# 2006 DRAFT RULEMAKING ACTIVITIES DATA SHEETS

**APPLIANCE STANDARDS**
**BUILDING TECHNOLOGIES PROGRAM**
**U. S. DEPARTMENT OF ENERGY**

**October 2005**

# Table of Contents (alphabetical order)

| | | |
|---|---|---|
| Fluorescent Lamp Ballasts | Test Procedure | 37 |
| Furnaces and Boilers (Residential) | Standards | 38 |
| Furnace Fans (Residential) | Standards | 39 |
| Furnace Fans (Residential) | Test Procedure | 40 |
| Furnaces, Warm Air (Commercial) | Standards | 41 |
| Furnaces, Warm Air (Commercial) | Test Procedure | 42 |
| High Intensity Discharge Lamps | Determination | 43 |
| High Intensity Discharge Lamps | Test Procedure | 44 |
| Ice Cream Freezers; Self-Contained Commercial Refrigerators, Freezers, and Refrigerator-Freezers without Doors (Supermarket Refrigerator Systems); and Remote-Condensing Commercial Refrigerators, Freezers, and Refrigerator-Freezers | Standards | 45 |
| Illuminated Exit Signs | Standards | 48 |
| Incandescent General Service Lamps | Standards | 49 |
| Incandescent General Service Lamps | Test Procedure | 50 |
| Incandescent Reflector Lamps | Standards | 51 |
| Incandescent Reflector Lamps | Test Procedure | 52 |
| Oil- and Gas-Fired Packaged Boilers (Commercial) | Standards | 53 |
| Oil- and Gas-Fired Packaged Boilers (Commercial) | Test Procedure | 54 |
| Package Air-Conditioning and Heating Equipment; Small, Large, and Very Large (Commercial) | Standards | 55 |
| Package Air-Conditioning and Heating Equipment; Small, Large, and Very Large (Commercial) | Test Procedure | 56 |
| Packaged Terminal Air Conditioners and Heat Pumps (Commercial) | Standards | 57 |
| Pool Heaters (Gas) | Standards | 58 |
| Pool Heaters (Gas) | Test Procedure | 59 |
| Ranges and Ovens and Microwave Ovens (Electric and Gas) | Standards | 60 |
| Ranges and Ovens and Microwave Ovens (Electric and Gas) | Test Procedure | 61 |
| Refrigerated Bottle or Canned Beverage Vending Machines (Beverage Vending Machines), and Self-Contained Commercial Refrigerators with Doors for Pull-Down Temperature Applications (Beverage Merchandisers) | Standards | 62 |
| Refrigerators, Refrigerator-Freezers, & Freezers (Residential) | Standards | 64 |
| Refrigerators, Refrigerator-Freezers, & Freezers (incl. Compact Refrigerators) (Residential) | Test Procedure | 65 |
| Room Air Conditioners | Standards | 66 |
| Room Air Conditioners | Test Procedure | 67 |
| Self-Contained Commercial Refrigerators, Freezers, and Refrigerator-Freezers with Doors for Holding Temperature Applications (Reach-In Refrigerators, Freezers, and Refrigerator-Freezers with Doors) | Standards | 68 |
| Single-Packaged Vertical Air-Conditioners and Heat Pumps (SPVU) | Standards | 69 |
| Tankless Gas-Fired Instantaneous Water Heaters | Standards | 70 |
| Torchieres | Standards | 71 |

| | | |
|---|---|---|
| Torchieres | Test Procedure | 72 |
| Traffic Signal Modules and Pedestrian Modules | Standards | 73 |
| Unit Heaters (Commercial) | Standards | 74 |
| Water-Cooled Air Conditioners and Water-Source Heat Pumps (Commercial) | Standards | 75 |
| Water Heaters (Commercial) | Standards | 76 |
| Water Heaters (Commercial) | Test Procedure | 77 |
| Water Heaters (Residential) | Standards | 78 |
| Water Heaters (Residential) | Test Procedure | 79 |

# Standards

**Product:** Air Conditioners and Heat Pumps less than 65 kBtu/hr, 3-Phase (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2004 - 2030** | Energy Savings:[1]<br>SEER 12 standard level = 2.17<br>SEER 13 standard level = 2.9 |
| **Potential Economic Benefits/Burdens** | NPV, billions of $1998:<br>SEER 12 = 1.1<br>SEER 13 = (0.71) |
| **Potential Environmental or Energy Security Benefits** | Carbon emissions reduction:<br>SEER 12 = 34 million tons<br>SEER 13 = 43 million tons |
| **Status of Required Changes to Test Procedures** | DOE plans to publish a Final Rule to incorporate test procedures similar to those referred to in ASHRAE Standard 90.1 into the CFR in 2006. |
| **Other Regulatory Actions** | The California Energy Commission has energy efficiency standards in place (CEC Appliance Energy Regulations, 2003). Possible State and regional environmental regulation (e.g. air quality). |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | EPA phase out of HCFC refrigerants. |
| **2005 Priority** | Active Rulemaking |

[1] Based on Screening Analysis Report for Commercial HVAC Standards, see 65 FR 30929.

# Standards (revised for 2006)

**Product:** Automatic Ice Makers (Commercial)

| Factors for Consideration | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2010-2035** | Not relevant for priority setting because EPACT 2005 prescribes an initial standard. |
| **Product / Technology Availability (Including Price/Cost information):** | |
| **Cumulative Burden** | • The industry dealt with the phase out of CFC's in the mid-1990's.<br>• Some of the companies involved in manufacturing this equipment have parent companies, which own divisions that have been subject to energy standards of other products. |
| **Status of Test Procedures** | • Per EPACT 2005, the test procedure shall be the test procedure specified in Air-Conditioning and Refrigeration Institute Standard 810-2003, in effect on January 1, 2005. |
| **Other Regulatory Actions** | Canadian Regulations |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | FEMP Recommendations |
| **Issues** | Significant product variety. DOE is authorized to set standards for "other types" of automatic ice makers (commercial) not covered by the standards prescribed by EPACT 2005.<br><br>DOE must conduct 2 rulemakings to assess possible revisions to the prescribed standards, the first of which is due in January 2015. |

# Determination Analysis (revised for 2006)

**Product:** Battery Chargers and External Power Supplies

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 -2035** [2] | 80% efficiency: 1.8 |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $2002) 2010-2035** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Not available. |
| **Status of Required Changes to Test Procedures** | DOE does not have a test procedure for battery chargers and power supplies. EPACT 2005 requires that a test procedure be finalized by 2/8/2007. |
| **Other Regulatory Actions** | California Energy Commission (CEC) is considering minimum efficiency regulations on power supplies and battery chargers. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | EPA has issued a draft ENERGY STAR® Specification in February, 2004. European Code of Conduct has established voluntary minimum efficiency specifications. Market penetration of more efficient switch mode power supplies is increasing because they tend to be lighter and smaller in size. More efficient power supplies can be made more compatible with different frequencies and voltages making them more suitable for the international market. |
| **Issues** | Clear product definitions are required. |
| **2005 Priority** | Priority Not Specified. |

[2] Energy savings estimates are based on an analysis of battery chargers and power supplies conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

# Test Procedure (revised for 2006)

**Product:** Battery Chargers and External Power Supplies

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | DOE does not have a test procedure. |
| **Priority of Standard, 2006 Proposed** | |
| **International or Other Coordinating Activities** | EPA has issued an efficiency test procedure for Energy Star external power supplies. The test procedure is "Test Method for Calculating the Energy Efficiency of Single-Voltage External Ac-Dc and Ac-Ac Power Supplies August 11, 2004."<br><br>EPA is developing an energy consumption test procedure for Energy Star Battery Chargers.<br><br>CEC uses the EPA test procedure for its energy efficient external power supplies standard.<br><br>European Union has issued a Code of Conduct for test procedures and voluntary efficiency specifications.<br><br>International Electrotechnical Commission (IEC) test procedure (IEC 62301) exists for testing standby power.<br><br>IEEE 1515-2000 provides background on general test conditions and brief references to efficiency.<br><br>Australian government is interested in establishing an internationally harmonized test procedure. |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | Final rule by 2/8/2007. |
| **Issues** | Clear product definitions are required for test procedure development. |

# Standards (revised for 2006)

**Product:** Ceiling Fans and Ceiling Fan Light Kits

<table>
<tr><th>Factors for Priority Setting</th><th>Assessment</th></tr>
<tr><td>Potential Energy Savings[3] from Regulatory Action; Cumulative (Quads) 2009-2034</td><td>
<table>
<tr><td rowspan="2">Energy Savings Efficiency Level</td><td colspan="2">Lighting Efficiency[a,b,c]</td></tr>
<tr><td>Energy Reduction Relative to Baseline (%)</td><td>Energy Savings Potential, 2009-2034 (quads)</td></tr>
<tr><td>EPACT 2005[d]</td><td>0%</td><td>0.00</td></tr>
<tr><td>ENERGY STAR®</td><td>68%</td><td>0.74</td></tr>
</table>
These savings estimates are based on the following assumptions:<br>
a. Approximately 95% of ceiling fans are installed with lighting (RLW, 2002)<br>
b. Approximately 80% of ceiling fan light kits use medium base sockets, which are already regulated under EPACT 2005. The remaining 20% are candelabra sockets or sockets other than medium screw base (RLW, 2005). This 20% of ceiling fan light kits analyzed contains only suspended ceiling fans.<br>
c. The lumens/watt (LPW) of candelabra base CFLs is assumed to be the same as the LPW of medium base CFLs, or approximately 47 LPW (Energy Star, 2005 and NCI, 2005).<br>
d. The 190 watt maximum energy consumption standard level recommended under EPACT 2005 is lower than the assumed baseline unit power consumption of 120 watts, resulting in no energy savings.
</td></tr>
<tr><td>Potential Economic Benefits/Burdens</td><td>Not Available.</td></tr>
<tr><td>Potential Environmental or Energy Security Benefits</td><td>Specific estimates of emission reductions have not been developed.</td></tr>
<tr><td>Status of Required Changes to Test Procedures</td><td>Ceiling Fans:<br>EPACT 2005 states that test procedures for ceiling fans shall be based on the ‘Energy Star Testing Facility and Performing the Solid State Test Method for Energy Star Qualified Ceiling Fans, Version 1.1’. The Secretary may also review and revise the test procedure.<br>Ceiling Fan Light Kits:<br>EPACT 2005 states that test procedures for ceiling fan light kits shall be based on the test procedures referenced in the Energy Star specifications for Residential Light Fixtures and CFL bulbs in effect on date of enactment. The Secretary may also review and revise the test procedure.</td></tr>
<tr><td>Recommendations by Interested Parties</td><td></td></tr>
<tr><td>Evidence of Market-Driven or Voluntary Efficiency Improvements</td><td>Energy Star Standards:<br>Low Fan Speed – 1,250 CFM minimum airflow, 155 CFM/watt efficiency;<br>Medium Fan Speed – 3,000 CFM minimum airflow, 100 CFM/watt efficiency;</td></tr>
</table>

