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

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

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures and should keep EPA informed on the progress of these efforts:

- 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;

- 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.

ENERGY STAR® Program Requirements for Residential Ventilating Fans

Eligibility Criteria

Below is the Version 2.2 product specification for ENERGY STAR qualified residential ventilating fans. A product must meet all of the identified criteria to earn the ENERGY STAR.

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

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

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

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

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

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

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

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

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

   I. ANSI/AMCA Standard 210-07, "*Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating*": This ANSI/AMCA standard defines uniform methods for conducting laboratory tests on housed fans to determine airflow rate, pressure, power and efficiency, at a given speed of rotation.

J. ANSI/AMCA Standard 300-08, "*Reverberant Room Method for Sound Testing of Fans*": This ANSI/AMCA standard applies to fans of all types and sizes. It is limited to the determination of airborne sound emission for the specified setups.

K. AMCA Publication 311-05, "*Certified Ratings Program – Product Rating Manual for Fan Sound Performance*": Publication that prescribes and establishes specifications to be used in connection with the AMCA Certified Ratings Program for the sound performance of fans. This document covers the actual testing, the certification process, the challenge procedures and the use of the AMCA Certified Ratings seal.

L. Inch of Water Gauge (w.g.): A traditional unit of pressure used to describe both water and gas pressures. The conventional equivalent of one inch of water is 249.0889 pascals, which is 2.490889 millibars, about 0.036127 pounds per square inch (psi) or about 0.073556 inches (1.86832 millimeters) of mercury. The word "gauge" after a pressure reading indicates that the pressure stated is actually the difference between the absolute, or total, pressure and the ambient air pressure at the time of the reading.

M. Light Source: The lighting portion of a combination unit or a range hood. For units using a compact fluorescent or fluorescent lamp, the light source includes the lamp and the ballast.

N. Power Consumption: The operation of the fan motor consumes electrical power measured in Watts (W). Under this specification, power used for lights, sensors, heaters, timers, or night lights is not included in the determination of power consumption.

O. Sone: An internationally recognized unit of loudness, which simplifies reporting of sound output by translating laboratory logarithmic decibel readings into a linear scale that corresponds to the way people sense loudness. A sone is equal in loudness to a pure tone of 1,000 cycles per second at 40 decibels above the listener's threshold of hearing.

P. Working Speed: The lowest speed above 100 CFM for a two-speed fan and a low setting above 90 CFM for a multi-speed fan as defined in HVI 916.

2) Qualifying Products: In order to qualify as ENERGY STAR, a residential ventilating fan must meet definitions A through C in Section 1, above, and the specification and testing requirements provided in Sections 3 and 4, below. For the purposes of this specification, residential ventilating fans include the following product types: range hoods; and, in-line (single and multi-port), bathroom, and utility room fans, including ducted and direct-discharge models. Ventilating fans with sensors and timers may qualify under this specification. Residential ventilating fans qualifying under this specification can also be used in small commercial applications (e.g., bathroom of a restaurant). Ventilating fan models with resistance heating and range hood models with incandescent lighting are not eligible under this Version 2.2 specification.

3) ENERGY STAR Specification Requirements for Qualifying Products: Only those products described in Section 2, above, that meet the energy-efficiency criteria outlined in Tables 1 – 4, below, may qualify for ENERGY STAR.

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 89 cfm	1.4
Bathroom and Utility Room Fans – 90 to 500 cfm (max)	2.8
In-Line (single-port & multi-port) Fans	2.8

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

A. Lighting Requirements: Residential bathroom and utility room fans and range hoods that include 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	≥ 46 LPW for all lamp types below 30 total listed lamp Watts. ≥ 60 LPW for all lamp types that are ≤ 24 inches and ≥ 30 listed lamp Watts. ≥ 70 LPW for all lamp types that are > 24 inches and ≥ 30 listed lamp Watts.
Lamp Start Time	The time needed after switching on the lamp to start continuously and remain lighted must be an average of one second or less. For manufacturers using magnetic ballasts and lamps with integrated electronic starting chips, lamps must be included with the residential ventilating fan when shipped from the factory.
Lamp Life	For residential ventilating fans that are shipped with a lamp, the average rated life of the lamp must be ≥ 10,000 hours. 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. 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 *rated* 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.

