



# ENERGY STAR® Program Requirements for Residential Ceiling Fans

## Eligibility Criteria

Below is the Version 2.1 product specification for ENERGY STAR qualified residential ceiling fans. A product must meet all of the identified criteria to earn the ENERGY STAR.

- 1) **Definitions:** Below are the definitions of the relevant terms in this document.
  - A. **Residential Ceiling Fan:** A non-portable device designed for home use that is suspended from the ceiling for circulating air via the rotation of fan blades. Some ceiling fans also have an integral or attachable light kit.
  - B. **Light Kit:** A complete lighting unit consisting of a lamp or lamps, and ballasting (when applicable) together with the parts designed to distribute the light, position and protect the lamps, and connect the lamps to the power supply. Light kits can be:
    - Integral – the light kit is attached to the ceiling fan housing at the time of purchase. This type of a light kit is integrated into the bottom cap of the fan and cannot be removed or replaced with another light kit.
    - Attachable – the light kit is not, at the time of sale, physically attached to the fan. The light kit must be attached to the ceiling fan for the lights to work. Attachable light kits might be included inside the ceiling fan box at the time of sale or sold separately for subsequent attachment to the fan.
  - C. **Controls:** Controls enable the user to turn on/off or adjust the lighting and fan movement. Controls may be in the form of pull chain, slide switch, wall switch/panel, or remote control.
  - D. **Airflow:** The rate of air movement at a specific fan setting expressed in cubic feet per minute (CFM). Airflow is determined from testing done using the Solid State Test Method as defined in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.
  - E. **Airflow Efficiency:** The ratio of airflow divided by power at a specific residential ceiling fan setting expressed in CFM per watt (CFM/watt). Airflow and power are determined from testing done using the Solid State Test Method as defined in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.
  - F. **Power Consumption:** Defined as the active power and expressed in watts. Power consumption is measured during residential ceiling fan testing at a specific speed using the test procedure described in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.
  - G. **Solid State Test Method:** A test method that specifies the apparatus and testing protocol for measuring a residential ceiling fan's airflow and power consumption. The method utilizes a hot-wire anemometer and requires a temperature controlled room and computer for recording test data.
  - H. **Hugger Fan:** A fan style where the motor mounts directly to the ceiling. Hugger fans are most commonly used in rooms with low ceilings. Hugger fans are manufactured and marketed as

such and should not be confused with multi-mount (traditional) fans that can be hung without the down rod, giving the same effect as a hugger fan. Hugger fans are designed to allow installations on 7'6" – 8' height ceilings when using a fan light kit in a location where walking under the fan will occur.

2) **Qualifying Products:** In order to qualify as ENERGY STAR, a residential ceiling fan must meet the definition in Section 1A and the specification requirements provided in Sections 3 through 7, below. Ceiling fan light kits, integral and attachable, must meet the definition in Section 1B and the requirements provided in Appendix A. Hugger fans cannot qualify as ENERGY STAR under this Version 2.1 specification.

3) **Performance Specification and Lighting Requirements for Qualifying Products:**

A. Airflow Efficiency

Qualifying products shall meet or exceed the following minimum requirements for total airflow and airflow efficiency when operating in a downward-blowing direction. Models sold with light kits or integrated light sources must be tested with those light sources mounted in their intended position and switched off. The representative model's (i.e. unit shipped to test facility) measured performance may vary by 5 percent of the performance levels provided in Table 1, below, at the time of testing and still be deemed compliant with this specification. These test results may then be used to represent the performance of all individual units sold under the same brand and model name, including those units sold with different finishes (as listed on the ENERGY STAR qualifying product list). Each individual unit must perform within 5 percent of the tested representative model to be compliant with this specification.

As of **October 1, 2004**, tested representative model (i.e., unit shipped to test facility) must meet the minimum requirements listed in Table 1, below, without the assistance of the 5 percent tolerance at the time of testing. Once a representative model has qualified as ENERGY STAR, all additional units manufactured under the same model name/number, and found in the distribution channel (i.e., retail), must perform within 5 percent of the tested performance levels submitted to EPA and listed on the ENERGY STAR Web site.

