



ENERGY STAR® Program Requirements for Residential Ventilating Fans

Partner Commitments

Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified residential ventilating fans. The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on ventilating fans and specifying the testing criteria for ventilating fans. EPA may, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at EPA's request;
- comply with current ENERGY STAR Identity Guidelines, describing how the ENERGY STAR logos and name may be used. Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;
- qualify at least one ENERGY STAR qualified ventilating fan model within one year of activating the residential ventilating fans portion of the agreement. When Partner qualifies the product, it must meet the specification (e.g., Tier 1 or 2, if applicable) in effect at that time;
- provide clear and consistent labeling of ENERGY STAR qualified ventilating fans. The ENERGY STAR label must be clearly displayed on the front/inside of the product, in product literature (i.e., user manuals, spec sheets, etc.), and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed;
- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualifying ventilating fan models. Once the Partner submits its first list of ENERGY STAR qualified ventilating fan models, the Partner will be listed as an ENERGY STAR Partner. Partner must provide annual updates in order to remain on the list of participating product manufacturers;
- provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total number of ENERGY STAR qualified ventilating fans shipped (in units by model) or an equivalent measurement as agreed to in advance by EPA and Partner. Partner is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by meaningful product characteristics (e.g., capacity, size, speed, or other as relevant), total unit shipments for each model in its product line, and percent of total unit shipments that qualify as ENERGY STAR. The data for each calendar year should be submitted to EPA, preferably in electronic format, no later than the following March and may be provided directly from the Partner or through a third party. The data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;
- authorize and ensure sharing by certification organizations of verification testing outcomes on an annual basis and challenge testing outcomes when challenge testing is performed to enable EPA to verify data submitted by Partners for ENERGY STAR qualification. Information to be shared in

56 the testing outcome reports shall include a list of the Partner's ENERGY STAR qualified products
57 the ratings of which underwent verification or challenge testing; the airflow ratings of those
58 products (rounded down to the nearest whole cfm, *and as certified, if these values differ*; the
59 sound ratings of those products; the fan motor electrical power values of those products; and an
60 indication as to the resolution of any verification or challenge testing failures.

Note: In addition to airflow ratings rounded down to the nearest whole cfm for qualification and verification purposes, EPA is requesting certified airflow ratings for inclusion on the qualified product list.

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- notify EPA of a change in the designated responsible party or contacts for residential ventilating fans within 30 days.

65 **Performance for Special Distinction**

66 In order to receive additional recognition and/or support from EPA for its efforts within the
67 Partnership, the ENERGY STAR Partner may consider the following voluntary measures and should keep
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- consider energy efficiency improvements in company facilities and pursue the ENERGY STAR label for buildings;
 - purchase ENERGY STAR qualified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR qualified product information to employees for use when purchasing products for their homes;
 - ensure the power management feature is enabled on all ENERGY STAR qualified monitors in use in company facilities, particularly upon installation and after service is performed;
 - provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR qualified product models;
 - feature the ENERGY STAR label(s) on Partner Web site and in other promotional materials. If information concerning ENERGY STAR is provided on the Partner Web site as specified by the ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on the ENERGY STAR Web site at www.energystar.gov), EPA may provide links where appropriate to the Partner Web site;
 - provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, communicate, and/or promote Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that Partner would like EPA to be aware of. For example, activities may include: (1) increase the availability of ENERGY STAR qualified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrate the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) provide information to users (via the Web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products; and (4) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event;
 - provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message;

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- join EPA's SmartWay Transport Partnership to improve the environmental performance of the company's shipping operations. SmartWay Transport works with freight carriers, shippers, and other stakeholders in the goods movement industry to reduce fuel consumption, greenhouse gases, and air pollution. For more information on SmartWay, visit www.epa.gov/smartway;
- join EPA's Climate Leaders Partnership to inventory and reduce greenhouse gas emissions. Through participation, companies create a credible record of their accomplishments and receive EPA recognition as corporate environmental leaders. For more information on Climate Leaders, visit www.epa.gov/climateleaders;
- join EPA's Green Power partnership. EPA's Green Power Partnership encourages organizations to buy green power as a way to reduce the environmental impacts associated with traditional fossil fuel-based electricity use. The partnership includes a diverse set of organizations including Fortune 500 companies, small and medium businesses, government institutions as well as a growing number of colleges and universities, visit <http://www.epa.gov/grnpower>.

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ENERGY STAR® Program Requirements for Residential Ventilating Fans

Eligibility Criteria

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135 Below is the product specification (Version 2.1) for ENERGY STAR qualified residential ventilating fans. A
136 product must meet all of the identified criteria to earn the ENERGY STAR.