[3] Energy savings estimates are based on an updated analysis of ceiling fans and ceiling fan light kits conducted for DOE’s 2006 schedule setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website.
<http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

| | |
|---|---|
| | High Fan Speed – 5,000 CFM minimum airflow, 75 CFM/watt efficiency.<br>All integral and attachable light kits must meet the requirements of the ENERGY STAR RLF specification.<br>(ENERGY STAR® Program Requirements for Residential Ceiling Fans, Version 2.0)<br><br>There are over 15 utility and regional energy efficiency program sponsors across states including California, Connecticut, Idaho, Illinois, Massachusetts, Rhode Island, Minnesota, New Hampshire, New York, Ohio, and Vermont. |
| **Issues** | EPACT 2005 directs the Secretary of Energy to complete the following<br>*Ceiling Fans:*<br>- Directs design requirements (e.g., fan controls, adjustable speed, reversible) for products manufactured on or after January 1, 2007.<br>- DOE may consider and issue energy efficiency or energy use standards for electricity used by ceiling fans to circulate air in a room. Previously, DOE began examination of this product and consequently possesses preliminary analyses, allowing for a relatively quick restart time if energy conservation standards are pursued.<br>- EPACT 2005 requires consideration to establish separate (and exempted) product classes for highly decorative fans.<br>*Ceiling Fan Light Kits:*<br>- For light kits other than E-26 and pin-base, the Secretary shall consider and issue requirements by January 1, 2007. If it fails to do so, then starting January 1, 2009, a prescriptive standard takes effect.<br>- Light kits with E-26 shall be shipped with compliant CFLs starting January 1, 2007. Light kits with pin-sockets shall meet Energy Star Residential Light Fixtures version 4.0 by January 1, 2007.<br>- Light kits with medium screw base sockets shall meet Energy Star Compact Fluorescent Lamps version 3.0 or use light sources with equivalent lumens per watt performance by January 1, 2007.<br>- After January 1, 2010, the Secretary may consider and issue new requirements for all light kits. |
| **2005 Priority** | Preliminary Analysis |

**Suspended Ceiling Fan Background Data**

| Type | Data type | Value | Source |
|---|---|---|---|
| Suspended Ceiling Fans (candelabra lighting only) | Installed Base, millions (1997) | 34.9[4] | Calwell and Horowitz (2001); Appliance Magazine (2000); Hunter (2001); NCI (2005) |
| | Equipment Lifetime, years (1997) | 13 | |
| | AEC, quad | 0.056 | |
| Suspended Ceiling Fan Motors | Installed Base, millions (2001) | 181.1[5] | Calwell and Horowitz (updated 2003); ADL 1999; RECS (1997 & 2001); Appliance Magazine (2000); Hunter (2001); NCI (2005) |
| | Equipment Lifetime, years (1997) | 13 | |
| | AEC, quad | 0.159 | |

**Suspended Ceiling Fan Lighting UEC**

| Description | Value | Comments |
|---|---|---|
| Stock UEC (kWh) | 73 | Based on a 120 watt baseline unit power consumption, Calwell and Horowitz (updated 2003) and NCI (2005) |
| Typical New UEC (kWh) | 73 | Assumed same as stock |
| Minimum Efficiency Standard | N/A | No minimum efficiency standard |
| Current ENERGY STAR ® Efficiency (kWh) | 23 | Based on a 38 watt average unit power consumption for ENERGY STAR® ceiling fans with lighting, NCI (2005) |

**Suspended Ceiling Fan Motor UEC[6]**

| Description | Value | Comments |
|---|---|---|
| Stock UEC (kWh) | 154 | Based on 100 cfm/W airflow, Calwell and Horowitz (updated 2003) and NCI (2005) |
| Typical New UEC (kWh) | 154 | Assumed same as stock |
| Minimum Efficiency Standard | N/A | No minimum efficiency standard |
| Best Available Efficiency (cfm/W) | 165 | Aerodynamic fan blade and more efficient motor |
| Current ENERGY STAR® Efficiency (cfm/W) | 122.3 | Aerodynamic fan blades |
| Future Technology (maximum technology) (cfm/W) | 260 | High-efficiency motor and aerodynamic fan blades, Permanent split capacitor or permanent magnet motor |

[4] The 34.9 million ceiling fan lighting units reflects an estimate by Calwell and Horowitz (2001 and updated in 2003) that 95% of all ceiling fans have associated lighting (RLW, 2002), and that 20% of that lighting is not medium screw based (RLW, 2005). This estimate contains only suspended ceiling fans.

[5] This estimate contains only suspended ceiling fans.

[6] This table is open to comment and presents several advanced technologies, and their respective efficiency levels, that the Department may require in the future.

**Suspended Ceiling Fan UEC and Energy Savings Potential (Fan Energy Only)[7]**

| Technology/ Standard Level | UEC (kW-h) | Annual Energy Savings Potential (quad) | Energy Saving Potential (2010-2035), (quads) | Source |
|---|---|---|---|---|
| Typical Device (current stock) | 154 | NA | NA | Calwell and Horowitz (updated 2003) and NCI (2005) |
| 'Typical New' | 154 | NA | NA | Assumed same as Stock |
| Best Available Technology | 94 | 0.062 | 1.21 | Calwell and Horowitz (updated 2003) and NCI (2005) |
| ENERGY STAR®, Fan Efficacy Only | 126.4 | 0.029 | 0.56 | Calwell and Horowitz (updated 2003) and NCI (2005) |
| Future Technology (maximum technology) | 58.6 | 0.099 | 1.93 | Calwell and Horowitz (updated 2003) and NCI (2005) |

**Ceiling Fan UEC and Energy Saving Potential (Lighting Only)**

| Technology/ Standard Level | UEC (kW-h) | Annual Energy Savings Potential (quad) | Energy Saving Potential (2009-2034) (quads) | Source |
|---|---|---|---|---|
| Current stock | 73 | NA | NA | Calwell and Horowitz (updated 2003) and NCI (2005) |
| Typical new | 73 | NA | NA | Assumed same as stock |
| EPACT 2005 recommendation[8] | 116 | 0.000 | 0.00 | Calwell and Horowitz (updated 2003) and NCI (2005) |
| ENERGY STAR® Lighting | 23 | 0.038 | 0.74 | Calwell and Horowitz (updated 2003) and NCI (2005) |

References:

1. Calwell, Chris and Travis Reeder, Ecos Consulting, 2003. Estimating National Ceiling Fan Energy Use & Savings Potential.
2. Energy Star, 2005. CFL Product List, October 4, 2005. www.energystar.gov.
3. Hunter, 2001. E-mail from Clarissa Jones, Hunter Fan Company, to Aristotle Marantan, NCI, dated December 17, 2001.
4. NCI, 2005. Analysis of Percent Suspended Ceiling Fan in Market.
5. RLW Analytics, 2002. S*tatewide Investor Owner Utility Ceiling Fan Study: Final Report*. Prepared for San Diego Gas and Electric Company.
6. RLW, 2005. 2005 *California Statewide Residential Lighting and Appliance Efficiency Saturation Study, Final Report*. August 23, 2005. Prepared for California's Investor Owned Utilities: SDG&E, Southern California Gas Company, SCE, PG&E, Prepared by: RLW Analytics.

[7] This table is open to comment and presents several advanced technologies, and their respective efficiency levels, that the Department could require in the future. A fan energy standards rulemaking is not included in the 2006 Schedule Setting.

[8] The 190 watt standard level recommended under EPACT 2005 is lower than the assumed baseline unit power consumption of 120 watts, resulting in no energy savings.

# Standards (revised for 2006)

**Product:** Central Air Conditioners and Heat Pumps (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Energy Savings from Regulatory Action; Cumulative (Quads) 2006 - 2030**[9] | Minimum energy efficiency standards of 13 SEER and 7.7 HSPF for non-space constrained products save 4.2 quads. |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $1998) 2006-2030**[10] | Minimum energy efficiency standards of 13 SEER and 7.7 HSPF save 1 billion dollars. |
| **Potential Environmental or Energy Security Benefits; Cumulative Emission Reductions 2006-2020**[11] | Minimum energy efficiency standards of 13 SEER and 7.7 HSPF save 32.7 Mt of Carbon and 93.8 kt of $NO_x$. |
| **Status of Required Changes to Test Procedures** | The final rule test procedure was published October 11, 2005. (70 FR 59122) |
| **Other Regulatory Actions** | A technical amendment publishing efficiency standards for all classes of products, and discussing the impact of the US Appeals Court decision appeared in the Federal Register on August 17, 2004. (69 FR 50997) |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | |
| **Issues** | |
| **2005 Priority** | No Current Activity |

[9] Energy savings from DOE's Final Rule, January 22, 2001. DOE's analysis of residential central air conditioners and heat pumps is in the Technical Support Document available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. These estimated savings will be achieved through the 2001 Final Rule and do not represent additional potential savings from further regulatory action.
<http://www.eere.energy.gov/buildings/appliance_standards/residential/central_ac_hp.html>

[10] Economic impacts from DOE's Final Rule, January 22, 2001.

[11] Emission reductions from DOE's Final Rule, January 22, 2001.

# Test Procedure (revised for 2006)

**Product:** Central Air Conditioners and Heat Pumps (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | The test procedure for residential central air conditioners and heat pumps is being updated but will not impact product efficiency ratings. |
| **Priority of Standard, 2006 Proposed** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | Industry is supportive of changes to update test procedure. |
| **Statutory Deadline** | |
| **Issues** | The test procedure is being updated in two phases. The first phase consists of a comprehensive update to the test method and was published as a Final Rule on October 11, 2005. (70 FR 59122) The second phase consists of changes to the test method for SDHV systems as well as further updates to other sections of the test procedure (e.g., frost accumulation testing, multi-capacity system testing, and test reporting). The second phase of the update is expected to be published as a NOPR in 2006. |

# Coverage

**Product:** Certain Incandescent Reflector Lamps (ER/BR)

| Factors for Consideration | Assessment |
|---|---|
| **Potential Energy Savings[12] from Regulatory Action; Cumulative (Quads) 2010-2035** | Scenario 1: Halogen Standard = 0.74 quad<br>Scenario 2: Halogen Infrared Standard = 2.17 quads |
| **Product / Technology Availability (Including Price/Cost information):** | Product is primarily directed toward the residential sector, but is also used in other sectors.<br>Readily available at retail outlets. |
| **Cumulative Burden** | ER/BR lamps were exempted from the standard that regulated other incandescent reflector lamps in the Energy Policy Act of 1992.<br>By 2001, 57% of all reflector lamp shipments were ER/BR lamps (NEMA, 2003), and these lamps accounted for approximately 77% of reflector lamp shipments to the residential sector.<br>ER/BR lamps are not part of EPACT 2005. |
| **Status of Test Procedures** | The Department has a test procedure for incandescent reflector lamps that is applicable to ER/BR lamps. |
| **Other Regulatory Actions** | None. |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None. |
| **Issues** | If regulated, consumers may try and substitute non-regulated lamps (e.g., A-type or K-type) in sockets that had previously used ER/BR reflector lamps. If so, the overall system (fixture and lamp) efficiency may be lower than before the regulation.<br>PAR lamps, which are already regulated and more efficient than ER/BR lamps, are readily able to be installed in sockets that currently use ER/BR lamps.<br>The Department must promulgate a definition of "household" in order to qualify ER/BR lamps as covered products for a standards rulemaking. |

[12] Energy savings estimates are based on an updated analysis conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website.
<http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

# Standards

**Product:** Clothes Dryers (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 – 2035** | Heat Pump Elec. Dryer (5.7 EF) = 4.8 [13]<br>Microwave Elec. Dryer (3.5 EF) = 1.6<br>Modulating Gas Dryer (2.8 EF) = 0.06<br>Heat Pump Electric Dryer (5.2 EF) = 4.5 |
| **Potential Economic Benefits/Burdens** | Not available |
| **Potential Environmental or Energy Security Benefits** | Not available |
| **Status of Required Changes to Test Procedures** | Reduced annual cycles need to be considered, definitions and creation of new product class for condensing dryers. |
| **Other Regulatory Actions** | DOE regulation of clothes washers.<br>DOE regulation of white goods for full line manufacturers. |
| **Recommendations by Interested Parties** | There appears to be a general consensus among stakeholders that updating clothes dryer standards should be given low priority. |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | At least three U.S. manufacturers are marketing high efficiency clothes washers, which are likely to have improved moisture extraction. |
| **Issues** | Significant dryer savings potential has been considered in clothes washer rulemaking (greater moisture extraction). Mechanical extraction has been estimated to be much more cost-effective than thermal extraction.<br>New electric dryers advertise 30% reduction in energy usage. |
| **2005 Priority** | No Current Activity |

[13] All estimates are based on the 2003 prioritization analysis, with a small adjustment for the 2010-2035 timeframe assumed here.