<b>Table 1 –Air Flow Efficiency Requirements</b>		
<b>Fan Speed</b>	<b>Minimum Airflow</b>	<b>Efficiency Requirement</b>
Low	1,250 CFM	155 CFM/watt
Medium	3,000 CFM	100 CFM/watt
High	5,000 CFM	75 CFM/watt

This specification defines residential ceiling fan airflow efficiency on a performance basis: CFM of airflow per watt of power consumed by the motor and controls. This treats the motor, blades, and controls as a system, allowing multiple approaches to reach a given efficiency level. Efficiency is to be measured on each of three fan speeds (low, medium, high) using the "Solid State Test Method," which is explained in more detail in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.

For those ceiling fan models that offer more than three speeds (e.g., low, medium, high), manufacturer may choose the three individual speed settings that should be used to comply with the performance levels set forth in Table 1. However, at the time of testing measurements should be taken and reported for all discrete operating speeds. If more than three speeds are listed in the Performance Table, required in Section 7 of this specification, manufacturer should indicate which speeds qualify as ENERGY STAR.

## B. Lighting

All integral and attachable light kits must meet the requirements found in Appendix A of this ENERGY STAR specification. Partner should use the Ceiling Fan Qualified Product Information (QPI) form to report qualifying light kits.

Qualifying residential ceiling fans sold without integral or attachable light kits must provide information on product packaging or with product instructions regarding ENERGY STAR qualifying light kits that may be used with that particular residential ceiling fan.

- 4) **Controls**: Qualifying products shall permit convenient consumer adjustment of fan speed. This may be accomplished by means of one or more wall-mounted switch(es), a remote control, or readily accessible pull chains. For purposes of this specification, “readily accessible” shall be defined as a length sufficient to reach a height of no more than 80 inches (203 cm) above the floor when the residential ceiling fan is mounted according to the residential ceiling fan’s installation instructions. For those residential ceiling fans that can accommodate light kits, the lights and the fans must be able to be controlled separately, allowing users to switch off lights during fan operation or operate the lights without using the residential ceiling fan.

Qualifying products shall also provide for consumer adjustment of airflow direction (upward or downward) by one of the following means:

- A vertically or horizontally mounted slide switch on the motor housing. For vertically mounted switches, the downward position must correspond to downward airflow. For horizontally mounted switches, airflow direction must be clearly identified on the switch housing or within the product literature.
- A wall-mounted switch
- A remote control
- A readily accessible pull chain

- 5) **Sound**: No requirements at this time.

- 6) **Minimum Warranty**: Qualifying products shall provide a warranty of at least 30 years for the motor and at least one year for all other components of qualifying residential ceiling fans. All ceiling fan light kits (i.e., integral and sold separately) also shall meet applicable warranty requirements as listed in Appendix A.

- 7) **Consumer Information**: In addition to the ENERGY STAR mark, packaging of ENERGY STAR qualified residential ceiling fan models shall also state airflow, fan power consumption, and airflow efficiency at each of their three operating speeds, as determined by the test procedures specified in Section 3A, Airflow Efficiency. If the ceiling fan model offers more than three speeds, performance results should be provided for all speeds on the packaging, indicating which three speeds were used to qualify the fan as ENERGY STAR. This information shall appear in the following form on the outside portion of the package:

<b>Fan Speed</b>	<b>Airflow</b>	<b>Fan Power Consumption (without lights)</b>	<b>Airflow Efficiency (higher is better)</b>
Low	___ CFM	___ watts	___ CFM/watt
Medium	___ CFM	___ watts	___ CFM/watt
High	___ CFM	___ watts	___ CFM/watt

Product operating and installation instructions shall include a short list of standardized information regarding how to operate the products efficiently. This list shall include, at a minimum, information about the following topics:

- adjusting fan speed and direction for season and room occupancy to maximize energy savings
- HVAC thermostat adjustment for energy savings when a ceiling fan is in use
- proper mounting distance from the ceiling to maximize efficient operation
- how to find proper replacement lamps for the light kit, if included

- 8) **Testing and Reporting Procedures:** Manufacturers are required to perform tests and self-certify each representative model that they intend to qualify as ENERGY STAR. In performing these tests, laboratories must use the test method described in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*. When testing ceiling fan light kits, manufacturers must meet the testing and documentation requirements included in Appendix A.