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138 1) **Definitions:** Below is a brief description of a residential ventilating fan and other terms as relevant to
139 ENERGY STAR.

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141 A. **Residential Ventilating Fan:** A ceiling, wall-mounted, or remotely mounted in-line fan designed to
142 be used in a bathroom or utility room, or a kitchen range hood, whose purpose is to move
143 objectionable air from inside the building to the outdoors. Residential ventilating fans used for
144 cooling (e.g., whole-house fans) or air circulation are excluded. Heat/energy recovery ventilation
145 fans ducted to the ventilated space and powered attic ventilators (e.g., gable fans) are excluded,
146 but may be considered in a future version of this specification. Residential ventilating fans with
147 heat lamps are excluded from this specification. This specification does not address passive
148 ventilation of any kind.

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150 B. **Combination Unit:** A residential ventilating fan that contains a light source for general lighting
151 and/or a night light.

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153 C. **In-line Ventilating Fan:** A fan designed to be located within the building structure and that requires
154 ductwork on both intake and exhaust. Those in-line fans with only one intake are referred to as
155 "single port" in-line fans, while those with multiple intake ports are referred to as "multi-port" in-line
156 fans in this specification.

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158 D. **Base Model:** A fan model from which other models may be derived.

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160 E. **Base-Derived Model:** A fan model derived from another fan model such that differences between
161 the two models are limited to those that do not adversely affect product performance. **Examples of**
162 **acceptable differences include but are not limited to color, finish, and nameplate.**

Note: EPA has added to this Final Draft a clarification of "Base-Derived Model" to further elucidate what differences between fans may be considered acceptable in terms of product qualification.

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164 F. **HVI 915, "HVI (Home Ventilating Institute) Procedure for Loudness Rating of Residential Fan**
165 **Products":** Procedure used for testing and rating ventilating fan products for sound. This test
166 procedure includes laboratory requirements and methods for obtaining sound pressure, sound
167 power, and some values.

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169 G. **HVI 916, "HVI Airflow Test Procedure":** Procedure that establishes uniform methods for laboratory
170 testing of powered residential ventilating equipment for airflow rate. This publication covers the
171 test equipment, tests of specific HVI classification groups, and test reports for maintaining the
172 standard.

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174 H. **HVI 920, "HVI Product Performance Certification Procedure Including Verification and Challenge":**
175 Publication that describes HVI's certification, verification, and challenge testing procedures.

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177 I. **ANSI/AMCA Standard 210-07, "Laboratory Methods of Testing Fans for Certified Aerodynamic**
178 **Performance Rating":** This ANSI/AMCA standard defines uniform methods for conducting

- 179 laboratory tests on housed fans to determine airflow rate, pressure, power and efficiency, at a
180 given speed of rotation.
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- 182 J. ANSI/AMCA Standard 300-08, "Reverberant Room Method for Sound Testing of Fans": This
183 ANSI/AMCA standard applies to fans of all types and sizes. It is limited to the determination of
184 airborne sound emission for the specified setups.
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- 186 K. AMCA Publication 311-05, "Certified Ratings Program – Product Rating Manual for Fan Sound
187 Performance": Publication that prescribes and establishes specifications to be used in connection
188 with the AMCA Certified Ratings Program for the sound performance of fans. This document
189 covers the actual testing, the certification process, the challenge procedures and the use of the
190 AMCA Certified Ratings seal.
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- 192 L. Inch of Water Gauge (w.g.): A traditional unit of pressure used to describe both water and gas
193 pressures. The conventional equivalent of one inch of water is 249.0889 [pascals](#), which is
194 2.490889 [millibars](#), about 0.036127 pounds per square inch (psi) or about 0.073556 inches
195 (1.86832 millimeters) of mercury. The word "gauge" after a pressure reading indicates that the
196 pressure stated is actually the difference between the absolute, or total, pressure and the ambient
197 air pressure at the time of the reading.
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- 199 M. Light Source: The lighting portion of a combination unit or a range hood. For units using a
200 compact fluorescent or fluorescent lamp, the light source includes the lamp and the ballast.
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- 202 N. Power Consumption: The operation of the fan motor consumes electrical power measured in
203 Watts (W). Under this specification, power used for lights, sensors, heaters, timers, or night lights
204 is not included in the determination of power consumption.
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- 206 O. Sone: An internationally recognized unit of loudness, which simplifies reporting of sound output by
207 translating laboratory logarithmic decibel readings into a linear scale that corresponds to the way
208 people sense loudness. A sone is equal in loudness to a pure tone of 1,000 cycles per second at
209 40 decibels above the listener's threshold of hearing.
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- 211 P. Working Speed: The lowest speed above 100 CFM for a two-speed fan and a low setting above
212 90 CFM for a multi-speed fan as defined in HVI 916.
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- 214 2) Qualifying Products: In order to qualify as ENERGY STAR, a residential ventilating fan must meet
215 definitions A through C in Section 1, above, and the specification and testing requirements provided in
216 Sections 3 and 4, below. For the purposes of this specification, residential ventilating fans include the
217 following product types: range hoods; and, in-line (single and multi-port), bathroom, and utility room
218 fans, including ducted and direct-discharge models. Ventilating fans with sensors and timers may
219 qualify under this specification. Residential ventilating fans qualifying under this specification can also
220 be used in small commercial applications (e.g., bathroom of a restaurant). Ventilating fan models with
221 resistance heating and range hood models with incandescent lighting are not eligible under this
222 Version 2.1 specification.
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- 224 3) ENERGY STAR Specification Requirements for Qualifying Products: Only those products described in
225 Section 2 that meet the energy-efficiency criteria outlined in Tables 1 – 4, below, may qualify for the
226 ENERGY STAR.
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Table 1 Criteria for ENERGY STAR Qualified Residential Ventilating Fans – Minimum Efficacy Levels	
Airflow (cfm)	Minimum Efficacy Level (cfm/W)*
Range Hoods – up to 500 cfm (max)	2.8
Bathroom and Utility Room Fans – 10 to 80 cfm	1.4
Bathroom and Utility Room Fans – 90 to 130 cfm	2.8
Bathroom and Utility Room Fans – 140 to 500 cfm (max)	2.8
In-Line (single-port & multi-port) Ventilating Fans	2.8