# Test Procedure

**Product:** Clothes Dryers (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | The test procedure needs to be changed if there is to be a new standard. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | Canadian Standards Association (CSA) has conducted specialized dryer tests and has asked DOE to consider revisions to the test procedure. |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | A new product class needs to be defined for condenser dryers; currently there is one waiver in effect. Numerous changes are required prior to a standards rulemaking for clothes dryers, including the investigation of the same test cloth issues as for the clothes washer rulemaking. |

# Standards (revised for 2006)

**Product:** Clothes Washers (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Energy Savings from Regulatory Action; Cumulative (Quads) 2004-2030** | The Final Rule energy savings equal 5.5 quads over 2004-2030. These estimated savings will be achieved through the 2001 Final Rule and do not represent additional potential savings from further regulatory action. Required MEF of 1.04 in 2004 and 1.26 in 2007. |
| **Potential Economic Benefits/Burdens** | The Net Present Value (NPV) is $15.3 billion cumulative from 2004 to 2030 in 1997 dollars. |
| **Potential Environmental or Energy Security Benefits** | For period 2004- 2030, 95 million metric tons of carbon and 254 thousand metric tons of $NO_x$. |
| **Status of Required Changes to Test Procedures** | Final Rule issued January 12, 2001. Changes to the test procedure were incorporated into the standards rulemaking. DOE is working to find a suitable replacement for the test cloth used in the test procedure. |
| **Other Regulatory Actions** | DOE regulation of clothes dryers. DOE regulation of white goods for full line manufacturers. EPACT 2005 establishes standards for commercial clothes washers. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | Consortium for Energy Efficiency program with utilities. Energy Star program. Federal Energy Management Program for procurement initiative. At least three U.S. manufacturers are marketing high efficient clothes washers. |
| **Issues** | The State of California has filed a petition requesting an exemption to the federal standard in order to implement water consumption standards. |
| **2005 Priority** | Not Specified |

# Test Procedure

**Product:** Clothes Washers (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test Procedure was amended as part of the standards rulemaking (66 FR 3314). |
| **Priority of Standard, 2006 Proposed** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | As part of the January 12, 2001 standards final rule, the Department included revisions to the test procedure dealing with the energy test cloth. In the October 31, 2003 direct final rule (68 FR 62198), the Department modified the procedure for developing the correction factors for new production lots of energy test cloth by replacing the extractor test points at 50 g with 100 g test points.<br><br>The Department is currently working to find a suitable replacement for the test cloth. |

# Standards (revised for 2006)

**Product:** Clothes Washers (Commercial)

| Factors for Consideration | Assessment | |
|---|---|---|
| **Potential Energy Savings from Regulatory Action;**<br>**Cumulative (Quad) 2008-2030** | Not relevant for priority setting because EPACT 2005 prescribes the initial standard. | |
| **Product / Technology Availability (Including Price/Cost information):** | | |
| **Cumulative Burden** | No minimum energy efficiency standard exists for large capacity commercial clothes washers.<br>Many commercial clothes washer manufacturers make other "white" goods that have minimum energy efficiency standards, e.g., residential refrigeration standards were set in 1990, 1993, and in 2001. | |
| **Status of Test Procedures** | EPACT 2005 states that the test procedures shall be the same as the test procedures established by the Secretary for residential clothes washers. The residential clothes washer test procedure has a test cloth issue that the DOE is working to resolve. | |
| **Other Regulatory Actions** | California standard. | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | Energy Star minimum MEF=1.26 and is only for family sized units. | |
| **Issues** | No federal standards pre-existing. Energy Star program applied to family-sized commercial units only.<br>Accounting for remaining moisture content (RMC) has been resolved.<br>The CFR test does not account for energy savings resulting from soil sensors because the CFR test uses clean cloth.<br>EPACT 2005 provides a definition of "commercial clothes washer" based on size restrictions for horizontal-axis (3.5 cubic feet) and vertical-axis units (4.0 cubic feet). | |

# Standards (revised for 2006)

**Product:** Combination Appliances (Residential)

<table>
<tr><th>Factors for Priority Setting</th><th>Assessment</th></tr>
<tr><td>Potential Energy Savings[14] from Regulatory Action; Cumulative (Quad) 2010 – 2035</td><td>
<table>
<tr><td rowspan="2">Combination Appliances</td><td colspan="2">Type I: Oil boiler w/ tankless coil</td><td colspan="2">Type II: Gas water heater w/ fan-coil</td><td rowspan="2">Total energy savings (quad)</td></tr>
<tr><td>CAE[15]</td><td>Energy savings (quad)</td><td>CAE</td><td>Energy savings (quad)</td></tr>
<tr><td>Baseline</td><td>0.78</td><td>--</td><td>0.69</td><td>--</td><td>--</td></tr>
<tr><td>Mid efficiency</td><td>0.82 (more insulation)</td><td>0.06</td><td>0.70 (more insulation)</td><td>0.01</td><td>0.07</td></tr>
<tr><td>High efficiency</td><td>0.85 (sub-condensing oil boiler)</td><td>0.09</td><td>0.83 (condensing water heater)</td><td>0.16</td><td>0.25</td></tr>
</table>
</td></tr>
<tr><td>Potential Economic Benefits/Burdens</td><td>Mid Efficiency total: +0.00 B $US (NPV)<br>High Efficiency total: -0.68 B $US (NPV)</td></tr>
<tr><td>Potential Environmental or Energy Security Benefits</td><td>Not available</td></tr>
<tr><td>Status of Required Changes to Test Procedures</td><td>ASHRAE 124 (2004) is under review by ASHRAE; once this review is complete, DOE can adopt the test procedure. The current update introduced several changes (for example the water heater function of larger size water heaters is tested under SPC 118.1 (the commercial boilers test procedure) instead of under SPC 118.2(the residential boilers test procedure)).</td></tr>
<tr><td>Other Regulatory Actions</td><td>DOE regulation of residential furnaces and boilers; combination appliances are an additional class, and ~ 40% of the energy savings potential may overlap with the oil boilers furnace class (a component of Type I combination appliances).<br>DOE regulation of water heaters, the new rule became effective on 1/20/2004.</td></tr>
<tr><td>Recommendations by Interested Parties</td><td>Large manufacturers and energy advocates favor regulation of these appliances to avoid product switching from more stringently regulated furnaces and boilers toward unregulated combination appliances; one small combi manufacturer believes that combi systems are already regulated as water heaters and boilers, imposition of more stringent standards would be burdensome, and that significant savings are not available.</td></tr>
<tr><td>Evidence of Market-Driven or Voluntary Efficiency Improvements</td><td>Several manufacturers are marketing high efficiency oil boilers (at or above 86% AFUE); recently, one major manufacturer discontinued their highest efficiency model. Almost all water heaters models (after 1/2004) are at efficiency levels which meet or exceed the mid-efficiency level considered for this analysis.</td></tr>
<tr><td>Issues</td><td>EPACT 2005 gives DOE the authority to regulate combination appliances.</td></tr>
</table>

[14] Energy savings estimates are based on an analysis conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

[15] Combined Annual Efficiency (CAE) is calculated per ASHRAE 124 (2004).

| | |
|---|---|
| | Lack of a combination appliance standard may allow sales of low efficiency versions of water heaters and boiler products by calling them combination appliances, as baseline combination appliances can be less efficient than the individual appliances they replace.<br>Labeling of an appliance for combination use may not be effective because the unit is field assembled and enforcement is problematic. |
| **2005 Priority** | Not in final 2005 Priority Setting. |

## Background Material

NCI and LBNL jointly created an estimate of the current combination appliance market to estimate potential energy savings and approximate net present value. Further refinements are possible in the future if warranted.

| Description | Value | Comments/Source |
|---|---|---|
| Type I Baseline Definition | 80% AFUE, 140kBTU Oil Boiler, .49 EF | GAMA comments, Furnace and Boiler rulemaking, oil boiler class, 2002; EF rating estimated from tank size, 2000 Water Heater Final Rule. |
| Mid Efficiency Unit Definition | 84% AFUE (baffles, higher HX area), combined with 2" of insulation of the tank, .54 EF | Space heating function: Generally available mid-efficiency unit, special vent not generally required.<br>Water heating function: 2000 Water Heater Final Rule, slightly higher than 2000 standard level. |
| High Efficiency Unit Definition | 86% AFUE (higher HX area), combined with 2" of insulation of the tank, w/ stainless steel vent,<br>.57 EF | Space heating function: Condensing not generally available in the market; 86% AFUE units are, with SS vent required.<br>Water heating function: 2001 Water Heater rule |
| Annual Sales Volume | 70% of total oil boiler sales,<br>90,000 units per year | Oil boilers market : assumed 100% retrofits. Oil boiler shipments – 130,000 (Appl.Magazine 2003). Oil-fired water heaters – 40,000 (2000 water heaters rule). The differential assumed to represent the combination appliances market. |
| Lifetime | 18 Years | Appliance Magazine, 2001, p 58-9. |
| Product Cost Delta | +$123 (Mid), +$925 (High) | NCI Estimate. Based on insulation qty & price, HX area increase, and stainless steel vent costs (including installation). |
| Type II Baseline Definition | 75 Gallon/ 75kBTU Gas Water Heater combined with fan-coil,<br>.52 EF | Equivalent to the largest residential water heater size (GAMA). EF rating estimated from tank size, 2000 Water Heater Final Rule. |
| Mid Efficiency Unit Definition | 2" increased water heater insulation, .54 EF | 2000 Water Heater Final Rule, slightly higher than 2004 standard level. |
| High Efficiency Unit Definition | Condensing Gas Water Heater<br>w/ new plastic vent, .86 EF | "Market Disposition of High-Efficiency Water Heating Equipment", Arthur D. Little, Inc., 1996. |
| Annual Sales Volume | 100,000 units per year | Estimate that the lowest range from GRI's shipment forecast is appropriate, based on industry contacts (GRI Report GRI-00/0042, "Low Capacity Gas-Fired Space Heating Assessment: Final Technical Report", July 2001). Uncertainty is high, as the GRI Report indicates that due to unfamiliarity and local code restrictions, market penetration is currently limited. If full penetration is achieved, shipments could reach 500,000 units per year, with proportionally higher energy savings. |
| Product Lifetime | 9 years | 2001 Water Heater rule |
| Product Cost Delta | +$108 (Mid), +$715 (High) | NCI Estimate. Based on insulation qty & price, added SS heat exchanger and plastic vent (+ installation) |
| Energy Calculation Parameters | R = .71<br>214 Heating Days<br>64.3 Gallons/hour water load | ASHRAE 124 (2004)<br>ASHRAE 124 (2004) test<br>National average water load, 2000 Water Heater Final Rule |
| Discount Rate | 7% | 2000 Water Heater Final Rule |

# Test Procedure

**Product:** Combination Appliances (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test Procedure needs to be developed if there is to be a new standard. |
| **Priority of Standard, 2006 Proposed** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | Large manufacturers would like DOE to adopt ASHRAE 124 (2002); one small manufacturer is opposed to this. |
| **Statutory Deadline** | |
| **Issues** | ASHRAE is in an advanced stage of revising ANSI/ANRAE 124/1991 "Methods of Testing for Rating Combination Space-Heating and Water-Heating Appliances." To DOE's knowledge, this revision has not been finalized. Subsequent to revision completion, DOE could adopt the test procedure by referencing ASHRAE 124-200X. |