#### A. Laboratory Testing

Under this specification, ceiling fans may only be tested by those laboratories that meet the guidelines provided in EPA's ENERGY STAR Testing Facility Guidance Manual and have been approved to test for ENERGY STAR qualification. EPA will conduct annual "round-robin" testing of these laboratories (i.e. calibrations), to verify that test results fall within +/- 5 percent of each other. This process will be performed using a reference fan provided by EPA. Laboratories that can test and qualify ceiling fans under ENERGY STAR, can be downloaded from the ENERGY STAR Web site at [www.energystar.gov/partners](http://www.energystar.gov/partners). Additional direction regarding the laboratory calibration procedure is provided in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.

#### B. Reporting Requirements

The company whose brand name appears on the product packaging shall, for purposes of this specification, be considered the manufacturer. Manufacturers must complete a QPI form when submitting qualified products to EPA. This form must be accompanied by reports from a qualified laboratory containing airflow, power consumption, airflow efficiency data, and lighting test results (where applicable) for each residential ceiling fan model and light kits proposed for qualification. Families of residential ceiling fan models that are identical in every respect but finish may be qualified through submission of test data for a single representative model. Likewise, models that are unchanged or that differ only in finish from those sold in a previous year may remain qualified without the submission of new test data, assuming the specification remains unchanged. However, separate test data are required for all models that differ in any of the following characteristics:

- motor type or size
- rotational speed
- control type (if included with fan)
- blade weight, number, size, or pitch
- housing (i.e., size, design, ventilation)

#### C. Product Performance Review Process

To the extent ENERGY STAR is a self-certification program, EPA relies on the integrity of participating companies to ensure all products for which ENERGY STAR claims are made, meet all aspects of the ENERGY STAR performance specification. When mistakes are made and products are mislabeled or fail to perform as expected, EPA is committed to ensuring prompt corrective action.

In the event EPA is provided test data or other product information indicating a performance problem or mislabeling situation, EPA will take the following steps:

1. Inform the product manufacturer about the apparent performance and/or labeling problem.
  2. Ask the product manufacturer to withdraw the product (i.e. model number) from the ENERGY STAR qualified product list and stop labeling -OR- affirm the basis for qualification by supplying any relevant test data not already provided.
  3. In the event that a definitive conclusion cannot be reached based on the manufacturer's response, EPA will make every effort to test the product in question as part of its in-use screening initiative.
  4. If EPA concludes, based on testing performed on behalf of EPA in accordance with the ENERGY STAR specified test procedure, that the product in question does not fully qualify with the ENERGY STAR performance criteria, the product manufacturer will be asked to provide a "corrective action" plan to EPA outlining the process by which the product will be modified and retested so that qualification with the specification will be demonstrated within 90 days. If the product manufacturer fails to submit a corrective action plan or exceeds the deadline for implementing it, the product in question will be removed from the Qualified Product List on the ENERGY STAR Web site.
- 9) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR, under the Version 2.1 specification, will be defined as the *effective date* of the agreement. The ENERGY STAR Residential Ceiling Fan (Version 2.1) specification shall go into effect on **September 1, 2006**. Any previously executed agreement on the subject of ENERGY STAR qualified residential ceiling fans, shall be terminated effective August 31, 2006.
- A. **Qualifying and Labeling Products Under the Version 2.1 Specification:** All products, including models originally qualified under Version 2.0, with a **date of manufacture** on or after **September 1, 2006**, must meet the Version 2.1 requirements in order to bear the ENERGY STAR mark on the product or in product literature. The **date of manufacture** is specific to each unit and is the date (e.g., month and year) on which a unit is considered to be completely assembled.
  - B. **Elimination of Grandfathering:** EPA will not allow grandfathering under this Version 2.1 ENERGY STAR specification. **ENERGY STAR qualification under Version 2.0 is not automatically granted for the life of the product model.** Therefore any product sold, marketed, or identified by the manufacturing partner as ENERGY STAR must meet the current specification in effect at that time.
- 10) **Future Specification Revisions:** ENERGY STAR reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions.

## APPENDIX A: Ceiling Fan Light Kit Requirements

**Exclusion of magnetic ballasts:** Light kits that use magnetic ballasts cannot be ENERGY STAR qualified under this specification.