*Based on static pressure reference measurement as specified in Section 4.D. of this specification.

- A. Lighting Requirements: Combination unit residential bathroom and utility room ventilating fans having a light source must meet the lighting performance criteria listed in Table 2 or Table 3, depending on the type of light source. Ventilating fans that have lamp sockets that can accept incandescent lamps are excluded.

Table 2 – Fluorescent Light Source Criteria	
Performance Characteristic	ENERGY STAR Requirements
System Efficacy per lamp ballast combination, Lumens Per Watt (LPW) – see notes at end of this table	<p>≥ 46 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 listed lamp Watts.</p> <p>≥ 70 LPW for all lamp types that are > 24 inches and ≥ 30 listed lamp Watts.</p>
Lamp Start Time	<p>The time needed after switching on the lamp to start continuously and remain lighted must be an average of one second or less.</p> <p>For manufacturers using magnetic ballasts and lamps with integrated electronic starting chips, lamps <u>must</u> be included with the residential ventilating fan when shipped from the factory.</p>
Lamp Life	<p>For residential ventilating fans that are shipped with a lamp, the average rated life of the lamp must be ≥ 10,000 hours.</p> <p>For residential ventilating fans that are not shipped with lamps, a list of lamp types must be provided that would result in the lighting source complying with this specification requirement. This list must be clearly visible to the consumer on the residential ventilating fan packaging.</p>

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	Manufacturers are not required to provide specific lamp manufacturer names and model numbers on the packaging. Rather, generic lamp listings, such as the NEMA or ANSI generic descriptions will suffice.
Color Rendering Index	≥ 80 for compact fluorescent lamps. ≥ 75 for linear fluorescent lamps.
Correlated Color Temperature	For residential ventilating fans that are shipped with a lamp and do not have a <i>rated</i> color temperature of 2,700 Kelvin (K) or 3,000 K (actual measured CCT of 2,700 to 3,000K ± 200K), the packaging should clearly describe the color of the product (cool or warm) and state its intended use. For residential ventilating fans that are not shipped with a lamp, a list of lamp types must be provided that would result in the light source complying with this specification requirement. This list must be clearly visible to the consumer on the residential ventilating fan packaging. Manufacturers are not required to provide specific lamp manufacturer names and model numbers on the packaging. Rather, generic lamp listings such as the NEMA or ANSI generic descriptions will suffice.
Noise	Class A sound rating for electromagnetic and electronic ballasts, outside the fixture. Not to exceed a measured level of 24 dBA when measured in a room with ambient noise no greater than 20 dBA.
Maximum Total Lamp Wattage (excluding night lights)	≤ 50 Watts.
Maximum Night Light Wattage	≤ 4 Watts.

