ENERGY STAR Draft 1 Specification for Commercial Dishwashers

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Eligibility Criteria

Broken down into the following sections:

• Definitions
• Qualifying Products
• Energy-Efficiency Specifications
• Test Criteria
• Effective Date
• Future Specification Revisions
• Define the product and other terms relevant to testing or efficiency requirements:
  – Definitions from NSF/ANSI 170-2005
  – Dishwashing Machine
  – Stationary Rack Dishwasher
    • Under Counter
    • Door Type
  – Single Tank Conveyor Dishwasher
  – High-Temp (Hot Water Sanitizing) and Low-Temp (Chemical Sanitizing)

Questions for discussion:
(1) Are there other definitions that should be included?
(2) Are current definitions clear and accurate?
Qualifying Products

• Product subcategories that may qualify under the specification
  – Conveyor, Under Counter, Door Type
  – Single Tank
  – Single Rack
  – Both Chemical and Hot Water Sanitizing

Question for discussion:
(1) Are there any additional sub-product categories that should be included?
Discussion of Test Methods

David Zabrowski, Fisher Nickel, Inc.
Test Methods

• ASTM test methods
  – F1696 measures energy & water consumption for high temp door-type machines
  – F1920 measures energy & water consumption for high temp rack conveyor machines

• NSF test methods
  – Standard 3 measures water consumption & throughput for all types of machines
Limited Knowledge

- ASTM = Conveyor and Door Type machine test methods . . . but a negligible database to date
- NSF Standard 3: A hitchhiker’s guide to the world of dishmachines . . . but only provides production capacity and final rinse water consumption
- Water consumption provides rough indicator of energy consumption
ASTM Dishwasher Test Methods

• Pros
  – Measures machine energy consumption
  – Predicts operating costs
  – Standards are being overhauled

• Cons:
  – Slow test cycle rate does not reflect real world operation of the appliance
  – Test methods are underutilized by the industry
  – No database of ASTM dishwasher performance
NSF Standard 3

• Pros:
  – Large publicly-available database
  – Large differentiation in water consumption
  – Water use is a good surrogate for energy use

• Cons:
  – Water consumption measured cold not hot
  – Database includes discontinued models
  – No energy measurement
  – Does not account for benefits of insulation
Energy Efficiency Specifications

• Derived from information in the NSF database
  – With discontinued models removed from data set.
• Converted Gallons Per Hour to Gallons Per Rack
• ENERGY STAR strives to represent the top 25% of product models available when spec is set
  – Rule of thumb
  – Also must consider Guiding Principles
Determining Gallons per Rack*

**Conveyor Type**

\[
GPR = \frac{\text{GPH} \times \text{RL}}{\text{CS} \times 60}
\]

**Door Type**

\[
GPR = \frac{\text{GPH} \times (\text{WT} + \text{RT} + \text{DT} + \text{LT})}{3600}
\]

Load Time= 5 seconds for straight through door-type dishwashers.
Load Time= 7 seconds for corner door-type dishwashers.

**Undercounter Type**

\[
GPR = \frac{\text{GPH} \times (\text{WT} + \text{RT} + \text{DT} + \text{LT})}{3600}
\]

Load time= 30 seconds for undercounter dishwashers.

\begin{align*}
\text{WT} &= \text{Wash Time in seconds.} \\
\text{RT} &= \text{Rinse time in seconds.} \\
\text{DT} &= \text{Dwell time in seconds.} \\
\text{RL} &= \text{Rack length in feet.} \\
\text{LT} &= \text{Load time.} \\
\text{CS} &= \text{Maximum conveyor speed in feet per minute} \\
\text{GPH} &= \text{Water use in gallons per hour.}
\end{align*}

* Source: NSF Web site
14 out of 61 (23.0%) meet 0.95 specification level.
## Energy-Efficiency Specifications

**Table 1: Efficiency Requirements for Commercial Dishwashers**

<table>
<thead>
<tr>
<th>Category</th>
<th>High Temp Efficiency Requirements</th>
<th>Low Temp Efficiency Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under Counter</td>
<td>1.0 gal/rack</td>
<td>1.70 gal/rack</td>
</tr>
<tr>
<td>Stationary Single Tank Door</td>
<td>0.95 gal/rack</td>
<td>1.16 gal/rack</td>
</tr>
<tr>
<td>Single Tank Conveyor</td>
<td>0.70 gal/rack</td>
<td>0.62 gal/rack</td>
</tr>
</tbody>
</table>
Questions for Discussion:
(1) Is the NSF data set with discontinued models removed the right one to use?
(2) Is the method for calculating gallons per rack accurate?
(3) Are the specification levels reasonable and reflect the top performers in the market?
(4) Are there other data points or performance criteria that EPA should consider?
Effective Date

- The date that manufacturers may begin to qualify and label products as ENERGY STAR
  - Will be coordinated with product launch at industry venue

Questions for Discussion:

(1) How much time is needed to test, qualify, and label products once the specification is finalized?
(2) What would be the appropriate venue to launch the specification?
Future Specification Revisions

- EPA may revisit the specification if technology and market changes affect its usefulness to differentiate products
  - Could have multiple tiers that get phased in over time
  - EPA will work with industry to revise specification using the same process

ENERGY STAR qualification is not automatically granted for the life of the product model
Next Steps

• Draft 1 released May 5, 2006 for stakeholder review
  – Stakeholder Comments due June 2, 2006 to canderson@icfi.com
  – Post information from this meeting to the Web site
  – Post all subsequent written comments to the Web site

• Compile and review industry comments
  – Obtain more data, if needed, during comment process
  – Conduct further research as needed

• Disseminate additional Draft(s) for review, as needed

• Finalize specification and launch – late 2006/early 2007
  – Mfrs sign Partnership Agreement and begin labeling products
For More Information

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- ENERGY STAR Product Development Web site
  www.energystar.gov/productdevelopment