**Self-ballasted pin based lamps:** Light kits that use a self-ballasted pin based lamp can be ENERGY STAR qualified light kits if all applicable requirements for qualifying products are met. This includes the requirement that the average rated life of the lamp must meet or exceed 10,000 hours and that the maximum measured ballast case temperature during normal operation inside the light kit does not exceed the ballast manufacturer maximum recommended temperature.

**Temporary allowance for decorative LEDs:** EPA encourages the use of innovative light source technologies such as LEDs. LEDs used as decorative lighting elements in ceiling fan light kits are allowed as long as the total wattage of the LEDs does not exceed five (5) watts, the average LED system (LED and driver) efficacy is at least 20 lumens per watt, and the LED is used to supplement a primary light source that meets all of the applicable performance characteristics outlined in the Eligibility Criteria. The ENERGY STAR Partner must supply the following LED information to EPA: total wattage consumed by all the LEDs, manufacturer warranty, an LED manufacturer specification sheet that shows wattage, efficacy, LED life, color, and lumen depreciation. This is a temporary allowance for the use of LEDs; EPA plans to develop more comprehensive specifications for LED performance as the technology advances and becomes more widely used in residential applications.

**Table 1 - Ceiling Fan Light Kits: Requirements**

Performance Characteristic	ENERGY STAR Specification
<p><b>Note:</b> Only electronic ballasts may be used to meet the requirements of this table. In addition, light kits that utilize compact fluorescent lamps that do not have a plug-in base (i.e use a mogul, medium, or other screw base) are not eligible to earn the ENERGY STAR.</p>	
<p><b><u>Combined Lamp &amp; Ballast Requirements:</u></b></p>	
<p>System Efficacy Per Lamp Ballast Platform in Lumens Per Watt (LPW)<sup>1</sup>,</p>	<p>≥ 50 LPW for all lamp types below 30 total listed lamp watts.</p> <p>≥ 60 LPW for all lamp types that are ≤ 24 inches and ≥ 30 total listed lamp watts.</p> <p>≥ 70 LPW for all lamp types that are &gt; 24 inches and ≥ 30 total listed lamp watts.</p>

<sup>1</sup> Efficacy shall be determined by the following equation:

$$\text{Efficacy [Lumens per Watt]} = \frac{\text{Measured Lamp Lumens [Lumens]}}{\text{Measured Input Power [Watts]}}$$

Lamp Lumens: Lamp lumens must be measured using the lamp and ballast that are shipped with the light kit.

Input Power: Input power must be measured with the lamp and ballast that are shipped with the light kit.

<b><u>Lamp Requirements:</u></b>	
Lamp Life	For lamps shipped with the light kits, the average rated life of the lamp must be $\geq$ 10,000 hours.
Lumen Maintenance	Lamp shall have an average rated lumen maintenance of at least 80% of initial lamp lumens at 40% (4,000 hours minimum) rated lamp life.
Color Rendering Index (CRI)	CRI for lamps used in light kit must be $\geq$ 80
Correlated Color Temperature	Lamps must have one of the following designated correlated color temperatures (CCT): 2700K, 3000K, 3500K, 4100K, 5000K, or 6500K.
Lamp/Lampholder Compatibility	<p>Lamps must utilize an ANSI/IEC standardized lamp base configuration, as defined by ANSI C81.61 and IEC 60061-1.</p> <p>The lampholder must be designed to accept lamps with ANSI/IEC standardized lamp base configurations for all applicable wattages. For example, if the ballast can operate lamps with multiple wattages (e.g., an 18W, 26W, or 32W lamp) then the lampholder must be designed to accept lamps with ANSI/IEC standardized lamp base configurations for all three applicable wattages.</p> <p>In addition, lamps shall either:</p> <ul style="list-style-type: none"> <li>• <i>Meet the requirements of an ANSI/IEC standardized lamp specification sheet, as defined by ANSI C78.901-2001 and IEC 60901 (for compact fluorescent lamps) or ANSI C78.81-2001 and IEC 60081 (for linear lamps) if an applicable standard exists, or,</i></li> <li>• <i>If no ANSI/IEC lamp standard exists (e.g., a spiral compact fluorescent lamp), a custom lamp specification sheet must be provided at the time of submittal. Specific lamp characteristics that should be included in the lamp specification sheet are detailed in Table 3.</i></li> </ul>
Lamp Labeling Requirement	A manufacturer designation that encompasses the lamp manufacturer name, wattage, correlated color temperature, and color rendering index must be labeled on the lamp or lamp base.
<b><u>Electronic Ballast Requirements</u></b>	
<b><u>(Note: Magnetic Ballasts May Not Be Used in Light Kits):</u></b>	
General	Per ANSI C82.11 Section 5 except paragraph 5.3.1.
Lamp Start Time	The time needed after switching on the lamp to start continuously and remain illuminated must be an average of one second or less.
Power Factor	$\geq$ 0.5
Lamp Current Crest Factor	$\leq$ 1.7