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Notes:

Light Source efficacy shall be determined by the following equation:

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

- Lamp Lumens: Lamp lumens must be measured using the lamp and ballast that are shipped with the residential ventilating fan.
- Light Source Input Power: Light Source input power must be measured using the lamp and ballast that are shipped with the residential ventilating fan.
- For residential ventilating fans shipped without lamps, efficacy shall be determined by testing at least one of the lamp types listed on the product packaging.
- In some cases, original equipment manufacturers (OEMs) may already offer lamps and ballasts

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that meet the above criteria. Manufacturers may choose a lamp/ballast combination from the NEMA/ALA matrices at www.nema.org/lampballastmatrix/ or data from an ENERGY STAR Platform Letter of Qualification supplied by the OEM.

Table 3 - Light Source Criteria for LED Light Engines

Performance Characteristic	ENERGY STAR Requirements	Methods of Measurement Reference Standards
Note: These requirements apply only to light sources using LED light engines.		
LED Light Engine Efficacy <i>Per LED light engine in lumens per watt (LPW)</i>	≥ 50 LPW for uncovered LED light engines ≥ 40 LPW for covered LED light engines (engines featuring integral secondary optics)	<i>ASSIST Recommends: Recommendations for Testing and Evaluating White LED Light Engines and Integrated LED Lamps Used in Decorative Lighting Luminaires. Vol 4, Issue 1, May 2008.</i> (ASSIST, May 2008) ^{1, 2}
LED Light Engine Color Rendering Index (CRI)	≥ 75	ASSIST, May 2008; ANSI C78.377-2008
LED Light Engine Correlated Color Temperature (CCT)	Light output must meet one of the following nominal correlated color temperature (CCT) values: 2700K, 3000K, 3500K, 4000K, 4500K, 5000K, 5700K, 6500K.	ASSIST, May 2008; ANSI C78.377-2008
LED Light Engine Maximum Measured Driver/Driver Case Temperature (During <i>in situ</i> Operation)	T _c not to exceed the LED driver manufacturer maximum recommended case temperature when measured during <i>in situ</i> operation.	ASSIST, May 2008 (<i>see page 8</i>)
Lumen Maintenance	≥ 25,000 hours to 70% Lumen Maintenance (L ₇₀)	<i>ASSIST Recommends: LED Life for General Lighting Vol. 1, February 2005, rev. August 2007</i> (ASSIST, rev. August 2007) ^{3, 4}
Color Stability	Chromaticity shift for LED packages over time shall not exceed 0.007 on the CIE 1976 (u', v') diagram (corresponds with a 7-step MacAdam ellipse).	
Power Factor	≥ 0.7	ANSI C82.77
¹ ASSIST, May 2008: Available at http://www.lrc.rpi.edu/programs/solidstate/assist/pdf/AR-LEDLightEngine-May2008.pdf . ² Note: EPA understands that IESNA LM-79 (“ <i>IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products</i> ”) may in the future incorporate LED light engine test procedures; as such, EPA may reference LM-79 in future revisions of this specification. ³ ASSIST, rev. August 2007: Available at http://www.lrc.rpi.edu/programs/solidstate/assist/pdf/ASSIST-LEDLife-revised2007.pdf . ⁴ Note: EPA understands IESNA LM-80 (“ <i>IESNA Approved Method For Measuring Lumen Maintenance of LED Light Sources</i> ”) to be under development as of June 2008, and may reference LM-80 in future revisions of this specification.		

Output Operating Frequency	<p>≥ 120 Hz</p> <p>Note: This performance characteristic addresses problems with visible flicker due to low frequency operation and applies to steady-state as well as dimmed operation. Dimming operation shall meet the requirement at all light output levels.</p>	Oscilloscope instruction manual
Noise	Class A sound rating for power supplies for the light source, not to exceed a measured level of 24 dBA (audible) when the power supplies are installed in the product.	Class A sound rating for power supplies for the light source, not to exceed a measured level of 24 dBA (audible) when the power supplies are installed in the product and are measured using a sound meter (similar in performance to B&K type2209) where the microphone is located 12inches from the product in any direction.
Transient Protection	Power supply shall comply with ANSI/IEEE C62.41, Class A operation. The line transient shall consist of seven strikes of a 100 kHz ring wave, 2.5 kV level, for both common mode and differential mode.	ANSI/IEEE C62.41
Electromagnetic and Radio Frequency Interference	Power supplies must meet FCC requirements for consumer use (FCC 47 CFR Part 15/18 Consumer Emission Limits)	Consumer Limits per FCC 47 CFR Part 15/18
Maximum Total Lamp Wattage (excluding night lights)	50 Watts.	
Maximum Night Light Wattage	4 Watts.	
Warranty	A written warranty must be included with packaging at the time of shipment, covering repair or replacement of replaceable defective electrical parts for a minimum of three years from the date of purchase.	No Standard Available (Use manufacturer protocol)
Product Packaging for Consumer Awareness	<u>CCT Labeling:</u> Product packaging language is required that clearly describes the nominal color designation of the LED light engine in units of Kelvin.	No Standard Available (Use manufacturer protocol)