# Standards (revised for 2006)

**Product:** Dehumidifiers (Residential)

| Factors for Consideration | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action;**<br>**Cumulative (Quad) 2008-2030** | Not relevant for priority setting because EPACT 2005 prescribes an initial standard. |
| **Product / Technology Availability (Including Price/Cost information):** | As of August 30, 2001, 2 high-capacity dehumidifiers (36<L/day<57) and 10 standard capacity dehumidifiers (up to 35 L/day) meet Energy Star requirements. |
| **Cumulative Burden** | The major manufacturers of dehumidifiers also make other household appliances which have been regulated for energy efficiency, such as room AC units (Fedders, Frigidaire, Whirlpool) and other major white goods (Frigidaire, Whirlpool make dryers, washers, dishwashers, etc., all of which have been regulated in the past). Insufficient data for other regulation. |
| **Status of Test Procedures** | EPACT 2005 states that test procedures for dehumidifiers shall be based on the test criteria used under the Energy Star Program Requirements for Dehumidifiers as in effect on the date of enactment. |
| **Other Regulatory Actions** | Not known. |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | 12 Models Meet or Exceed Energy Star Performance Levels |
| **Issues** | Different sized dehumidifiers |

# Standards

**Product:** Direct Heating Equipment

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2010 – 2035** [16] | Direct Heating Equipment[17]:<br>Electronic Ignition: 0.1<br>Elec. Ignition + High efficiency: 0.2<br><br>Hearth Products[18]:<br>Electronic Ignition: -0.1 |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $2002) 2010-2035** [19] | Direct Heating Equipment:<br>Electronic Ignition: -0.2<br>Elec. Ignition + High efficiency: -0.5<br><br>Hearth Products:<br>Electronic Ignition: -1.2 |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been developed. |
| **Status of Required Changes to Test Procedures** | Final Rule published May 12, 1997. |
| **Other Regulatory Actions** | None known that will impact product. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | Fuel switching.<br>Rural communities use for backup heating during power outages. Utility concern with electronic ignition.<br>Hearth products are relatively new. Recent shipments data show shipments of hearth products approaching one million. As hearth products gain wider acceptance in future, potential energy savings may be significant. |
| **2005 Priority** | No Current Activity |

[16] Energy savings estimates are based on an updated analysis of direct heating equipment conducted for DOE's 2005 priority setting . The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

[17] Direct heating equipment includes: wall furnaces, floor furnaces, and room heaters.

[18] Hearth products include: fireplaces, fireplace inserts, gas stoves, and decorative gas logs.

[19] Economic impacts are based on an updated analysis of direct heating equipment conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

# Test Procedure

**Product:** Direct Heating Equipment

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test Procedure was changed as a result of a standards rulemaking analysis conducted in 1994. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards

**Product:** Dishwashers (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings[20] from Regulatory Action; Cumulative (Quads) 2010 - 2035** | Best Available (as listed in ENERGY STAR®) (1.19 EF) = 2.2<br>Current ENERGY STAR® Dishwasher (0.58 EF) = 0.5 |
| **Potential Economic Benefits/Burdens** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Not available. |
| **Status of Required Changes to Test Procedures** | Test procedure was recently revised to better reflect energy consumption for new technologies (e.g. adaptive controls) and reduced annual cycles. |
| **Other Regulatory Actions** | DOE regulation for energy efficiency of other white goods for full line manufacturers. |
| **Recommendations by Interested Parties** | Not Available. |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | Federal Energy Management Program for procurement initiative. Adaptive control (soil sensing) dishwashers. ENERGY STAR® program. Various state- and utility-level programs. |
| **Issues** | Increased efficiency may impact product utility (e.g. may require pre-rinsing of dishes or cleaning of filters) or the availability of affordable models (contract housing). Possible increase in standby energy consumption from displays. End user tendency to pre-treat dishes, which impacts energy consumption. |
| **2005 Priority** | Pending Rulemaking |

[20] Energy savings estimates are based on an updated analysis conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website.
<http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

# Test Procedure

**Product:** Dishwashers (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | New test procedure in effect as of February 2004 that incorporates soiled dishes and reduces the number of average-use cycles per year. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | Efforts underway to harmonize international test procedures should include dishwashers. |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | New technology in product, i.e. smart controls, fuzzy logic. Stand-by losses due to displays. Time delay before reported Energy Factors match new test procedure. |

# Standards (revised for 2006)

**Product:** Distribution Transformers[21]

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative 2010-2038 (Quads)[22]** | 1.77 – 9.77 quads for liquid-immersed and MV dry-type transformers. |
| **Potential Economic Benefits/Burdens[23]** | NPV: Up to $11.24 B at 3% discount rate.<br>NPV: Up to $2.65 B at 7% discount rate. |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been released publicly, however, estimated energy savings indicated above are indicative of the comparative emission benefits that are likely to be possible. Expected oil savings are minimal. |
| **Status of Required Changes to Test Procedures** | Need to publish a test procedure before the Notice of Proposed Rulemaking for MV dry-type and liquid-immersed and before the LV dry-type standard prescribed by EPACT 2005 goes into effect (1/1/2007). |
| **Other Regulatory Actions** | DOE is codifying the LV dry-type standard required by EPACT 2005 (effective 1/1/2007).<br>Some States have adopted NEMA TP-1 as a minimum efficiency standard or required purchasing standard. |
| **Recommendations by Interested Parties** | NEMA recommends adopting its TP-1 standard, revised in 2002. |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | EPA ENERGY STAR® program for liquid-immersed transformers. NEMA's TP-1 promotes energy efficient electrical products. |
| **Issues** | NEMA recommends adoption of voluntary standards as specified in TP-1. Potential energy savings from regulatory action questioned by NEMA.<br><br>LV Dry-Type transformers removed from DOE rulemaking by EPACT 2005. |
| **2005 Priority** | Active Rulemaking |

[21] DOE is currently performing an analysis of impacts of standards including energy savings, life-cycle cost, national net-present-value, and engineering analyses. The results of this analysis will be made available for public comment once they are completed.
[22] Based on DOE Draft NOPR analysis (8/2005):
<http://www.eere.energy.gov/buildings/appliance_standards/commercial/distribution_transformers_draft_analysis_nopr.html>
[23] Based on DOE Draft NOPR analysis (8/2005):
<http://www.eere.energy.gov/buildings/appliance_standards/commercial/distribution_transformers_draft_analysis_nopr.html>

# Test Procedure (revised for 2006)

**Product:** Distribution Transformers

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | The test Procedure should be established before the NOPR stage of the Standard rulemaking (liquid-immersed and MV Dry-Type). For LV Dry-Type, the EPACT 2005 prescribed standard goes into effect on 1/1/2007. |
| **Priority of Standard, 2006 Proposed** | |
| **International or Other Coordinating Activities** | ENERGY STAR® is based on NEMA TP-2 test method; Canada uses the CAN/CSA C802.2 standard which directly references parts of NEMA TP-2. |
| **Recommendation by Interested Parties** | NEMA recommends using NEMA TP-2 test method. |
| **Statutory Deadline** | |
| **Issues** | Definition of Distribution Transformer, Compliance Demonstration, Enforcement. |

# Standards

**Product:** Electric Motors, 1 - 200 HP

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 - 2035** | From EPACT to NEMA Premium: 0.28 Commercial + 1.0 Industrial = 1.28 Total.[24] Significant uncertainty in estimates due to uncertainties in efficiency of installed base and typical duty cycles. |
| **Potential Economic Benefits/Burdens** | Not Available. |
| **Potential Environmental or Energy Security Benefits** | Not Available. |
| **Status of Required Changes to Test Procedures** | |
| **Other Regulatory Actions** | None known that will impact product. |
| **Recommendations by Interested Parties** | CEE and others suggest that motors running for 2000 or fewer hours/year tend to be economically unattractive candidates for replacement with premium efficiency motors. |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | ASHRAE 90.1. Consortium for Energy Efficiency program with utilities. DOE Motor Challenge. Motor Decisions Matter. NEMA Premium efficient motors programs. NIST Efficiency of Electric Motors program. |
| **Issues** | DOE regulates system efficiencies (e.g. HVAC) where motors are components of such systems. Many motors operate at part load, but part-load efficiency is not regulated. Duty cycles of many motors are low, which impacts the economic viability of improving efficiency. |
| **2005 Priority** | No Current Activity |

[24] Energy savings estimates are based on an updated analysis of electric motors conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

# Test Procedure

**Product:** Electric Motors, 1 - 200 HP

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | Natural Resources Canada: Energy Efficiency Regulations for Electric Motors<br>International Electrotechnical Commission/International Standards Organization (IEC/ISO) |
| **Recommendation by Interested Parties** | CEE suggests increasing efficiency requirements tends not to be cost effective for low-duty-cycle motors (less than 2000 hours/year operation). |
| **Statutory Deadline** | |
| **Issues** | . |

# Determination Analysis

**Product:** Electric Motors, Small[25]

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads): 2010-2030** [26] | 0.2 – 1.2 |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $2000) 2010-2030** [27] | $0.1 – $1.3 |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been developed, however, estimated energy savings indicated above are indicative of the comparative emission benefits that are likely to be possible. Expected oil savings are minimal. |
| **Status of Required Changes to Test Procedures** | IEEE 114 – 2001 test procedure for single-phase induction motors was published May 24, 2002.<br>IEEE 112 – 1996 test procedure for polyphase motors is in effect. |
| **Other Regulatory Actions** | Small motors used in NAECA "covered products" (e.g. white goods) and certain commercial equipment are exempt. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | |
| **2005 Priority** | Preliminary Analysis |

[25] DOE has performed an analysis of impacts of standards including energy savings, life-cycle cost, national net-present-value, and engineering analyses. The results of the analysis are available in a draft report entitled "Analysis of Conservation Standards for Small Electric Motors" from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. < http://www.eere.energy.gov/buildings/appliance_standards/commercial/small_electric_motors.html>

[26] Based on "Analysis of Conservation Standards for Small Electric Motors", Draft for Public Comment, June 2003.

[27] Based on "Analysis of Conservation Standards for Small Electric Motors", Draft for Public Comment, June 2003.

# Test Procedure

**Product:** Electric Motors, Small

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test procedure not necessary unless positive determination is made for standards. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards

**Product:** Faucets, Showerheads, Urinals and Toilets

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads)** | The Department has not conducted any recent analysis regarding potential energy savings for this product. |
| **Potential Economic Benefits/Burdens** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Not available. |
| **Status of Required Changes to Test Procedures** | |
| **Other Regulatory Actions** | None. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | As flow rates and water consumption decline the effects on utility need to be carefully considered. |
| **2005 Priority** | No Current Activity |

# Test Procedure

**Product:** Faucets, Showerheads, Urinals and Toilets

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | The performance requirements previously called out in the ASME A112.19.6 standard (Hydraulic Requirements for Toilets and Urinals) will be incorporated into the parent standard, ASME A112.19.2 and will be titled: "Vitreous China Plumbing Fixtures and Hydraulic Requirements for Toilets and Urinals." |

# Standards

**Product:** Fluorescent Lamps

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2008 - 2030** | *Best Available* FEMP procurement recommendation levels (4-foot, 8-foot, and U-tube lamps) = 0.47 [28]<br>*Recommended* FEMP procurement recommendation levels (4-foot, 8-foot, and U-tube lamps) = 0.14 |
| **Potential Economic Benefits/Burdens** | Not Available. |
| **Potential Environmental or Energy Security Benefits** | Not Available. |
| **Status of Required Changes to Test Procedures** | IES and ANSI procedures are in place, DOE test procedure Final Rule issued May 29, 1997. |
| **Other Regulatory Actions** | Existing EPA mercury disposal requirements apply, but EPA issued a final rule July 6, 1999, including lamps as Universal Hazardous Waste. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | ENERGY STAR® Buildings, ASHRAE 90.1, FEMP Procurement Guidelines and Federal Relighting Initiative, and some utility DSM programs. |
| **Issues** | Because lamps are components of systems, establishment of standards is more difficult. |
| **2005 Priority** | No Current Activity |

[28] Both estimates are from the 2003 prioritization analysis. These estimates are not adjusted to the 2010-2035 timeframe.

