



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

Definitions

- 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

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

* Source: NSF Web site

Door Type

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

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

Undercounter Type

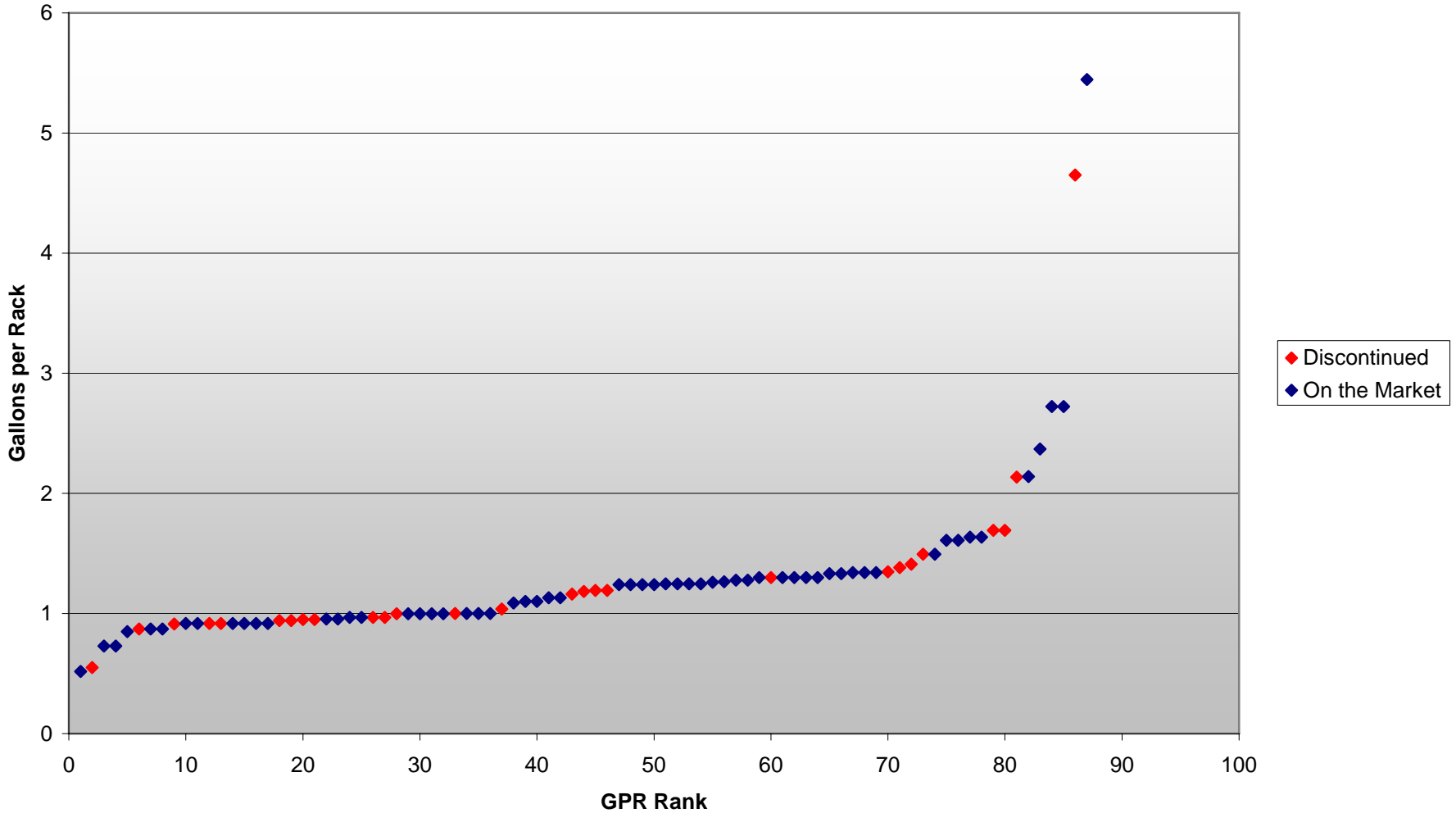
$$\text{GPR} = \frac{\text{GPH} \times (\text{WT} + \text{RT} + \text{DT} + \text{LT})}{3600}$$

Load time= 30 seconds for undercounter dishwashers.