<p>Product Packaging for Consumer Awareness (continued)</p>	<p><u>Controls Compatibility:</u> External packaging must state any known incompatibilities with dimmers, occupancy or vacancy sensors, timing devices or any other external lighting controls.</p> <p><u>Incandescent Equivalency:</u> Light sources incorporating LED light engines generating < 800 lumens must clearly state on product packaging the incandescent light output equivalency of the LED light engine based on the table below:</p> <table border="1" data-bbox="508 657 946 940"> <thead> <tr> <th>Luminous Flux (Lumens)</th> <th>Incandescent Equivalency (W)</th> </tr> </thead> <tbody> <tr> <td>≥ 40</td> <td>6</td> </tr> <tr> <td>≥ 70</td> <td>10</td> </tr> <tr> <td>≥ 250</td> <td>25</td> </tr> <tr> <td>≥ 450</td> <td>40</td> </tr> </tbody> </table> <p>Example packaging declaration: “This light source produces light equivalent to a 25 watt incandescent bulb.”</p>	Luminous Flux (Lumens)	Incandescent Equivalency (W)	≥ 40	6	≥ 70	10	≥ 250	25	≥ 450	40	<p>Note: EPA seeks to ensure that light sources for qualified ventilating fans meet consumer expectations for light output. This consumer awareness requirement is intended to help consumers understand the limitations of LED light engines producing less than 800 lumens (equivalent to 60 watts incandescent).</p>
Luminous Flux (Lumens)	Incandescent Equivalency (W)											
≥ 40	6											
≥ 70	10											
≥ 250	25											
≥ 450	40											
<ul style="list-style-type: none"> • Efficacy • Color Rendering Index (CRI) • Correlated Color Temperature (CCT) 	<p>Provide: A test report from a laboratory:</p> <ul style="list-style-type: none"> • trained by a representative of the Lighting Research Center (RPI) on behalf of the Alliance for Solid-State Illumination Systems and Technologies (ASSIST); or • qualified to participate in the Department of Energy’s CALiPER program. <p><i>Note: Upon availability of NVLAP accreditation for LED test methods, EPA will investigate test procedures under the proposed NVLAP scope and evaluate for inclusion here as an additional test report option.</i></p> <p>Sample Size:</p> <ul style="list-style-type: none"> • 1 complete light source sample (light engine installed); and • 2 additional light engine samples external to the light source; and • Any components and/or materials required to install additional LED light engines in light source. 											
<ul style="list-style-type: none"> • Lumen Maintenance • Color Stability 	<p>Provide:</p> <ul style="list-style-type: none"> • Lumen maintenance and color stability data declared by LED package manufacturer, in accordance with ASSIST Sample Data Sheet for High-Power LEDs (Issue 4); or • LED package datasheets conforming to IESNA LM-80 protocols, once the metric is available. 											

<ul style="list-style-type: none"> • Maximum Measured Driver/Driver Case Temperature • Power Factor • Transient Protection 	Provide: <ul style="list-style-type: none"> • Laboratory test report. Sample Size: <ul style="list-style-type: none"> • One light engine sample must be tested.
Warranty	Provide: A copy of the actual light source manufacturer written warranty that is included with product packaging.
Product Packaging for Consumer Awareness	Provide: A written copy or a PDF graphic of the language that will be displayed on product packaging and within the packaging as required.

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B. Quality Assurance Requirements: To assure the quality of ENERGY STAR qualified residential ventilating fans, the following quality assurance requirements must be met for a fan to earn the ENERGY STAR:

1. Warranty

Partner shall provide a minimum one-year warranty for a product to qualify for the ENERGY STAR.

2. Fan Sound Levels

For most ventilating fan products, fan noise is the most obvious indicator of product quality to the consumer. Table 4, below, provides maximum noise levels allowed for residential bath and utility ventilating fans and range hoods to earn the ENERGY STAR. There is no sound requirement for single or multi-port in-line fans.

Table 4 Criteria for ENERGY STAR Qualified Residential Ventilating Fans – Maximum Allowable Sound Levels	
Airflow (cfm)	Maximum Allowable Sound Level (Sones)*
Range Hoods – up to 500 cfm (max)	2.0**
Bathroom and Utility Room Fans – 10 to 80 cfm	2.0
Bathroom and Utility Room Fans – 90 to 130 cfm	2.0
Bathroom and Utility Room Fans – 140 to 500 cfm (max)	3.0

* Based on static pressure reference measurement as specified in Section 4.D. of this specification.