# Test Procedure

**Product:** Fluorescent Lamps

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test Procedure changes are not needed for standard. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards (revised in 2006)

**Product:** Fluorescent Lamp Ballasts

| Factors for Priority Setting | Assessment |
|---|---|
| **Energy Savings from Regulatory Action; Cumulative (Quads) 2005-2030** [29] | 1.2 – 2.3<br>These estimated savings will be achieved through the 2000 Final Rule and do not represent additional potential savings from further regulatory action. |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $1997) 2005-2030** [30] | 1.4 – 2.6 |
| **Potential Environmental or Energy Security Benefits; Cumulative Emission Reductions 2005-2030** [31] | 10.9 – 32.1 Mt Carbon<br>34.0 – 103.4 kt NOx |
| **Status of Required Changes to Test Procedures** | None required. |
| **Other Regulatory Actions** | |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | EPA Green Lights and ENERGY STAR® Buildings, ASHRAE 90.1, DOE's FEMP Procurement Guidelines and Federal Relighting Initiative, EPACT 1992 Voluntary Luminaire Testing and Rating Program, The Energy Cost Savings Council, and some utility DSM programs. |
| **Issues** | After the standards rulemaking required by EPACT 2005, this product will still require a rulemaking to meet pre-existing legislative requirements. |
| **2005 Priority** | No Current Activity |

[29] Energy savings from DOE's Final Rule, September 19, 2000. DOE's analysis of fluorescent ballasts is in the Technical Support Document available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/notices_rules.html#2000>

[30] Economic impacts from DOE's Final Rule, September 19, 2000.

[31] Emission reductions from DOE's Final Rule, September 19, 2000.

# Test Procedure

**Product:** Fluorescent Lamp Ballasts

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | No test procedure changes required for issuing new energy efficiency standards. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards (revised for 2006)

**Product:** Furnaces and Boilers (Residential)[32]

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2012 - 2035** | Total range considered: [0.28 – 9.29 quads] |
| **Potential Economic Benefits/Burdens** | $0.1 to $3.2 B per year in 2025. |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been released publicly, however, estimated energy savings indicated above are indicative of the comparative emission benefits that are likely to be possible. |
| **Status of Required Changes to Test Procedures** | Final rule issued May 12, 1997. |
| **Other Regulatory Actions** | Possible State and regional environmental regulation. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | ENERGY STAR® program. Wisconsin state condensing furnace/boiler program. Consortium for Energy Efficiency (CEE) promotes a residential gas heating initiative specifying three high efficiency tier levels for gas furnaces and one high efficiency tier for gas boilers. |
| **Issues** | Regional variations, venting and electricity issues. EPACT 2005 gives DOE the authority to regulate furnace fan electricity consumption.<br><br>EPACT 2005 also gives DOE the authority to regulate combination appliances. |
| **2005 Priority** | Active Rulemaking |

[32] DOE is currently performing the NOPR phase analyses including engineering, life-cycle cost, energy savings, national net-present-value, and the manufacturer impact analysis. Numbers given on this data sheet are based on the DOE ANOPR analysis, July 2004.

# Standard (revised for 2006)

**Product:** Furnace Fans (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 -2035** [33] | Brushless permanent magnet motor: 4.0<br>Backward inclined blower + brushless permanent magnet motor: 4.5 |
| **Potential Economic Benefits/Burdens** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Not available. |
| **Status of Required Changes to Test Procedures** | Current DOE furnace test procedure reports annual auxiliary consumption of entire furnace. New test procedure may need to be developed specifically for residential furnace fan efficiency. |
| **Other Regulatory Actions** | The Energy Policy Act of 2005 authorizes DOE to prescribe energy conservation standards or energy use standards for electricity used for purposes of circulating air through duct work. |
| **Recommendations by Interested Parties** | Furnace and Boiler standards rulemaking comments:<br>Several state and non-governmental organizations recommend regulating furnace fan efficiency.<br>Gas Research Institute (GRI) and Edison Electric Institute (EEI) recommend separate rulemakings on electricity and gas consumption.<br>American Gas Association (AGA) recommends standards on motors.<br>A manufacturer (Trane) does not want electricity regulated under a residential furnace standards rulemaking.<br>In case DOE decides to regulate electricity consumption, Lennox recommends the use of $E_{AE}$. |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | Consortium for Energy Efficiency (CEE) and Gas Appliance Manufacturers Association (GAMA) have agreed on specifications for electrically efficient condensing furnaces. Some electric utilities are offering incentives for electrically efficient furnaces. |
| **Issues** | In order for DOE to prescribe energy conservation standards or energy use standards for electricity used for purposes of circulating air through duct work, an appropriate electricity consumption metric or an efficiency descriptor must be identified. |
| **2005 Priority** | Not specified. |

[33] Energy savings estimates are based on a DOE analysis as described in memo to DOE, "Furnace Fan Electricity Savings (Estimated Range based on FB 2004 ANOPR and 2005 DOE Priority Setting)" dated August 18, 2005.

# Test Procedure (revised for 2006)

**Product:** Furnace Fans (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test procedure revisions may be necessary to identify an appropriate electricity consumption metric or efficiency descriptor. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | None |
| **Recommendation by Interested Parties** | Furnace and Boiler rulemaking comments:<br>Some interested parties recommend Watt per CFM rating. |
| **Statutory Deadline** | None |
| **Issues** | $E_{AE}$ includes more components than furnace fan. |

# Standards

**Product:** Furnaces, Warm Air (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2005-2030** | 0.5[34] (ASHRAE Standard 90.1-1999) |
| **Potential Economic Benefits/Burdens** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been developed however, estimated energy savings indicated above are indicative of the comparative emission benefits that are likely to be possible. Expected oil savings are minimal. |
| **Status of Required Changes to Test Procedures** | DOE has published a Final Rule to incorporate test procedures similar to those referred to in ASHRAE 90.1 into the CFR on October 21, 2004. (69 FR 61916) |
| **Other Regulatory Actions** | Possible State and regional environmental regulation (e.g. air quality). |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | Revised ASHRAE 90.1 standards approved June 1999. |
| **2005 Priority** | No Current Activity |

[34] Based on Screening Analysis Report for Commercial HVAC Standards, see 65 FR 30929

# Test Procedure (revised for 2006)

**Product:** Furnaces, Warm Air (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Standards set by EPACT have been amended upon revision of ASHRAE 90.1 as of January 12, 2001. |
| **Priority of Standard, 2006 Proposed** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Determination Analysis (revised for 2006)

**Product:** High Intensity Discharge (HID) Lamps[35]

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2011-2035** | 0.5 |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $2002) 2011-2035** | $1.2 B (3% discount rate)<br>$0.5 B (7% discount rate) |
| **Potential Environmental or Energy Security Benefits** | Not available. |
| **Status of Required Changes to Test Procedures** | IES and ANSI procedures are in place.<br>Issues with definitions, covered products and sampling. |
| **Other Regulatory Actions** | |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | |
| **Issues** | EPACT 2005 bans mercury vapor lamp ballasts manufactured or imported after January 1, 2008. |
| **2005 Priority** | Preliminary Analysis |

[35] DOE performed an analysis of impacts of standards including energy savings, life-cycle cost, national net present value, and engineering analyses in the draft Technical Support Document, "High-Intensity Discharge Lamps Analysis of Potential Energy Savings," December 2004. <http://www.eere.energy.gov/buildings/appliance_standards/commercial/high_intensity_lamps.html>

# Test Procedure

**Product:** High Intensity Discharge (HID) Lamps

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test Procedure needs to be developed for standard, if there is a positive determination. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards (revised for 2006)

**Product:** Ice Cream Freezers; Self-Contained Commercial Refrigerators, Freezers, and Refrigerator-Freezers without Doors (Supermarket Refrigeration Systems); and Remote-Condensing Commercial Refrigerators, Freezers, and Refrigerator-Freezers

<table>
<tr><th>Factors for Priority Setting</th><th>Assessment</th></tr>
<tr><td>Potential Energy Savings[36] from Regulatory Action; Cumulative (Quads) 2010-2035</td><td>
<table>
<tr><td rowspan="2">Energy Savings Efficiency Level</td><td colspan="2">Ice Cream Freezers (Solid Door)</td><td colspan="2">Ice Cream Freezers (Transparent Door)</td></tr>
<tr><td>Energy Reduc. (%)</td><td>Energy Savings (quad)</td><td>Energy Reduc. (%)</td><td>Energy Savings (quad)</td></tr>
<tr><td>Energy Star</td><td>43</td><td>0.11</td><td>-</td><td>-</td></tr>
<tr><td>CEC (1/1/07)</td><td>43</td><td>0.11</td><td>0</td><td>0</td></tr>
</table>
<table>
<tr><td rowspan="2">Energy Savings Efficiency Level</td><td colspan="2">Supermarket Refrigeration</td><td colspan="2">Open-Type Commercial Refrigeration Equipment</td></tr>
<tr><td>Energy Reduc. (%)</td><td>Energy Savings (quad)</td><td>Energy Reduc. (%)</td><td>Energy Savings (quad)</td></tr>
<tr><td>Brushless DC Evaporator Fan Motors</td><td>8</td><td>0.55</td><td>-</td><td>-</td></tr>
<tr><td>Combination with less than 5 year payback</td><td>7</td><td>0.48</td><td>-</td><td>-</td></tr>
<tr><td>Combination</td><td>-</td><td>-</td><td>9</td><td>0.24</td></tr>
</table>
</td></tr>
<tr><td>Potential Economic Benefits/Burdens</td><td>Not Available.</td></tr>
<tr><td>Potential Environmental or Energy Security Benefits</td><td>Specific estimates of emission reductions have not been developed.</td></tr>
<tr><td>Status of Required Changes to Test Procedures</td><td>Separate Test Procedures for display cases and compressors and/or condensing units.<br>Display Cases: CRS-S1-96 (ARI CRMD), ASHRAE 72, CSA C657-95.<br>Compressors and Condensing Units: Many different test standards depending on compressor and heat rejection type.</td></tr>
<tr><td>Other Regulatory Actions</td><td></td></tr>
<tr><td>Recommendations by Interested Parties</td><td>None.</td></tr>
<tr><td>Evidence of Market-Driven or Voluntary Efficiency Improvements</td><td>Market penetration of energy-saving technologies (ADL/DOE Study)<br>Floating Head Pressure 62%<br>Mechanical Subcooling 65%<br>Liquid-Suction Heat Exchanger 25% (MT), 50% (LT)<br>Antisweat Heater controls 69%</td></tr>
<tr><td>Issues</td><td>EPACT 2005 requires DOE to develop a standard for these products.<br>Many system types<br>Systems are engineered and built on-site (not factory-completed).<br>Interaction between air-conditioning and refrigeration systems.</td></tr>
<tr><td>2005 Priority</td><td>Not applicable.</td></tr>
</table>

[36] Energy savings estimates are based on an updated analysis conducted for DOE's 2006 schedule setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