Maximum Measured Ballast Case Temperature During Normal Operation Inside Light kit(s)	<u>Not</u> to exceed the ballast manufacturer maximum recommended ballast case temperature during normal operation inside a light kit. <b>Note:</b> This performance characteristic is separate and distinct from thermal requirements established by UL, which governs safety rather than longevity of the ballast. All qualified light kits are expected to meet this requirement
Electromagnetic and Radio Frequency Interference	Ballast must meet FCC requirements for consumer use (FCC 47 CFR Part 18 Consumer Emission Limits)
Ballast Frequency	20 to 33 kHz or $\geq$ 40 kHz
Transient Protection	Per ANSI C82.11b, paragraph 5.10.1 (100kHz Ring Wave, 2.5kV, both common mode and differential mode, 7 strikes)
End of Life Protection	All ballasts that operate lamps sized T5 and smaller must contain an end of life protection circuit. For ballasts that operate multiple lamps and are required to have end of life protection, the ballast must shut down no more than two lamps when one of the lamps has reached end of life. For example, a light kit with one ballast and five lamps must not shut down more than the lamp that has reached end of life plus one additional lamp.
Dimming	Light kits that utilize dimmable ballasts shall be dimmable from 100% to 30%, or less, of maximum light output, or be switchable to three levels of brightness, not including the off position.
Safety - Ballasts and “Non Edison base Fluorescent Adapters”	The cover page of a safety test report or a general coverage statement must be provided to demonstrate compliance with ANSI/UL 935 or UL 1993, as appropriate.
<b>Light Kit Requirements</b>	
Light Kit Warranty	A written warranty must be included with light kit packaging at the time of shipment, which covers repair or replacement of defective parts of the light kit housing and electronics (excluding the lamp) for a minimum of two years from the date of purchase.
Noise	Class A sound rating for electronic ballasts within the light kit, not to exceed a measured level of 24 dBA (audible) when the ballast is installed in the light kit.
Lamp Shipment Requirement	All light kits must be shipped with the lamp(s).
Replaceable ballast	Ballasts in all light kits must be accessible and removable by an electrician without the cutting of wires and without damage to the housing or decorative elements of the light kit.
Safety - Hardwired Light kits <sup>2</sup>	The cover page of a safety test report or a general coverage statement must be provided to demonstrate compliance with UL 1598.
Product Packaging for Consumer Awareness Requirements	Product packaging language is required that clearly describes the nominal color designation of the lamp in units of Kelvin (i.e., 2700K, 3000K, 3500K, 4100K, 5000K, or 6500K).

<sup>2</sup> Regarding ceiling fans that are intended to be used outdoors, light kits must be compliant with NFPA 70, the National Electrical Code (NEC), including requirements for damp locations (Articles 410-4a and Article 100).



**Table 2 – Reference Standards and Required Documentation**

<b>Performance Characteristic</b> (refer to Tables 1 and 2 as appropriate)	<b>Methods of Measurement Reference Standards</b>	<b>Required Documentation</b> (to be attached to QPI Form)
System Efficacy: Lamp Lumens Input Power	IESNA LM-9; LM-66; ANSI C82.2	<p>Laboratory test results must be produced using the specific lamp and ballast combination that will operate in the light kit. For this test, a sample of three or more lamps must be used. Two of the three samples must pass in order to qualify for ENERGY STAR.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices.</li> </ol> <p><b>Note:</b> If the laboratory used for this test is accredited by NVLAP or one of its MRA signatories it must also have a scope of accreditation that includes the method of measurement reference standard for this performance characteristic.</p>