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3. Installed Fan Performance

All qualifying ventilating fan models, with the exception of in-line and range hood models, when measured by industry standard testing procedures at 0.25 in. w.g. static pressure, shall deliver a rated airflow (cfm) equal to or greater than the following percentages of rated airflow delivered at 0.1 in. w.g. static pressure for that particular model:

Product Category	Rated Airflow (0.25 in. w.g.)
Bathroom and Utility Room Fans – 10 to 80 cfm	60%
Bathroom and Utility Room Fans – 90 to 130 cfm	70%
Bathroom and Utility Room Fans – 140 to 500 cfm	70%

C. Inclusion of Installation Instructions and Consumer Recommendations: Picture diagram-type installation instructions shall be included with each qualified ventilating fan. The instructions shall indicate the following:

1. How to properly seal the fan with caulk or other similar material to inhibit air leakage to the exterior of the thermal envelope of the building.
2. Recommended ductwork types, elbows (including radii), terminations, sealants, and lengths that will minimize static pressure losses and promote adequate airflow.
3. Proper installation of vibration deadening materials such as short pieces of flexible duct.
4. Proper installation of insulation around the fan to minimize building heat loss and gain.

In-Line Fan (Additional) Installation Instructions: Manufacturers must include the following information on the in-line product or in product literature:

To ensure quiet operation of ENERGY STAR qualified in-line and remote fans, each fan should be installed using sound attenuation techniques appropriate for the installation. For bathroom and general ventilation applications, at least 8 feet of insulated flexible duct must be installed between the exhaust or supply grille(s) and the fan. For kitchen range hood remote ventilation applications, where metal duct is generally required by code, a metal sound attenuator must be installed between the range hood and the fan.

4) Product Testing: Manufacturers are required to have tests performed according to the requirements included in this Version 2.1 specification, and then submit qualifying model information to EPA for approval. The test results must be reported using the Residential Ventilating Fan Qualified Product Information (QPI) Form. Manufacturers are required to report fan performance information on the QPI Form using the following units of measure:

A. Airflow Rating (cfm): The airflow of a residential ventilating fan shall be measured in cubic feet per minute (cfm). The cfm values shall be measured in accordance with ANSI/AMCA 210-07 or HVI 916. Fan testing setup shall conform to HVI 916, Section 6, Test Setups and Diagrams.

Note: Certification is allowed only for base and base-derived models. Airflow certification cannot be performed for geometrically similar fans tested at other speeds or sizes.

B. Efficacy (cfm/W): The efficacy of the residential ventilating fan shall be expressed in cubic feet per minute per Watt (cfm/W).

Manufacturers shall calculate efficacy by using airflow and fan motor electrical power values as certified per the requirements of this specification. Fan motor electrical usage will be the only energy consumption considered for the efficacy calculation. Energy used for other fan auxiliaries, such as lights, is not included in the determination of fan efficacy.

For the purposes of this calculation and ENERGY STAR data reporting, the following rounding and reporting rules apply:

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1. When calculating efficacy for ENERGY STAR qualification, fan cfm shall be rounded down to the nearest whole cfm, and this cfm value shall be reported to EPA. The Partner shall also indicate if this value is the product's certified cfm rating. If the product's certified cfm rating differs from this value, for example, if it is rounded down to the nearest ten (10) cfm, then this value shall also be reported to EPA and noted as being the certified rating. EPA will publish each product's certified rating on the ENERGY STAR Qualified Product List (QPL).

Note: EPA has included the provision that cfm be rounded down to the nearest whole cfm when calculating efficacy to ensure that the efficacy of products on the ventilating fans Qualified Product List are based on the actual cfm, and have been calculated from cfm and wattage figures that have been rounded and reported in a consistent manner, allowing the comparison of efficacy ratings across fans. However, since many residential ventilating fans have their cfm values rounded down to the nearest ten (10) cfm for the purposes of certification, in order to avoid confusion in the marketplace, EPA is proposing to publish the fan cfm certified rating on the ENERGY STAR Qualified Product List.