## Ice Cream Freezers

### Installed Base Data for Ice Cream Freezers

| Data type | Value | Source |
|---|---|---|
| Installed Base, thousands | 88 | Wall Street Journal (2005)[37] |
| Equipment Lifetime, years | 7 to 10 | Assumed same as commercial solid door freezer |
| Primary Annual Energy Consumption, quad | Solid door 0.012<br>Transparent door 0.012 | CEC (2004)[38] |

### Ice Cream Freezers - Energy Saving Potential Estimates

| Technology/ Standard Level | | % Energy Savings Potential | Annual Primary Energy Savings Potential (quad) | Primary Energy Saving Potential (2010-2035), (quads) | Source |
|---|---|---|---|---|---|
| Solid Door | CEC January 1, 2007 Standard | 43 | 0.005 | 0.11 | % Energy Savings potential from CEC Appliance Efficiency Regulations[39] |
| Solid Door | Energy Star | 43 | 0.005 | 0.11 | % Energy Savings potential from Energy Star Website[40] |
| Transparent Door | CEC January 1, 2007 Standard | 0 | 0 | 0 | % Energy Savings potential from CEC Appliance Efficiency Regulations[41] |

[37] Ball, Jeffrey. Wall Street Journal "Companies Try Keeping Ice Cream Frozen, Emissions Down," May 4, 2005. Available at <http://www.greenpeace.org/usa/news/ask-and-ye-shall-receive/companies-try-keeping-ice-crea>
[38] California Energy Commission, "Codes and Standards Enhancement Imitative for PY2004: Title 20 Standards Development Analysis of Standards Options for Commercial Packaged Refrigerators, Freezers, Refrigerator/Freezers, and Ice Makers," April 28, 2004. Prepared by ACEEE for CEC page 1.
[39] Available at: <http://www.energy.ca.gov/2005publications/CEC-400-2005-012/CEC-400-2005-012.PDF>
[40] Available at: <http://www.energystar.gov/ia/partners/product_specs/eligibility/commer_refrig_elig.pdf>
[41] Available at: <http://www.energy.ca.gov/2005publications/CEC-400-2005-012/CEC-400-2005-012.PDF>

## Supermarket Refrigeration

### Installed Base Data for Supermarket Refrigeration

| Data type | Value | Source |
|---|---|---|
| Installed Base, thousands | 30 | ADL (1996) |
| Equipment Lifetime, years | 10 | |
| Primary Annual Energy Consumption, quad | 0.326 | |

### Ice Cream Freezers - Energy Saving Potential Estimates

| Technology/ Standard Level | % Energy Savings Potential | Annual Primary Energy Savings Potential (quad) | Primary Energy Saving Potential (2010-2035), (quads) | Source |
|---|---|---|---|---|
| 1. Brushless DC Evaporator Fan Motors | 8 | 0.026 | 0.55 | Fy 2003 Priority Setting - Supermarket Refrigeration Estimates with Timeframe = 26 years and Primary Energy Use used for Energy Savings Calculation |
| 2. Combination: Hot Gas Defrost, Antisweat Heater Control, Defrost Control, Liquid-Suction Heat Exchangers for Low Temperature applications, Evaporative Condensers, Floating Head Pressure, Heat Reclaim, and Mechanical Subcooling | 7 | 0.023 | 0.48 | |

# Standards

**Product:** Illuminated Exit Signs

| Factors for Consideration | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action;**<br>**Cumulative (Quad) 2010-2035** | Not relevant for priority setting because EPACT 2005 prescribes the standard. |
| **Product / Technology Availability (Including Price/Cost information):** | Product is primarily directed toward the commercial sector.<br>Readily available for building owners - ENERGY STAR® has 45 certified manufacturers.<br>Total costs over a ten-year period, including first cost, energy, and maintenance will be approximately $380 for incandescent signs and about $65 for LED signs. Even on a first cost basis, which can be an important purchasing determinant, LEDs have become cost competitive. While incandescent signs without battery backup are still marginally less expensive than LED signs, the price for both types of signs with battery backup is about the same because the incandescent system requires a much larger battery. |
| **Cumulative Burden** | California mandated that exit signs should be ENERGY STAR® level on or after March 1, 2003.<br>Some states banned incandescent lamps from exit signs in the 1990's.<br>Safety related features are regulated (dimensions, operating hours, etc.). |
| **Status of Test Procedures** | EPA has developed and ENERGY STAR® test procedure, which draws upon industry standard methods, including those of Underwriters Laboratories and the National Fire Protection Association. |
| **Other Regulatory Actions** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | The ENERGY STAR® program has 45 certified manufacturers.<br>Of the total installed base of exit signs in the United States, approximately 80% are already ENERGY STAR® / Light Emitting Diode (NCI, 2003). |
| **Issues** | Codes from all types of jurisdictions require regular exit sign inspection, despite predicted lamp life. |

# Standards

**Product:** Incandescent General Service Lamps

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 - 2035** | 1.5% efficacy increase = 0.9<br>3% efficacy increase = 1.8<br>17% efficacy increase (halogen lamp)= 10.0 [42] |
| **Potential Economic Benefits/Burdens** | Not Available. |
| **Potential Environmental or Energy Security Benefits** | Not Available. |
| **Status of Required Changes to Test Procedures** | DOE test procedure Final Rule issued May 29, 1997 incorporating IES and ANSI testing procedures. Test procedure is applicable to this product. |
| **Other Regulatory Actions** | |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | ENERGY STAR® Buildings, ASHRAE 90.1, FEMP Federal Relighting Initiative, and some utility DSM programs, Voluntary Luminaire Testing and Rating Program. |
| **Issues** | Because lamps are components of systems, establishment of standards is more difficult. |
| **2005 Priority** | No Current Activity |

[42] Analysis is based on cumulative energy savings compared to A-type incandescent lamps. All estimates are based on the 2003 prioritization analysis, with a small adjustment for the 2010-2035 timeframe assumed here.

# Test Procedure

**Product:** Incandescent General Service Lamps

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test Procedure changes not needed for standard. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards

**Product:** Incandescent Reflector Lamps

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 - 2035** | Currently Regulated [43]<br>1.5% efficacy increase = 0.1<br>3% efficacy increase = 0.2<br>30% efficacy increase (HIR) = 1.6<br>Note: Halogen Infrared Reflector (HIR) |
| **Potential Economic Benefits/Burdens** | Not Available. |
| **Potential Environmental or Energy Security Benefits** | Not Available. |
| **Status of Required Changes to Test Procedures** | DOE test procedure Final Rule issued May 29, 1997 incorporating IES and ANSI testing procedures. Test procedure is applicable to this product. |
| **Other Regulatory Actions** | |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | ENERGY STAR® Buildings, ASHRAE 90.1, FEMP Federal Relighting Initiative, and some utility DSM programs, Voluntary Luminaire Testing and Rating Program. |
| **Issues** | Because lamps are components of systems, establishment of standards is more difficult. |
| **2005 Priority** | No Current Activity |

[43] Lamps in this analysis are regulated reflector lamps that comply with the 1992 EPACT standards. These are primarily parabolic aluminized reflector (PAR) halogen lamps. All estimates are based on the 2003 prioritization analysis, with a small adjustment for the 2010-2035 timeframe assumed here. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

# Test Procedure

**Product:** Incandescent Reflector Lamps

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test Procedure changes not needed for standard. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards

**Product:** Oil- and Gas-Fired Packaged Boilers (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2004-2030** | Energy Savings:[44]<br>0.28 for small and large gas-fired boilers (to go beyond ASHRAE Standard 90.1-1999 levels, Max NPV) |
| **Potential Economic Benefits/Burdens** | NPV, billions of $1998:<br>0.2 for small and large gas-fired boilers (to go beyond ASHRAE Standard 90.1-1999 levels, Max NPV) |
| **Potential Environmental or Energy Security Benefits** | Carbon emissions reduction:<br>4 million tons C over analysis period for small and large gas-fired boilers (to go beyond ASHRAE Standard 90.1-1999 levels, Max NPV) |
| **Status of Required Changes to Test Procedures** | DOE plans to publish a Final Rule to incorporate test procedures similar to those referred to in ASHRAE Standard 90.1 into the CFR in 2005. |
| **Other Regulatory Actions** | Possible State and regional environmental regulation (e.g. air quality). |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | Revised ASHRAE 90.1 standards approved June 1999, which would save an estimated 0.064 quad for small and large gas-fired boilers from 2001-2030 (ASHRAE 90.1-1999 relative to EPCA). DOE will consider higher standards above 90.1 for additional energy savings.<br>Data included in the Screening Analysis only covers estimated energy savings for gas-fired packaged boilers. No analysis has yet been conducted for oil-fired packaged boilers. |
| **2005 Priority** | Active Rulemaking |

[44] Based on Screening Analysis Report for Commercial HVAC Standards, see 65 FR 30929.

# Test Procedure (revised for 2006)

**Product:** Oil- and Gas-Fired Packaged Boilers (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Standards set by EPACT are being amended upon revision of ASHRAE 90.1 |
| **Priority of Standard, 2006 Proposed** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards (revised for 2006)

**Product:** Package Air-Conditioning and Heating Equipment; Small, Large, and Very Large (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2008-2035** | Irrelevant for prioritization, standard prescribed by Congress. |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $2001) 2008-2035** | Irrelevant for prioritization, standard prescribed by Congress. |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been developed. |
| **Status of Required Changes to Test Procedures** | DOE essentially needs to certify that the October 21, 2004 final rule test procedure (69 FR 61962) for commercial unitary AC & HP products applies to these three products (small, large, very large). |
| **Other Regulatory Actions** | Possible State and regional environmental regulation (e.g. air quality). |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | |
| **2005 Priority** | Active Rulemaking for small and large. DOE did not have the authority to regulate very large products prior to EPACT 2005. |

# Test Procedure (revised for 2006)

**Product:** Package Air-Conditioning and Heating Equipment; Small, Large, and Very Large (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | EPACT 2005 sets energy conservation standards for small, large, and very large commercial package air-conditioning and heating equipment. |
| **Priority of Standard, 2006 Proposed** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | DOE essentially needs to certify that the October 21, 2004 final rule test procedure (69 FR 61962) for commercial unitary AC & HP products applies to small, large, and very large commercial package air-conditioning and heating equipment.<br><br>The October 21, 2004 final rule (69 FR 61962) also addresses commercial water-cooled air-conditioners and water-source heat pumps; commercial air-cooled central air-conditioners and heat pumps, 3-phase, < 65 kBtu/hr; and single-packaged vertical units (SPVU). |

# Standards

**Product:** Packaged Terminal Air Conditioners and Heat Pumps (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2004 - 2030** | Energy Savings:[45]<br>0.03 (to go beyond ASHRAE Standard 90.1-1999 **new construction** equip. levels)<br>0.56 (to go beyond ASHRAE Standard 90.1-1999 **replacement** equip. levels) |
| **Potential Economic Benefits/Burdens** | NPV, billions of $1998:<br>0.01 (to go beyond ASHRAE Standard 90.1-1999 **new construction** equip. levels)<br>0.5 (to go beyond ASHRAE Standard 90.1-1999 **replacement** equip. levels) |
| **Potential Environmental or Energy Security Benefits** | Carbon emissions reduction:<br>1 million tons (to go beyond ASHRAE Standard 90.1-1999 **new construction** equip. levels)<br>8 million tons (to go beyond ASHRAE Standard 90.1-1999 **replacement** equip. levels) |
| **Status of Required Changes to Test Procedures** | |
| **Other Regulatory Actions** | EPA phase out of HCFC refrigerants. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | Revised ASHRAE 90.1 standards approved June 1999, which would save an estimated 0.11 quad from 2001-2030. DOE will consider higher standards for additional energy savings. |
| **2005 Priority** | Active Rulemaking |

[45] Based on Screening Analysis Report for Commercial HVAC Standards, see 65 FR 30929.