Lamp Start Time	ANSI C82.11-5.2	<p>Laboratory test results must be produced using the specific lamp and ballast combination that will operate in the light kit. For this test, a sample of three or more lamps must be used. Two of the three samples must pass in order to qualify for ENERGY STAR.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices; or</li> <li>4. a test report from an OSHA NRTL laboratory.</li> </ol>
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Lamp Life	IESNA LM-40-01; LM-65-01; IEC 60091; IEC 60901; ANSI C82.1; ANSI C82.11	<p>Laboratory test results must be produced using the specific lamp that will operate in the light kit and either the ballast that will operate in the light kit or a commercially available ballast that meets the applicable ANSI ballast requirements for the lamp being tested. For this test, a sample of ten or more lamps must be used.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices; or</li> <li>4. a test report from an ISO 9000 registered facility.</li> </ol> <p>Manufacturers may obtain ENERGY STAR conditional qualification for their light kit if all of the following items are provided:</p> <ol style="list-style-type: none"> <li>1) A letter on letterhead from a NVLAP laboratory, one of its MRA signatories, or an ISO 9000 registered facility demonstrating lamp life testing has begun.</li> <li>2) A laboratory report proving that testing has been completed for at least 40% of rated life.</li> <li>3) The date for testing completion.</li> </ol> <p>Conditional approval will only be granted for a period of no longer than 325 days.</p> <p>Note: If the laboratory used for this test is accredited by NVLAP or one of its MRA signatories it must also have a scope of accreditation that includes the method of measurement reference standard for this performance characteristic.</p>
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Lumen Maintenance	IESNA LM-40-01; IESNA LM-9-99; IESNA LM-65-01; IESNA LM-66-00; ANSI C78.5	<p>Laboratory test results must be produced using the specific lamp that will operate in the light kit. For this test, a sample of ten or more lamps must be used to demonstrate that at least 80% of the samples achieved the required lumen maintenance value.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP, one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices; or</li> <li>4. a test report from an ISO 9000 registered facility.</li> </ol>
Color Rendering Index	IESNA LM-58; CIE 13.3	<p>Laboratory test results must be produced using the specific lamp that will operate in the light kit. For this test, a sample of ten or more lamps must be used to demonstrate that at least 80% of the samples achieved the required color rendering index value.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices.</li> </ol> <p><b>Note:</b> If the laboratory used for this test is accredited by NVLAP or one of its MRA signatories it must also have a scope of accreditation that includes the method of measurement reference standard for this performance characteristic.</p>

<p>Correlated Color Temperature</p>	<p>IESNA LM-58; LM-16</p>	<p>Laboratory test results must be produced using the specific lamp that will operate in the light kit. For this test, a sample of ten or more lamps must be used. Test results must demonstrate that at least 90% of the lamps tested fall within a 7-step ANSI Mac Adam ellipse.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP, one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices; or</li> <li>4. a test report from an ISO 9000 registered facility.</li> </ol> <p>It is also intended that the lamp manufacturer will meet the following quality requirements during the production runs of each lamp model:</p> <ol style="list-style-type: none"> <li>1. The lamp manufacturer is required to maintain color control such that a minimum of 90 percent of the ongoing production (as represented by samples tested from each production shift for the same color and when typically evaluated over 12 month period) will fall within the 7 step Mac Adam color ellipse associated with the designated (manufacturer declared) target color.</li> <li>2. For the purposes of meeting color control the lamp manufacturer must maintain testing equipment calibrated to international practices and standards and must compile the ongoing color control data in a manner so that it can be easily reviewed upon EPA request.</li> <li>3. At a minimum, the manufacturer's color quality control program must maintain the following information for a 3-year period:</li> </ol>
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		<ul style="list-style-type: none"> <li>a. Test dates and sample size (minimum of two lamps per production shift)</li> <li>b. Test results (x,y) for each sample lamp measured</li> <li>c. Test results (all x,y data) for sample lamps plotted graphically against the designated seven step color ellipse and available for review at least on a quarterly basis</li> <li>d. Records to substantiate that 90 percent of the (x,y) data points fall within the applicable seven (7) step Mac Adam ellipse. Manufacturers are encouraged to exceed this target.</li> </ul>
Noise	Class A sound rating for electronic ballasts within the light kit, not to exceed a measured level of 24 dBA (audible) when the ballast is installed in the light kit and is measured using a sound meter (similar in performance to B&K type 2209) where the microphone is located 12 inches from the light kit in any direction.	<p>No supplemental documentation required.</p> <p><b>Note:</b> A laboratory test report must be submitted upon EPA request.</p>
Light Kit Warranty	No Standard Available (Use manufacturer protocol)	Provide a copy of the actual two-year light kit manufacturer written warranty that is included with product packaging.
Dimming	No Standard Available (Use manufacturer protocol)	<p>No supplemental documentation required.</p> <p><b>Note:</b> A laboratory test report proving the light kit is dimmable from 100% to 30% must be submitted upon EPA request.</p>
Lamp/Lampholder Compatibility:  Lamp Base Configuration	ANSI C81.61; IEC 60061-1	Provide manufacturer data indicating the lamp base type used.