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2. Fan motor electrical power shall be rounded up to and reported using three significant digits when wattage is greater than 10 watts, (e.g., 51.6 Watts, 516 Watts), or two significant digits when wattage is less than 10 watts (e.g., 5.2 Watts). Wattage readings to assume standardized air and as tested watts.
 3. Efficacy (cfm/W) shall be rounded to and reported at the nearest one decimal place (tenth).
- C. Sound Rating (sone): The sound output of a residential ventilating fan is measured in sones. Sound shall be measured and rated in accordance with HVI 915, or ANSI/AMCA Standard 300-08 and AMCA Publication 311-05 (spherical sones method only). Fan testing setup shall conform to HVI 915, Section 8, Test Setups.
- D. Static Pressure Reference Measurements: Ventilating fan performance characteristics such as motor wattage, cfm, and sones must be reported to EPA at specific static pressures. These reference measurements vary depending upon the fan type and follow HVI 920, *HVI Product Performance Certification Procedure Including Verification and Challenge* rating points. The static pressure reference measurements are listed below for each qualifying fan type.
1. Ducted products (products with one duct such as bathroom and utility room fans): 0.1 in. w.g. static pressure
 - a. Partner must also test and report products at 0.25 in. w.g. static pressure for airflow (cfm)
 - b. Partner is not required to test sound levels or wattage at 0.25 in. w.g. static pressure
 2. Ducted range hoods must be tested at working speed as defined in HVI 916.
 3. Direct discharge (non-ducted) products: 0.03 in. w.g. static pressure
 4. In-line ventilating fans: 0.20 in. w.g. static pressure (Wattage and cfm only)
- E. Verification and Challenge Testing: The Partner shall be subject to the verification and challenge testing procedures of the organization that certifies its ventilating fan products, and ensure that the certification organization share with EPA the results of this testing, as described in the Commitment section of this specification. If as a result of this testing the Partner chooses to certify the ratings of the tested product at a value that differs from the product's value as originally used for ENERGY STAR qualification, the Partner shall report this to EPA. If the new cfm/W value does not permit the product to qualify for ENERGY STAR, the Partner shall provide EPA with a corrective action plan and EPA will remove the product from the QPL. If the Partner chooses to delist a product following verification or challenge testing, the Partner shall report this to EPA,

400 along with a corrective action plan, and EPA will remove the product from the QPL.

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402 5) **Product Certification:** To participate in the ENERGY STAR program, each model must be certified by
403 HVI, AMCA, or another such organization as approved by EPA (see Section 6, Requirements of
404 Organizations Certifying Products for ENERGY STAR). **Certification includes both initial qualification**
405 **testing, as well as ongoing verification testing. In both, testing must be conducted according to the**
406 **Product Testing requirements described in Section 4.**
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Note: The first sentence of the paragraph above, requiring certification by HVI, AMCA, or another such organization as approved by EPA, was at the beginning of Section 4, Product Testing, in the previous version of this revision. For the sake of clarity, a new section was added, Section 5, Product Certification, and the aforementioned sentence was moved to this section. Also added was clarification that certification includes both initial qualification testing and ongoing verification testing, and that for both, testing must be conducted according to the Product Testing requirements in this specification.

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409 6) **Requirements of Organizations Certifying Products for ENERGY STAR:**
410 This specification does not grant any organization the exclusive right to certify the performance of a
411 residential ventilating fan product for ENERGY STAR qualification. EPA will maintain a list of
412 organizations authorized under this specification. As EPA approves certification organizations, it will
413 add them to this list. EPA will consider the following elements when reviewing a certification
414 organization for inclusion on this list:

415 A. **Laboratory Requirements:**

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418 1. **Laboratory accreditation: To test residential ventilating fan products under this specification,**
419 **the certification organization must ensure that all ENERGY STAR models are tested by an**
420 **independent 3rd party laboratory that is accredited by an accreditation body that is a signatory,**
421 **in good standing, to a mutual recognition arrangement of a laboratory accreditation**
422 **cooperation (i.e. ILAC, APLAC, etc.) that verifies, by evaluation and peer assessment, that its**
423 **signatory members are in full compliance with ISO/IEC 17011 and that their accredited**
424 **laboratories comply with ISO/IEC 17025. Laboratories must be specifically qualified to carry**
425 **out tests to determine whether ventilating fans meet key product criteria for ventilating fans as**
426 **outlined in this document. A laboratory's Scope of Accreditation must reflect its specific**
427 **competence to carry out the test procedures referenced in Sections 4.A. through 4.D. of the**
428 **ENERGY STAR Program Requirements for Residential Ventilating Fans.**
429
430 2. **Further, the laboratory shall follow the test procedures described in this specification. This**
431 **applies to product rating for certification, verification, and challenge procedures.**

Note: The Section above, Laboratory Requirements, was at the beginning of Section 4, Product Testing, in the previous version of this revision. It has been moved to Section 5 in this Final Draft in order to clarify that it will apply to any and all labs that may test fans for ENERGY STAR qualification.

All 3rd party labs testing for certification programs authorized by EPA as of the effective date of this specification to test residential ventilating fans for ENERGY STAR qualification will have until one year from the effective date to meet the laboratory accreditation requirements described above in order to continue to test fans for the purpose of ENERGY STAR qualification.

