



ENERGY STAR® Program Requirements for Residential Ventilating Fans

Partner Commitments

Following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacture and labeling of ENERGY STAR qualified products. The ENERGY STAR Partner must adhere to the following partner commitments:

Qualifying Products

1. Comply with current ENERGY STAR Eligibility Criteria, which define performance requirements and test procedures for residential ventilating fans. A list of eligible products and their corresponding Eligibility Criteria can be found at www.energystar.gov/specifications.
2. Obtain certification of ENERGY STAR qualification from a Certification Body recognized by EPA for residential ventilating fans prior to associating the ENERGY STAR name or mark with any product. As part of this certification process, products must be tested in a laboratory recognized by EPA to perform residential ventilating fan testing.

Using the ENERGY STAR Name and Marks

3. Comply with current ENERGY STAR Identity Guidelines, which define how the ENERGY STAR name and marks may be used. Partner is responsible for adhering to these guidelines and ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance. The ENERGY STAR Identity Guidelines are available at www.energystar.gov/logouse.
4. Use the ENERGY STAR name and marks only in association with qualified products. Partner may not refer to itself as an ENERGY STAR Partner unless at least one product is qualified and offered for sale.
5. Provide clear and consistent labeling of ENERGY STAR qualified residential ventilating fans.
 - 5.1. The ENERGY STAR mark 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.
 - 5.2. It is also recommended that the mark appear on the product packaging.

Verifying Ongoing Product Qualification

6. Participate in third-party verification testing through a Certification Body recognized by EPA for residential ventilating fans.
7. Comply with tests that EPA/DOE may conduct at its discretion 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 the government's request.

Providing Information to EPA

8. Provide unit shipment data or other market indicators to EPA annually to assist with creation of ENERGY STAR market penetration estimates, as follows:

- 8.1. Partner must submit the total number of ENERGY STAR qualified residential ventilating fans shipped in the calendar year or an equivalent measurement as agreed to in advance by EPA and Partner. Partner shall exclude shipments to organizations that rebrand and resell the shipments (unaffiliated private labelers).
- 8.2. Partner must provide unit shipment data segmented by meaningful product characteristics (e.g., type, capacity, presence of additional functions) as prescribed by EPA.
- 8.3. Partner must submit unit shipment data for each calendar year to EPA or an EPA-authorized third party, preferably in electronic format, no later than March 1 of the following year.

Submitted unit shipment data will be used by EPA only for program evaluation purposes and will be closely controlled. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;

9. Report to EPA any attempts by laboratories or Certification Bodies (CBs) to influence testing or certification results or to engage in discriminatory practices.
10. Notify EPA of a change in the designated responsible party or contacts within 30 days using the My ENERGY STAR Account tool (MESA) available at www.energystar.gov/mesa.

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:

- 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.
- Consider energy efficiency improvements in company facilities and pursue benchmarking buildings through the ENERGY STAR Buildings program.
- 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.
- Feature the ENERGY STAR mark(s) on Partner website and other promotional materials. If information concerning ENERGY STAR is provided on the Partner website as specified by the ENERGY STAR Web Linking Policy (available in the Partner Resources section of the ENERGY STAR website), EPA may provide links where appropriate to the Partner website.
- Ensure the power management feature is enabled on all ENERGY STAR qualified displays and computers 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 products.
- 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 website, etc. The plan may be as simple as providing a list of planned activities or milestones of which Partner would like EPA to be aware. For example, activities may include: (1) increasing the availability of ENERGY STAR qualified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrating the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) providing information to users (via the website and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products; and (4) building awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event.

- Join EPA's SmartWay Transport Partnership to improve the environmental performance of the company's shipping operations. The SmartWay Transport Partnership 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. For more information on Green Power, visit www.epa.gov/greenpower.



ENERGY STAR® Program Requirements Product Specification for Residential Ventilating Fans

Eligibility Criteria Version 2.3

Following is the **Version 2.3** product specification for ENERGY STAR qualified residential ventilating fans. A product shall 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 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.
- 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. Product Family: A Base model and all associated Base-Derived Models.
- G. 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 pascal, 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.
- H. 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.
- I. Power Consumption: The operation of the fan motor consumes electrical power measured in Watts (W).
- J. 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.
- K. 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.

2) Scope:

- A. **Included Products:** Products that meet the definitions of a Residential Ventilating Fan as specified herein are eligible for ENERGY STAR qualification, with the exception of products listed in Section 2.B. The following product types are eligible: 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 that qualify under this specification may also be appropriate for some light commercial applications, such as the bathroom of a restaurant.
- B. **Excluded Products:** The following product types are not eligible for ENERGY STAR: heat/energy recovery ventilation fans ducted to the ventilated space; powered attic ventilators (e.g., gable fans); ventilating fans with heat lamps; ventilating fans with resistance heating; range hood models with incandescent lighting; and ventilating fans used for cooling (e.g., whole-house fans) or air circulation. This specification does not address passive ventilation of any kind.