<p>Lamps Compliant with an ANSI-IEC Standard (for lamp dimensions and electrical parameters)</p> <p>Lamps Not Compliant with an ANSI-IEC Standard (for lamp dimensions and electrical parameters)</p>	<p>ANSI C78.901-2001; ANSI C78.81-2001; IEC 60901; IEC 60081</p> <p>ANSI C78.901-2001; ANSI C78.81-2001 (used as a reference for the format and type of information required on a custom lamp specification sheet)</p>	<p>Provide manufacturer data indicating applicable ANSI-IEC lamp data sheet number.</p> <p>Provide a manufacturer lamp specification sheet that describes the following (use the ANSI lamp data sheets found in ANSI C78.901 and C78.81 as a reference for the format and type of information requested):</p> <ol style="list-style-type: none"> <li>1. Lamp Description, including: <ul style="list-style-type: none"> <li>• Lamp Model Number</li> <li>• Nominal Wattage</li> <li>• Bulb Designation / Lamp Size (i.e., T4, T5, T8, etc.)</li> <li>• Lamp Base Type as defined by ANSI C81.61 or IEC 60061-1(i.e., 2G13, GR10q, etc.)</li> <li>• Starting Circuit Application (i.e., rapid start, preheat, etc.)</li> </ul> </li> <li>2. Dimensional Characteristics, including diagram</li> <li>3. Lamp Operating Characteristics, including: <ul style="list-style-type: none"> <li>• Approximate wattage (W)</li> <li>• Voltage( V)</li> <li>• Current (A)</li> </ul> </li> </ol>
<p>Lamp Labeling Requirement</p>	<p>No Standard Available (Use manufacturer protocol)</p>	<p>Provide a copy of the actual language that will be included on the base of the lamp.</p>
<p>Replaceable Ballast</p>	<p>No Standard Available (Use manufacturer protocol)</p>	<p>Provide a copy of the language that includes guidance on ballast replacement and states that the ballast is replaceable with the use of a “qualified electrician.”</p>
<p>Safety: Indoor</p> <ul style="list-style-type: none"> <li>• Hardwired Light kits</li> <li>• Ballasts and “Non-Edison based Fluorescent Adapters”</li> </ul>	<p>UL 1598</p> <p>ANSI/UL 935 or UL 1993</p>	<p>Provide the cover page of a safety test report or a general coverage statement from an OSHA NRTL laboratory.</p> <p>Provide the cover page of a safety test report or a general coverage statement from an OSHA NRTL laboratory.</p>

<p>Safety: Outdoor</p>	<p>NFPA 70, the National Electrical Code (NEC), including requirements for wet locations when applicable (Articles 410-4a and Article 100)</p>	<p>Provide the cover page of a safety test report or a general coverage statement from an OSHA NRTL laboratory. Include evidence of a Rain Test for Wet Locations, when applicable.</p>
<p>Power Factor</p>	<p>ANSI C82.11-3.3.1</p>	<p>Laboratory test results must be produced using the specific ballast that will operate in the light kit. For this test, a sample of three or more ballasts must be used. At least two of the three samples must pass in order to qualify for ENERGY STAR.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices; or</li> <li>4. a test report from the manufacturer</li> </ol>