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433 B. **Verification procedure requirements:**

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435 1. The organization shall have in place a verification testing procedure.
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437 2. Product procurement: Products to undergo verification testing shall be procured from the
438 marketplace. In order to ensure the organization's ability to procure a production unit, the
439 organization shall not inform the Partner which models will be tested or where they will be
440 obtained. Where this is not possible, and the products must be procured from the Partner, the

- 441 organization shall ensure the samples are randomly selected from the production line.
442
443 3. Frequency of testing, and number of products to be tested: The organization shall ensure that
444 100% of each Partner's certified base model products that are ENERGY STAR qualified
445 undergo verification testing every three years. The proportion or number of a Partner's
446 products to be tested annually may be determined by the certification organization.
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448 4. Resolution of failures: The organization shall have in place a procedure to resolve product
449 failures, and provide EPA with details of this procedure.
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451 C. Challenge procedure requirements:
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453 1. The organization shall have in place a challenge testing procedure.
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455 2. Product procurement and resolution of failures shall follow Section 5.B, Verification procedure
456 requirements.
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458 D. Certification of base-derived or similar products: The certification organization shall not certify an
459 ENERGY STAR qualified product based on the ratings of another product unless the differences
460 between the two products are limited to those that do not adversely affect product performance.
461 **Examples of acceptable differences include but are not limited to color, finish, and nameplate.**
462

Note: EPA has added to this Final Draft a clarification of what differences between fans may be considered acceptable in terms of product qualification, noting these differences are usually cosmetic.

- 463 E. Membership requirements: The organization shall not require that a party seeking product
464 certification be a member of the organization. Product verification and challenge testing shall only
465 require that the product has been certified by the organization to perform verification or challenge
466 testing.
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468 F. Consideration of the organization's procedures: The certification, verification, and challenge
469 testing procedures, as well as all other relevant aspects of any certification organization must exist
470 in written format, be available in this format to current or prospective ENERGY STAR residential
471 ventilating fan program Partners, and must be submitted in this format to EPA for its review.
472
473 G. Reporting results to EPA: The certification organization shall report to EPA at least annually the
474 outcomes of verification and challenge testing for all ENERGY STAR qualified products certified
475 by the organization. **Data reporting shall follow the rounding and reporting rules enumerated in**
476 **Section 4, Product Testing.**
477

Note: To allow the proper evaluation of the efficacy of fans undergoing verification or challenge testing against ENERGY STAR requirements, it is important that EPA receive from the certification organization data conforming to the rounding and reporting rules enumerated in Section 4, Product Testing.

- 478 7) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR under
479 the Version 2.1 specification will be defined as the *effective date* of this agreement. The ENERGY

Note: Since the changes in the ENERGY STAR Residential Ventilating Fans (Version 2.1) specification add flexibility in terms of testing options, it will be made available to manufacturers as soon as the specification is final. We anticipate an effective date of **January 15, 2009**.

- 480 STAR Residential Ventilating Fans (Version 2.1) specification shall go into effect on **January 15, 2009**.
481
482 A. **Qualifying and Labeling Products under the Version 2.1 Specification:** All products with a **date of**
483 **manufacture** on or after **January 15, 2009** must meet the new Version 2.1 requirements in order
484 to use the ENERGY STAR on the product or in product literature. The date of manufacture is

485 specific to each unit, and is the date (e.g., month and year) of which a unit is considered to be
486 completely assembled. Given the nature of the Version 2.1 requirements, models originally
487 qualified under Version 2.0 do not need to be requalified under Version 2.1.

Note: Stakeholders are encouraged to provide feedback on this Final Draft specification revision by **January 5, 2009**. EPA expects to finalize the specification over the next few weeks at which time the specification will become effective immediately. An effective date of **January 15, 2009** is likely based on this intended timeline.

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- B. Elimination of Automatic Grandfathering: EPA does not allow grandfathering under this Version 2.1 specification. **ENERGY STAR qualification under Version 2.1 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.
 - C. Lab Accreditation: All 3rd party labs testing for certification programs authorized by EPA as of the effective date of this specification to test residential ventilating fans for ENERGY STAR qualification will have until January 1, 2010 to meet the laboratory accreditation requirements described in Section 6.A, above, in order to continue to test fans for the purpose of ENERGY STAR qualification.

Note: Subsection 6.A. of this specification describes the accreditation requirements a lab must meet in order to test fans for ENERGY STAR qualification. The paragraph above, in order to accommodate labs not currently in compliance with these requirements, establishes a one-year grace period for labs to meet them.

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- 8) Future Specification Revisions: ENERGY STAR reserves the right to revise 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.