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 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		
Note: These requirements apply only to light sources using LED light engines.		
Performance Characteristic	**ENERGY STAR Requirements**	**Methods of Measurement Reference Standards**
LED Light Engine Efficacy *Per LED light engine in lumens per watt (LPW)*	≥ 50 LPW for uncovered LED light engines ≥ 40 LPW for covered LED light engines (engines featuring integral secondary optics)	*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.*(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 *in situ* Operation)	T_c not to exceed the LED driver manufacturer maximum recommended case temperature when measured during *in situ* operation.	ASSIST, May 2008 *(see page 8)*
Lumen Maintenance	≥ 25,000 hours to 70% Lumen Maintenance (L_{70})	*ASSIST Recommends: LED Life for General Lighting Vol. 1, February 2005, rev. August 2007* (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 ("*IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products*") 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 ("*IESNA Approved Method For Measuring Lumen Maintenance of LED Light Sources*") to be under development as of June 2008, and may reference LM-80 in future revisions of this specification.

Output Operating Frequency	≥ 120 Hz 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.	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	CCT Labeling: 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)

<table>
<tr>
<td>Product Packaging for Consumer Awareness (continued)</td>
<td>
<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.

<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:
<table>
<tr><th>Luminous Flux (Lumens)</th><th>Incandescent Equivalency (W)</th></tr>
<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>
<tr><td colspan="2">Example packaging declaration:
“This light source produces light equivalent to a 25 watt incandescent bulb.”</td></tr>
</table>
</td>
<td>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).</td>
</tr>
<tr>
<td>• Efficacy
• Color Rendering Index (CRI)
• Correlated Color Temperature (CCT)</td>
<td colspan="2">
Provide:
A test report from a laboratory:
• 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.

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.

Sample Size:
• 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.
</td>
</tr>
<tr>
<td>• Lumen Maintenance
• Color Stability</td>
<td colspan="2">
Provide:
• 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.
</td>
</tr>
</table>

• **Maximum Measured Driver/Driver Case Temperature** • **Power Factor** • **Transient Protection**	**Provide:** • Laboratory test report. Sample Size: • 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.

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 139 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.

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 89 cfm	60%
Bathroom and Utility Room Fans – 90 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 2.2 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: Qualification 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 tested 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:

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 (e.g., 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).

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). Watt readings should assume standardized air (as defined in AMCA 210-07) and as tested watts.

3. Efficacy (cfm/W) shall be rounded and reported to the nearest one decimal place (tenth).

4. Bathroom and utility room fans, and in-line fans, with more than one speed must be tested and meet the efficacy requirements of this specification at each speed. Fans of this type that have a rotary speed dial or similar mechanism that allows for a theoretically infinite number of speeds between the minimum and maximum speed must be tested and meet the efficacy requirements of this specification at their minimum and maximum speeds, and at a speed half-way between them. The Partner must report to EPA the efficacy result at each of these speeds.

5. Range hoods must be tested and meet the efficacy requirements of this specification in each possible configuration (e.g., vertical, horizontal). The Partner must report to EPA the efficacy result at each configuration.

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.

1. Bathroom and utility room fans with more than one speed must be tested and meet the sound level requirements of this specification at each speed. Fans of this type that have a rotary speed dial or similar mechanism that allows for a theoretically infinite number of speeds between the minimum and maximum speed must be tested and meet the sound level requirements of this specification at their minimum and maximum speeds, and at a speed half-way between them. The Partner must report to EPA the sound level at each of these speeds.

2. Range hoods must be tested and meet the sound level requirements of this specification in each possible configuration (e.g., vertical, horizontal). The Partner must report to EPA the sound level at each configuration.

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 shares with EPA the results of this testing, as described in the Commitments 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 the new ratings to EPA. If the new

cfm/W or sone value does not permit the product to qualify for ENERGY STAR, the Partner shall provide EPA with a corrective action plan. EPA will remove the product from the Qualified Product List and the Partner will be asked to cease using the ENERGY STAR mark until the violation can be resolved. If the Partner chooses to delist a product following verification or challenge testing, the Partner shall report this to EPA, along with a corrective action plan that addresses the removal of the ENERGY STAR mark from products, company Web site(s), and product literature.

5) Product Certification: To participate in the ENERGY STAR program, each model must be certified by HVI, AMCA, or another such organization as approved by EPA (see Section 6, Requirements of Organizations Certifying Products for ENERGY STAR). Certification testing includes both initial qualification testing, as well as ongoing verification testing. Certification testing must be conducted according to the Product Testing requirements described in Section 4.

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

   A. Laboratory Requirements:

      Laboratory accreditation: To test residential ventilating fan products under this specification, the certification organization must ensure that all ENERGY STAR models are tested by an independent 3rd party laboratory that is accredited by an accreditation body that is a signatory, in good standing, to a mutual recognition arrangement of a laboratory accreditation cooperation (i.e. ILAC, APLAC, etc.) that verifies, by evaluation and peer assessment, that its signatory members are in full compliance with ISO/IEC 17011 and that their accredited laboratories comply with ISO/IEC 17025. Laboratories must be specifically qualified to carry out tests to determine whether ventilating fans meet key product criteria for ventilating fans as outlined in this document. A laboratory's Scope of Accreditation must reflect its specific competence to carry out the test procedures referenced in Sections 4.A. through 4.D. of this specification.