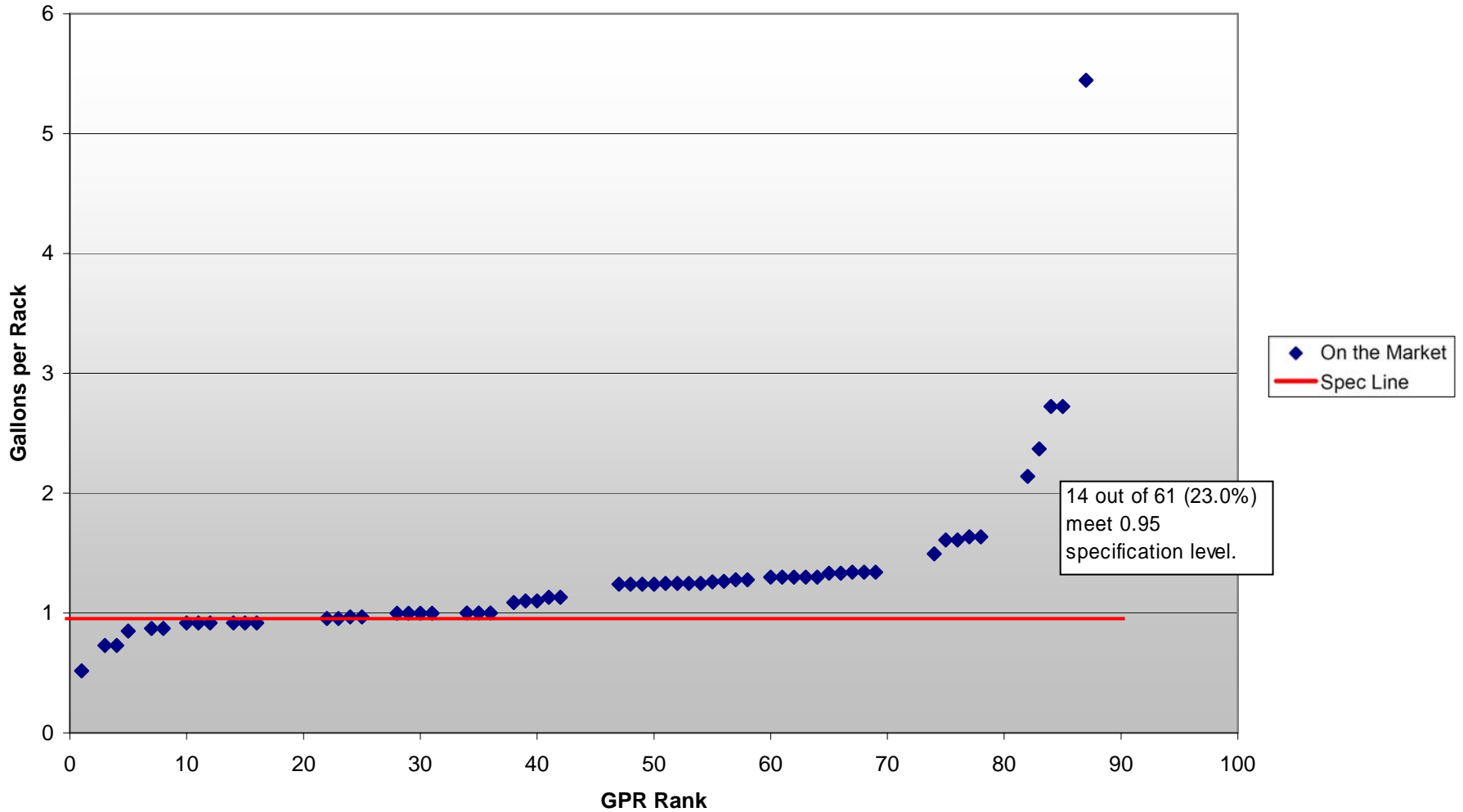
WT= Wash Time in seconds.
RT= Rinse time in seconds.
DT= Dwell time in seconds.
RL= Rack length in feet.

LT= Load time.
CS= Maximum conveyor speed in feet per minute
GPH= Water use in gallons per hour.

Door Type High Temperature Commercial Dishwasher Gallons Per Rack (All Models)



Door Type High Temperature Commercial Dishwasher Gallons per Rack





Energy-Efficiency Specifications

Table 1: Efficiency Requirements for Commercial Dishwashers

Category	High Temp Efficiency Requirements	Low Temp Efficiency Requirements
Under Counter	1.0 gal/rack	1.70 gal/rack
Stationary Single Tank Door	0.95 gal/rack	1.16 gal/rack
Single Tank Conveyor	0.70 gal/rack	0.62 gal/rack



Energy-Efficiency Specifications

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