<p>Lamp Current Crest Factor</p>	<p>ANSI C82.11-3.3.3 and 5.6 ANSI C82.1-5.6.1</p>	<p>Laboratory test results must be produced using the specific ballast that will operate in the light kit. For this test, a sample of three or more ballasts must be used. At least two of the three samples must pass in order to qualify for ENERGY STAR.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices; or</li> <li>4. a test report from an OSHA NRTL laboratory.</li> </ol>
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<p>Measured Maximum Ballast Case Temperature During Normal Operation Inside Light kit(s)  <b>NOTE:</b> existing requirement but EPA is now enforcing compliance</p>	<p>UL 1598, Section 11 (Acceptable when the thermocouple is placed at the hot-spot location indicated by the ballast manufacturer.)</p> <p style="text-align: center;">-OR-</p> <p>Lighting Research Center (LRC) "Proposed Durability Testing Method: Temperature" available at <a href="http://www.lrc.rpi.edu/programs/lightingTransformation/pdf/durabilityTestingFinalReport.pdf">http://www.lrc.rpi.edu/programs/lightingTransformation/pdf/durabilityTestingFinalReport.pdf</a></p> <p><b>Note:</b> All qualified light kits are expected to meet the Measured Maximum Ballast Case Temperature During Normal Operation Inside Light kit(s) requirement.</p>	<p>Laboratory test results must be produced using the light kit with the highest operating temperature among all light kits being qualified, the specific ballast that will operate in the light kit, and a lamp with the same wattage and lamp type (e.g., triple-tube, quad tube, spiral) that will operate in the light kit. For this test, a sample of one or more light kits must be used.</p> <p>The supplemental documentation should include the following:</p> <ul style="list-style-type: none"> <li>• Light kit model(s) tested</li> <li>• Lamp model(s) and ballast model(s) tested</li> <li>• Measured maximum ballast case temperatures</li> <li>• Ambient temperature</li> <li>• Test procedure, including description of light kit installation, thermocouple location(s), and time that elapsed before readings were taken.</li> <li>• Ballast Manufacturer Maximum Recommended Case Temperature During Normal Operation Inside the Light kit(s)</li> <li>• Ballast Hot Spot Location Diagram from the ballast manufacturer</li> </ul> <p>Provide a test report from:</p> <ol style="list-style-type: none"> <li>1. a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an OSHA NRTL laboratory; or</li> <li>3. the light kit or ballast manufacturer</li> </ol>
<p>Electromagnetic and Radio Frequency Interference</p>	<p>Consumer Limits Per FCC 47 CFR Part 18.305 and 18.307</p>	<p>No supplemental documentation required.</p> <p><b>Note:</b> A laboratory test report must be submitted upon EPA request.</p>

Ballast Frequency	Oscilloscope instruction manual	<p>Laboratory test results must be produced using the specific ballast that will operate in the light kit. At least two of the three samples must pass in order to qualify for ENERGY STAR.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices; or</li> <li>4. a test report from the manufacturer</li> </ol>
Transient Protection	ANSI C82.11b, paragraph 5.10.1	<p>Laboratory test results must be produced using the specific ballast that will operate in the light kit. For this test, a sample of three or more ballasts must be used. All samples must pass in order to qualify for ENERGY STAR.</p> <p>Provide:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices; or</li> <li>4. a test report from the manufacturer</li> </ol>

End of Life Protection	IEC 61347-2-3 Amendment 1 to Edition 1 2004-06 (or ANSI C82.11-2005, upon its release)	<p>Laboratory test results must be produced using the specific ballast that will operate in the light kit. For this test, a sample of one or more ballasts must be used.</p> <p>For all ballasts that that operate T4 and/or T5 sized lamps, demonstrate that the ballast is in compliance with the referenced standards by providing:</p> <ol style="list-style-type: none"> <li>1. a test report from a laboratory accredited by NVLAP or one of its MRA signatories; or</li> <li>2. an EPA approved Platform Letter of Qualification that lists the lamp/ballast combination used in the light kit and the test result for this performance characteristic; or</li> <li>3. EPA-approved documentation from an industry association, such as the NEMA/ALA matrices; or</li> <li>4. a test report from the ballast manufacturer</li> </ol> <p>For all ballasts that operate T3 and smaller sized lamps, provide from the ballast manufacturer a circuit diagram and an accompanying engineering description outlining the scheme that is used to achieve the end of life function within the ballast.</p>
Product Packaging for Consumer Awareness Requirements	No Standard Available (Use manufacturer protocol)	Provide a written copy or a PDF graphic of the language that will be displayed on the product packaging.