   B. Verification procedure requirements:

      1. The organization shall have in place a verification testing procedure.

      2. Product procurement: Products to undergo verification testing shall be procured from the marketplace. In order to ensure the organization's ability to procure a production unit, the organization shall not inform the Partner which models will be tested or where they will be obtained. Where this is not possible, and the products must be procured from the Partner, the organization shall ensure the samples are randomly selected from the production line.

      3. Frequency of testing, and number of products to be tested: The organization shall ensure that 100% of each Partner's certified base model products that are ENERGY STAR qualified undergo verification testing every three years. The proportion or number of a Partner's products to be tested annually may be determined by the certification organization.

      4. Speed/configuration at which verification testing shall take place: Bathroom and utility room fans, and in-line fans, with more than one speed must undergo verification testing at any one speed at which the product was originally qualified. Range hoods must undergo verification testing at working speed at any one configuration at which the product was originally qualified.

      5. Resolution of failures: The organization shall have in place a procedure to resolve product failures, and provide EPA with details of this procedure.

C. Challenge procedure requirements:

1. The organization shall have in place a challenge testing procedure.

2. Product procurement and resolution of failures shall follow Section 6.B, Verification procedure requirements.

D. Certification of base-derived or similar products: The certification organization shall not certify an ENERGY STAR qualified product based on the ratings of another product unless the differences between the two products are limited to those that do not adversely affect product performance. Examples of acceptable differences include but are not limited to color, finish, and nameplate.

E. Membership requirements: The organization shall not require that a party seeking product certification be a member of the organization. Product verification and challenge testing shall only require that the product has been certified by the organization.

F. Consideration of the organization's procedures: The certification, verification, and challenge testing procedures, as well as all other relevant aspects of any certification organization, must be available in written format to current or prospective ENERGY STAR residential ventilating fan program Partners, and must be submitted in this format to EPA for its review.

G. Reporting results to EPA: The certification organization shall report to EPA on an annual basis the outcomes of verification and challenge testing for all ENERGY STAR qualified products certified by the organization. Data reporting shall follow the rounding and reporting rules enumerated in Section 4, Product Testing.

7) Effective Date: The date that manufacturers may begin to qualify products as ENERGY STAR under the Version 2.2 specification will be defined as the *effective date* of this agreement. The ENERGY STAR Residential Ventilating Fans (Version 2.2) specification shall go into effect on **January 15, 2009**.

A. Qualifying and Labeling Products under the Version 2.2 Specification: All products with a **date of manufacture** on or after **January 15, 2009** must meet the new Version 2.2 requirements in order to use 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) of which a unit is considered to be completely assembled.

Note: Given that efficacy, sone, and warranty requirements have not changed from Version 2.0 to Version 2.2, models qualified under Version 2.0 meet the requirements of this Version 2.2 specification, and therefore do not need to be requalified under Version 2.2.

Range hoods qualified prior to January 15, 2009, the effective date of Version 2.2 of this specification, that were not tested at each possible configuration as described in Sections 4.B.5 and 4.C.2 will remain qualified through October 1, 2009. However, as of that date, range hoods with more than one possible configuration will no longer be considered ENERGY STAR qualified under this specification, and will be removed from the Residential Ventilating Fans Qualified Product List (QPL), unless they are retested and meet the requirements of this specification at each possible configuration. In the case of a failure to meet the requirements at any given configuration, the Partner shall take corrective actions to bring the product into compliance, or EPA will consider the product disqualified and remove it from the QPL.

Bathroom and utility room fans, and in-line fans, with more than one speed, qualified prior to January 15, 2009, the effective date of Version 2.2 of this specification, that were not tested at the required speeds as described in Sections 4.B.4 and 4.C.1, will remain qualified through October 1, 2009. However, as of that date, bathroom and utility room fans, and in-line fans, with more than one speed will no longer be considered ENERGY STAR qualified under this specification, and will be removed from the Residential Ventilating Fans QPL, unless they are retested and meet the requirements of this specification at each required speed. In the case of a failure to meet the

requirements at these speeds, the Partner shall take corrective action to bring the product into compliance, or EPA will consider the product disqualified and remove it from the QPL.

B. Elimination of Automatic Grandfathering: EPA does not allow grandfathering under this Version 2.2 specification. **ENERGY STAR qualification under Version 2.2 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 third party laboratories testing for certification programs authorized by EPA 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, to continue testing fans for the purpose of ENERGY STAR qualification.

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.