# Standards

**Product:** Pool Heaters (Gas)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2010 -2035** [46] | Electronic Ignition: 0.3<br>Non-Condensing Limit: 0.4<br>Condensing (Induced Draft): 0.5<br>Condensing (Pulse): 0.6 |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $2002) 2010-2035** [47] | Electronic Ignition: 0.4<br>Non-Condensing Limit: 0.3<br>Condensing (Induced Draft): -1.2<br>Condensing (Pulse): -2.9 |
| **Potential Environmental or Energy Security Benefits** | Not available. |
| **Status of Required Changes to Test Procedures** | Final Rule published May 12, 1997. |
| **Other Regulatory Actions** | None known. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | Solar pool heating market share growing. |
| **2005 Priority** | No Current Activity |

[46] Energy savings estimates are based on an updated analysis of pool heaters conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

[47] Economic impacts are based on an updated analysis of pool heaters conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

# Test Procedure

**Product:** Pool Heaters (Gas)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | No test procedure changes required for issuing new energy efficiency standards. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards

**Product:** Ranges and Ovens and Microwave Ovens (Electric and Gas)

| Factors for Priority Setting | Assessment | | |
|---|---|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 – 2035** [48] | Gas Ranges (Ovens + Cooktops): Electronic Ignition: 0.4 High efficiency: 0.7 | Electric Ranges (Ovens + Cooktops): High efficiency: 1.7 | Microwave Ovens: High efficiency: 0.3 |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $2002) 2010-2035** [49] | Gas Ranges (Ovens + Cooktops): Electronic Ignition: 0.6 High efficiency: -3.1 | Electric Ranges (Ovens + Cooktops): High efficiency: -5.7 | Microwave Ovens: High efficiency: -4.7 |
| **Potential Environmental or Energy Security Benefits** | Not available. | | |
| **Status of Required Changes to Test Procedures** | Final Rule published October 3, 1997. | | |
| **Other Regulatory Actions** | DOE regulation of white goods for full line manufacturers. | | |
| **Recommendations by Interested Parties** | | | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. | | |
| **Issues** | For gas cooking products, pilotless designs may require installation of an electrical outlet. Loss of consumer utility if loss of electrical power.<br><br>DOE is required to do two cycles of rulemakings for gas ranges, and one cycle for electric ranges (because the 9/1998 final rule only addressed electric ranges). A decision has not been made as to whether the next rulemaking will address both gas and electric products, or only gas products. | | |
| **2005 Priority** | No Current Activity | | |

[48] Energy savings estimates are based on an updated analysis of cooking products conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

[49] Economic impacts are based on an updated analysis of cooking products conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

# Test Procedure

**Product:** Ranges and Ovens and Microwave Ovens (Electric and Gas)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Test Procedure was changed prior to Final Rule for energy efficiency standards for electric cooking products. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standard (revised for 2006)

**Product:** Refrigerated Bottle or Canned Beverage Vending Machines (Beverage Vending Machines) and Self-Contained Commercial Refrigerators with Doors for Pull-Down Temperature Applications (Beverage Merchandisers)

<table>
<tr><th>Factors for Priority Setting</th><th>Assessment</th></tr>
<tr><td>Potential Energy Savings[50] from Regulatory Action; Cumulative (Quads) 2010-2035</td><td>The Energy Policy Act of 2005 prescribes a minimum efficiency standard for commercial refrigerators with a self-contained condensing unit designed for pull-down temperature applications and transparent doors. Therefore, there are no energy savings estimates calculated for this product. Energy savings estimates for beverage vending machines are provided below.<br><br>
<table>
<tr><td rowspan="2">Energy Savings Efficiency Level</td><td colspan="2">Vending Machines</td></tr>
<tr><td>Energy Reduction (%)</td><td>Energy Savings (quads)</td></tr>
<tr><td>< 2 yr. payback (ADL 1996)</td><td>32</td><td>0.85</td></tr>
<tr><td>< 5 yr. payback (ADL 1996)</td><td>42</td><td>1.11</td></tr>
<tr><td>Energy Star Tier 1</td><td>18</td><td>0.48</td></tr>
<tr><td>Energy Star Tier 2</td><td>33</td><td>0.87</td></tr>
<tr><td>CEC (8/1/04)</td><td>-</td><td>-</td></tr>
<tr><td>CEC (1/1/06)</td><td>18</td><td>0.48</td></tr>
<tr><td>CEC (1/1/07)</td><td>18</td><td>0.48</td></tr>
</table></td></tr>
<tr><td>Potential Economic Benefits/Burdens</td><td>Not Available.</td></tr>
<tr><td>Potential Environmental or Energy Security Benefits</td><td>Specific estimates of emission reductions have not been developed.</td></tr>
<tr><td>Status of Required Changes to Test Procedures</td><td>The Energy Policy Act of 2005 prescribes the ASHRAE 32.1 and ASHRAE 117 test procedures as the basis for a DOE test procedure for beverage vending machines and beverage merchandisers, respectively.</td></tr>
<tr><td>Other Regulatory Actions</td><td>The California Energy Commission has minimum performance requirements for beverage merchandisers and refrigerated beverage vending machines. The CEC treats beverage merchandisers as glass door commercial reach-in refrigerators, which are regulated.</td></tr>
<tr><td>Recommendations by Interested Parties</td><td>None</td></tr>
<tr><td>Evidence of Market-Driven or Voluntary Efficiency Improvements</td><td>ENERGY STAR® Standards<br>Vending Machines shall consume equal or less energy in a 24-hour period than the values obtained from the equations below.<br>Tier 1: $Y \leq 0.55[8.66 + (0.009 * C)]$ effective April 1, 2004<br>Tier 2: $Y \leq 0.45[8.66 + (0.009 * C)]$ effective January 1, 2007<br>Y = 24 hour energy consumption (kWh/day) after the machine has stabilized<br>C = vendible capacity<br>(ENERGY STAR® Program Requirements for Refrigerated Beverage Vending Machines, Version 1.0)<br>There are no ENERGY STAR® program requirements for beverage merchandisers.</td></tr>
<tr><td>Issues</td><td>Rating temperatures may need to be established in the development of the test procedures for refrigerated beverage vending machines.</td></tr>
<tr><td>2005 Priority</td><td>Preliminary Analysis</td></tr>
</table>

[50] Energy savings estimates are based on an updated analysis conducted for DOE's 2006 schedule setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

## Beverage Vending Machines

### Installed Base Data for Vending Machines

| Data type | Value | Source |
|---|---|---|
| Installed Base, thousands (1994) | 3,711 | ADL(1996); Appliance Magazine (2002) |
| Annual Sales, thousands (2001) | 353 | |
| Equipment Lifetime, years (1994) | 7 to 10 | |
| Primary Annual Energy Consumption, quad | 0.121 | |

### Vending Machines - Energy Saving Potential Estimates

| Technology/ Standard Level | % Energy Savings Potential | Annual Primary Energy Savings Potential (quad) | Primary Energy Saving Potential (2010-2035), (quads) | Source |
|---|---|---|---|---|
| <2 Years Payback (ECM Motors for Evaporator Fans and High Efficiency Compressor) | 32 | 0.039 | 0.85 | % Energy Savings potential from ADL (1996) |
| <5 Years Payback (High Efficiency Condenser Fan Motor) | 42 | 0.051 | 1.11 | % Energy Savings potential from ADL (1996) |
| Energy Star Tier 1 | 18 | 0.022 | 0.48 | % Energy Savings potential from Energy Star Website[51] |
| Energy Star Tier 2 | 33 | 0.040 | 0.87 | % Energy Savings potential from Energy Star Website[52] |
| CEC January 1, 2006 Standard | 18 | 0.022 | 0.48 | % Energy Savings potential from CEC Appliance Efficiency Regulations[53] |
| CEC January 1, 2007 Standard | 18 | 0.022 | 0.48 | % Energy Savings potential from CEC Appliance Efficiency Regulations[54] |
| Combination | 28 | 0.034 | 0.71 | % Energy Savings potential from ADL (1996) |

[51] Available at: <http://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/vend_machines/ES_V1.0_VendingMachine_spec.pdf>
[52] Available at: <http://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/vend_machines/ES_V1.0_VendingMachine_spec.pdf>
[53] Available at: <http://www.energy.ca.gov/2005publications/CEC-400-2005-012/CEC-400-2005-012.PDF>
[54] Available at: <http://www.energy.ca.gov/2005publications/CEC-400-2005-012/CEC-400-2005-012.PDF>

# Standards (revised for 2006)

**Product:** Refrigerators, Refrigerator-Freezers, & Freezers (Residential)[55]

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 -2035** | **Top-Mount and Side-Mount Refrigerator-Freezers:**<br>No future ENERGY STAR® sales after new standard: 2.4 quads<br>Current proportion of ENERGY STAR® sales after standard: 3.4 quads |
| **Potential Economic Benefits/Burdens; NPV (2005$) 2010-2035** | No future ENERGY STAR® sales after new standard (3% discount rate): $8.0 to $10.1 B<br>No future ENERGY STAR® sales after new standard (7% discount rate): $2.2 to $3.3 B<br>Current proportion of ENERGY STAR® sales after standard (3% discount rate): $3.3 B<br>Current proportion of ENERGY STAR® sales after standard (7% discount rate): - $1.2 B |
| **Potential Environmental or Energy Security Benefits** | Not available. |
| **Status of Required Changes to Test Procedures** | AHAM test procedure has been revised (AHAM HRF-1-2002) to correct repeatability and reproducibility issues with the testing of compact refrigerators.<br>DOE test procedure still references AHAM HRF-1-1979.<br>DOE issued a direct Final Rule on March 7, 2003 to make a small modification to the defrost calculations for some models.<br>DOE issued a Final Rule on December 19, 2001 to include a maximum temperature of the fresh food storage compartment and to exclude certain appliances whose physical configuration makes them unsuitable for general storage of perishable foods.<br>DOE is proceeding with an "anti-circumvention" rulemaking to discourage product designs that circumvent the test procedure. |
| **Other Regulatory Actions** | Industry recently had to comply with two regulations: (1) new energy efficiency standards which became effective July 1, 2001 and (2) a phase-out of the most commonly used blowing agent for foam insulation, HCFC-141b, in 2003.<br>Compact refrigerators are used in non-residential applications.<br>Home appliance manufacturers have had to adapt to more Federal energy efficiency standards than other industries (e.g., dehumidifiers, clothes washers, dishwashers, and room air conditioners).<br>International efficiency standards, disposal and recycling regulations, and ENERGY STAR®. |
| **Recommendations by Interested Parties** | In June 2004, energy efficiency advocates petitioned DOE for new amended standards. AHAM and its members opposed the petition. DOE granted the petition in April 2005 based upon petition criteria. |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | Market share of ENERGY STAR® qualifying products in 2002 is 25 percent.<br>EPACT 2005 contains financial incentives for energy efficient refrigerator freezers. |
| **Issues** | - The capital investment needed to redesign products and product platforms before they have reached the end of their useful life can result in stranded investments.<br>- Higher efficiency standards can result in higher per-unit costs that may deter some customers from buying higher-margin units with more features, thereby decreasing manufacturer profitability.<br>- Manufacturers stated that the prospect of product redesign as a result of new amended standards penalizes established manufacturers and alters the playing field for entry to the market by new competitors. In their view, this can decrease the relative barrier to entry of competitors into the market, which can increase market competition, reduce incumbent manufacturer profitability, and decrease U.S.-based production.<br>- Effects of previous standards on manufacturers (i.e., moving manufacturing outside of U.S., U.S. job losses). |
| **2005 Priority** | Not specified. |

