacity = 200 to 1000 lbs/day

- **48” units are used when high capacity is needed**
  
  Capacity = 1100 – 2300 lbs/day

Beverage application and small restaurants

[Images of 22”, 30”, and 48” ice machines]
Category: Air Cooled Machines  Sub category: 22 inch wide

Situation Analysis:

- 22” wide units fill an important need
  - Command a value premium
- 22” wide air-cooled units are inherently less efficient due to air-flow limitations
- Proposed regulations eliminates 11 out of 12 models, drastically limiting options for the consumer

Recommendation:

- Exemption or differing compliance requirements

Possible Solution:

- Provide a separate category for 22” wide units
  There is precedent in the proposed regulations which provides a separate category for self-contained air-cooled units
The proposed regulation does not consider width in setting efficiency levels.
Category: Air Cooled Machines   Sub category: 22 inch wide

Problem: 22” wide units are overly restricted

22 inch machines

Fail

Pass  8 % Passing
Category: Air Cooled Machines  Sub category: 22 inch wide

Recommendation: Provide exemption or differing compliance requirement

22 inch machines

Recommendation
Category: Remote Ice Machines

Conventional remote air-cooled ice machines consist of two components:

- Ice making head with compressor included (indoors)
- Condensing unit (outdoors)

Benefits:

- Heat is exhausted outside
- Fan noise is outside

Ice making head
(shown on a beverage dispenser)

Condensing Unit
(located outdoors)
Quiet Machine

- Condensing unit AND compressor are both outdoors
- Benefits
  - Virtually all noise (fan and compressor) is moved outside
  - Heat is exhausted outside (lower HVAC costs)
  - Ice making head is more compact, facilitating cleaning of dispensers
  - Ice making head is 115 volt and can be plugged into the wall

Ice making head

Compressor and Condensing Unit

McDonald’s and Taco Bell require this configuration
Subcategory: “Quiet” Ice Machines

Situation Analysis:

- They fill a need in the marketplace.
- Quiet units are inherently less efficient due to the separation of the compressor from the evaporator.
- Proposed regulations eliminate all quiet-type models with production over 850 lbs/day, eliminating 9 model families and creating an adverse impact to the consumer.

Recommendation:

- Exemption or
- Provide differing compliance requirements
Category: Remote Ice Machines

The proposed regulation does not differentiate “Quiet” remote air-cooled machines.
No Quiet machine over 850 lbs/day passes the regulation
Category: Remote Ice Machines    Sub category: Quiet Machines

Recommendation: Exemption or differing compliance requirement

![Graph showing energy consumption vs. capacity for quiet remote ice machines]
Category: Water-Cooled Machines

Situation Analysis

- Water-cooled ice machines use water to dissipate heat.
- They are quiet and require the least amount of maintenance.
- They are the most energy-efficient type of ice machine.
- Proposed regulation would create adverse impact by forcing a switch from water cooled to less efficient air cooled models above 1300 lbs.

Recommendation

Modify the energy consumption regulation for water-cooled units.
Proposed regulation creates an adverse impact by precluding water-cooled units above 1300 lbs/day which are the most efficient units on the market.
Category: Water-Cooled Machines

The proposed regulation creates an adverse energy impact by shifting the market toward remote air cooled machines above 1300 lbs/day (increases energy consumption by 1.25 kWh/100 lbs)
Category: Water-Cooled Machines

Recommendation: Exemption or differing compliance requirement

![Graph showing energy consumption vs. ice making capacity for different brands of water-cooled machines. The graph includes data points for each brand and a trend line indicating energy consumption per 100 lbs of ice. A recommendation arrow points to the CA-Stds line, suggesting a compliance standard.]
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Implementation Refinement: Minor Corrections and Clarifications

Definition of “commercial ice maker”

- The regulation does not provide a clear definition of “commercial ice maker”

  Does it include flakers?
  - Flakers are more energy and water efficient but not currently rated by ARI
  - Should California provide incentives to switch to flakers?

  Does it include residential ice machines? Industrial ice machines?

Recommendation

- The regulation should indicate that it applies to commercial cube ice machines with capacities between 50 and 2500 lbs per 24 hours when measured at standard ARI rating conditions

- Consider strategy to leverage benefit from more efficient flakers
Definition of “H”
- As defined in the regulation, “H = harvest rate in hundreds of pounds per 24 hours”
- This definition results in all units passing the regulation
- **Recommendation:** H = harvest rate in pounds per 24 hours

Definition of Water Use
- The regulation does not define what this means
- Does it mean potable water use? Condenser water use? Both?
- **Recommendation:** Water Use refers to condenser water only.
Implementation Refinement – Adverse Impact

Under the proposed regulation it is possible to convert a failing machine into a passing one by simply reducing its stated capacity.

- A manufacturer can under-state the capacity of an ice machine by any amount without violating the ARI regulation.
Example – Adverse Impact

- **ICE-O-Matic model ICE0520HA**
  
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Capacity</td>
<td>368 lbs/day</td>
</tr>
<tr>
<td>Rated energy</td>
<td>7.5 kWh/100 lbs</td>
</tr>
<tr>
<td>regulation Max energy</td>
<td>7.1 kWh/100 lbs</td>
</tr>
<tr>
<td>Result</td>
<td>FAIL</td>
</tr>
</tbody>
</table>

- **De-rating this unit as allowed by ARI:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Capacity</td>
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<tr>
<td>Rated energy</td>
<td>7.5 kWh/100 lbs</td>
</tr>
<tr>
<td>regulation Max energy</td>
<td>7.5 kWh/100 lbs</td>
</tr>
<tr>
<td>Result</td>
<td>PASS</td>
</tr>
</tbody>
</table>

- **By understating the capacity, this machine now complies with the regulation**

**Recommendation**

- The ARI test parameters must be changed to stipulate that the tested capacity must be within plus or minus 5% of the stated capacity.

  Eliminates potential of shifting market to less efficient machines
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Summary

We recommend the following considerations:

MINOR CORRECTIONS AND CLARIFICATIONS

Correctly define “H”
Clarify definition of “water use”
Clarify definition of “commercial ice maker”.

REDUCE ADVERSE IMPACT

- Provide a differing compliance requirement or exemption for:
  - 22 inch wide units
  - “Quiet” units
  - Water-cooled units
- Stipulate that the tested capacity must be within plus or minus 5% of the stated capacity
END