[55] See recent DOE report prepared in response to stakeholder petition.
<http://www.eere.energy.gov/buildings/appliance_standards/docs/2005residential_refrigerator_report.zip>

# Test Procedure

**Product:** Refrigerators, Refrigerator-Freezers, & Freezers (incl. Compact Refrigerators) (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | No changes are required for purposes of changing the efficiency standard. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | North American Energy Working Group (NAEWG) has harmonized test procedures between the U.S.A., Canada and Mexico. |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | AHAM test procedure has been revised (AHAM HRF-1-2002) to correct repeatability and reproducibility issues with the testing of compact refrigerators. DOE test procedure still references AHAM HRF-1-1979. DOE needs to update its test procedure to cite AHAM HRF-1-2002.<br>Definitions and test procedures are needed for a new product: combination compact refrigerator and wine cooler. |

# Standards

**Product:** Room Air Conditioners

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 -2035** [56] | ENERGY STAR®, 10.8 EER (10% more efficient): 0.8<br>CEE Tier One, 11.3 EER (15 % more efficient): 1.2<br>CEE Tier Two, 11.8 EER (20% more efficient): 1.5 |
| **Potential Economic Benefits/Burdens; Cumulative NPV (billions of $2002) 2010-2035** [57] | ENERGY STAR®: 0.0<br>CEE Tier One: -4.1<br>CEE Tier Two: -6.3 |
| **Potential Environmental or Energy Security Benefits** | Not available. |
| **Status of Required Changes to Test Procedures** | None required. |
| **Other Regulatory Actions** | EPA phase-out of HCFC-22 in 2010 for new appliances. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | Market share of ENERGY STAR® qualifying products in 2002 is 19 percent. |
| **Issues** | Industry must find a replacement refrigerant for HCFC-22 due to its phase-out in new appliances starting in 2010. |
| **2005 Priority** | No Current Activity |

[56] Energy savings estimates are based on an updated analysis of room air conditioners conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

[57] Economic impacts are based on an updated analysis of room air conditioners conducted for DOE's 2005 priority setting. The spreadsheet is available from the DOE Building Technologies Program, Appliances and Commercial Equipment Standards website. <http://www.eere.energy.gov/buildings/appliance_standards/docs/2006_schedule_setting_spreadsheets.zip>

# Test Procedure

**Product:** Room Air Conditioners

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | No test procedure changes required for issuing new energy efficiency standards. |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | Test procedure does not measure the benefits of designs which improve the seasonal performance of the appliance (e.g., variable speed compressors). |

# Standards (revised for 2006)

**Product:** Self-Contained Commercial Refrigerators, Freezers, and Refrigerator-Freezers with Doors for Holding Temperature Applications (Reach-In Refrigerators, Freezers, and Refrigerator-Freezers with Doors)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2010-2035** | The Energy Policy Act of 2005 prescribes a minimum efficiency standard for self-contained commercial refrigerators, freezers, and refrigerator-freezers with doors for holding temperature applications. Therefore, the energy savings estimates calculated for these products are irrelevant for the purposes of priority setting. |
| **Potential Economic Benefits/Burdens** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been developed. |
| **Status of Required Changes to Test Procedures** | The Energy Policy Act of 2005 prescribes the ASHRAE 117 test procedure as the basis for a DOE test procedure for commercial refrigeration equipment. |
| **Other Regulatory Actions** | The California Energy Commission has an efficiency standard for commercial refrigeration equipment. |
| **Recommendations by Interested Parties** | None |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | ENERGY STAR® Standards (solid door units only):<br>Refrigerators – Energy consumption under test procedures ≤ 0.10V + 2.04kWh/day<br>Freezers – Energy consumption under test procedures ≤ 0.40V + 1.38kWh/day<br>Refrigerator/Freezers - Energy consumption under test procedures ≤ 0.27AV – 0.71 kWh/day<br>Ice Cream Freezers – Energy consumption under test procedures ≤ 0.39V + 0.82 kWh/day<br>V = internal volume in cu. ft.<br>AV = adjusted volume = (1.63 * freezer volume in cu. ft.) + refrigerator volume in cu. ft.<br>(ENERGY STAR® Program Requirements for Commercial Solid Refrigerators and Freezers, Version 1.0) |
| **Issues** | Rating temperatures applicable for certain classes of commercial refrigeration equipment need to be established in the development of the test procedures. |
| **2005 Priority** | Preliminary Analysis |

# Standards (revised for 2006)

**Product:** Single-Packaged Vertical Air-Conditioners and Heat Pumps (SPVU)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2004-2030** | Not available. |
| **Potential Economic Benefits/Burdens** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been developed. |
| **Status of Required Changes to Test Procedures** | The ASHRAE standards final rule will adopt ASHRAE's recent changes to the test procedure applicable to SPVUs. |
| **Other Regulatory Actions** | EPA phase out of HCFC refrigerants. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | ASHRAE published Addendum d to ASHRAE Standard 90.1-2001, which provides minimum EER and COP levels for SPVAC and SPVHP products and references ARI Standard 390-2001 as the applicable test procedure. ARI has since updated Standard 390 to the 2003 version. DOE is evaluating the efficiency levels in Addendum d to ASHRAE Standard 90.1-2001 and the test procedures the referenced ARI Standard 390.<br><br>DOE is planning to continue with this rulemaking for SPVU's <65,000 Btu/hr. |
| **2005 Priority** | Active Rulemaking |

# Standards

**Product:** Tankless Gas-Fired Instantaneous Water Heaters

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad): 2004-2030** | Energy Savings:[58]<br>0.10 (to go beyond ASHRAE Standard 90.1-1999 levels, Max NPV) |
| **Potential Economic Benefits/Burdens** | NPV, billions of $1998:<br>0.05 (to go beyond ASHRAE Standard 90.1-1999 levels, Max NPV) |
| **Potential Environmental or Energy Security Benefits** | Carbon emissions reduction:<br>2 million tons (to go beyond ASHRAE Standard 90.1-1999 levels, Max NPV) |
| **Status of Required Changes to Test Procedures** | |
| **Other Regulatory Actions** | The California Energy Commission has energy efficiency standards in place (CEC Appliance Energy Regulations, 2003). |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | Instantaneous gas-fired water heater market share seems to be growing. |
| **Issues** | |
| **2005 Priority** | Active Rulemaking |

[58] Based on Screening Analysis Report for Commercial HVAC Standards, see 65 FR 30929.

# Standards (revised for 2006)

**Product:** Torchieres

| Factors for Consideration | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010-2035** | Not relevant for 2006 priority setting because EPACT 2005 prescribes a standard. |
| **Product / Technology Availability (Including Price/Cost information):** | |
| **Cumulative Burden** | |
| **Status of Test Procedures** | DOE needs to develop test procedure consistent with power consumption standard specified in EPACT 2005. |
| **Other Regulatory Actions** | California mandate is consistent with the standard prescribed by EPACT 2005. |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | |
| **Issues** | |

# Test Procedure (revised for 2006)

**Product:** Torchieres

| Factors | Assessment |
|---|---|
| **Test Procedure Overview** | DOE needs to develop a test procedure consistent with the power consumption standard specified in EPACT 2005. |
| **Potential Test Procedure(s)** | |
| **Product Peak Load Impact and Correlation with Test Procedure and Metric, by Technology** | |

# Standards (revised for 2006)

**Product:** Traffic Signal Modules and Pedestrian Modules

| Factors for Consideration | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action;**<br>**Cumulative (quad) 2010-2035** | Not relevant for priority setting because EPACT 2005 prescribes the standard. |
| **Product / Technology Availability (Including Price/Cost information):** | |
| **Cumulative Burden** | |
| **Status of Test Procedures** | EPACT 2005 states that test procedures for traffic signal modules and pedestrian modules shall be based on the test method used under the ENERGY STAR® program of the EPA for traffic signal modules, as in effect on the date of enactment. |
| **Other Regulatory Actions** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | |
| **Issues** | |

# Standards

**Product:** Unit Heaters (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quads) 2010 - 2035** | Not relevant for priority setting because EPACT 2005 prescribes a design standard. |
| **Potential Economic Benefits/Burdens** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Not available |
| **Status of Required Changes to Test Procedures** | No test procedure required. |
| **Other Regulatory Actions** | Products not covered by DOE. The National Energy Bill, if passed, would place efficiency-related requirements on unit heaters. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | Condensing and power vent products available on the market (both unit heaters and duct furnaces). |
| **Issues** | Significant impacts on design possible (such as requiring vent dampers and banning pilots) associated with possible Other Regulatory Actions. |
| **2005 Priority** | Not prioritized. |

# Standards

**Product:** Water-Cooled Air Conditioners and Water Source Heat Pumps (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2005-2030** | |
| **Potential Economic Benefits/Burdens** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been developed, however, energy savings indicated above are indicative of the comparative emission benefits that are likely to be possible. Expected oil savings are minimal. |
| **Status of Required Changes to Test Procedures** | |
| **Other Regulatory Actions** | EPA phase-out of HCFC refrigerants. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | |
| **2005 Priority** | No Current Activity |

# Standards

**Product:** Water Heaters (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Potential Energy Savings from Regulatory Action; Cumulative (Quad) 2005-2030** | 0.07[59] |
| **Potential Economic Benefits/Burdens** | Not available. |
| **Potential Environmental or Energy Security Benefits** | Specific estimates of emission reductions have not been developed, however, estimated energy savings indicated above are indicative of the comparative emission benefits that are likely to be possible. Expected oil savings are minimal. |
| **Status of Required Changes to Test Procedures** | |
| **Other Regulatory Actions** | |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | None known. |
| **Issues** | Revised ASHRAE 90.1 standards approved June 1999. |
| **2005 Priority** | No Current Activity |

[59] Based on Screening Analysis Report for Commercial HVAC Standards, see 65 FR 30929.

# Test Procedure (revised for 2006)

**Product:** Water Heaters (Commercial)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | Standards set by EPACT have been amended upon revision of ASHRAE 90.1 as of January 12, 2001 |
| **Priority of Standard, 2006 Proposed** | |
| **International or Other Coordinating Activities** | ASHRAE is in process of revising (SPC 118.1). Will include heat pump water heaters. |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |

# Standards

**Product:** Water Heaters (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Energy Savings from Regulatory Action; Cumulative (Quads) 2004-2030** | The Final Rule energy savings equal 4.6 quads over 2004-2030. These estimated savings will be achieved through the 2001 Final Rule and do not represent additional potential savings from further regulatory action. |
| **Potential Economic Benefits/Burdens** | The Net Present Value (NPV) is $2.0 billion cumulative from 2004 to 2030 in 1997 dollars. |
| **Potential Environmental or Energy Security Benefits** | For period 2004- 2030, 152 million metric tons of carbon and 273 thousand metric tons of $NO_x$. |
| **Status of Required Changes to Test Procedures** | Changes not required for standards. Final rule for test procedure was published in 1998. |
| **Other Regulatory Actions** | EPA phase out of HCFCs for insulation (2003). Consumer Product Safety Commission initiative for prevention of ignition of flammable vapors by gas water heaters. |
| **Recommendations by Interested Parties** | |
| **Evidence of Market-Driven or Voluntary Efficiency Improvements** | Demand-side management programs for high efficiency water heaters. |
| **Issues** | Fuel switching. Replacement blowing agent for insulation. Installation in small spaces. |
| **2005 Priority** | No Current Activity |

# Test Procedure

**Product:** Water Heaters (Residential)

| Factors for Priority Setting | Assessment |
|---|---|
| **Relationship to Changes in Standard** | No change needed |
| **Priority of Standard** | |
| **International or Other Coordinating Activities** | |
| **Recommendation by Interested Parties** | |
| **Statutory Deadline** | |
| **Issues** | |