3) Qualification Criteria:

A. Efficacy Requirements:

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 of this specification.

Efficacy shall be calculated by using airflow and fan motor electrical power values as tested per the requirements of this specification. Fan motor electrical usage is the only energy consumption considered for the efficacy calculation. Energy used for other fan auxiliaries (e.g., lights, sensors, heaters, timers, or night lights) is not included in the determination of fan efficacy.

- B. **Lighting Requirements:** Residential bathroom and utility room fans and range hoods that include a light source shall meet the lighting performance criteria listed in Table 2 or Table 3, depending on the type of light source.

Note: EPA is in the process of revising ventilating fan lighting requirements through the ENERGY STAR luminaires specification development process. Once the luminaires specification goes into effect (planned for mid-2011), Tables 2 and 3 below will be removed from this document and ventilating fan light sources will be required to meet the luminaires specification. In the meantime, EPA has ensured that test method references are complete in Tables 2 and 3 for purposes of qualification prior to the luminaires effective date. For more information on the luminaire specification development process visit: www.energystar.gov/newspecs.

Table 2: Fluorescent Light Source Criteria

Performance Characteristic	ENERGY STAR Requirements	Test Method References
<p>System Efficacy per lamp ballast combination, Lumens Per Watt (LPW) – see notes at end of this table</p>	<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>	<p>IESNA LM-9; LM-66; ANSI C82.2</p>
<p>Lamp Start Time</p>	<p>The time needed after switching on the lamp to start continuously and remain lighted shall be an average of one second or less.</p> <p>For manufacturers using magnetic ballasts and lamps with integrated electronic starting chips, lamps <u>shall</u> be included with the residential ventilating fan when shipped from the factory.</p>	<p>ANSI C82.11-5.2</p>
<p>Lamp Life</p>	<p>For residential ventilating fans that are shipped with a lamp, the average rated life of the lamp shall be ≥ 10,000 hours.</p> <p>For residential ventilating fans that are not shipped with lamps, a list of lamp types shall be provided that would result in the lighting source complying with this specification requirement. This list shall 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.</p>	<p>IESNA LM-40-01; LM-65-01; IEC 60091; IEC 60901; ANSI C82.1; ANSI C82.11</p>
<p>Color Rendering Index</p>	<p>≥ 80 for compact fluorescent lamps. ≥ 75 for linear fluorescent lamps.</p>	<p>IESNA LM-58; CIE 13.3</p>

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 shall be provided that would result in the light source complying with this specification requirement. This list shall 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.	IESNA LM-58; LM-16
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.	NA
Maximum Total Lamp Wattage (excluding night lights)	≤ 50 Watts.	NA
Maximum Night Light Wattage	≤ 4 Watts.	NA

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 shall be measured using the lamp and ballast that are shipped with the residential ventilating fan.
- Light Source Input Power: Light Source input power shall 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	Test Method References
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.(ASSIST, May 2008)^{1, 2}</i>
LED Light Engine Color Rendering Index (CRI)	≥ 75	ASSIST, May 2008; ANSI C78.377-2008
LED Light Engine Correlated Color Temperature (CCT)	Light output shall 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 (ASSIST, rev. August 2007)^{3, 4}</i>
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 (2002)
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 (1991)									
Electromagnetic and Radio Frequency Interference	Power supplies shall meet FCC requirements for consumer use (FCC 47 CFR Part 15/18 Consumer Emission Limits)	Consumer Limits per FCC 47 CFR Part 15/18 (Ch. 1, 10-1-05 Edition)									
Maximum Total Lamp Wattage (excluding night lights)	50 Watts.	NA									
Maximum Night Light Wattage	4 Watts.	NA									
Warranty	A written warranty shall 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)									
	<u>Controls Compatibility:</u> External packaging shall 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 shall clearly state on product packaging the incandescent light output equivalency of the LED light engine based on the table below: <table border="1" data-bbox="500 1654 950 1938"> <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>	Luminous Flux (Lumens)	Incandescent Equivalency (W)	≥ 40	6	≥ 70	10	≥ 250	25	≥ 450	40
Luminous Flux (Lumens)	Incandescent Equivalency (W)										
≥ 40	6										
≥ 70	10										
≥ 250	25										
≥ 450	40										

Example packaging declaration:
 “This light source produces light
 equivalent to a 25 watt
 incandescent bulb.”

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 specification versions.

- C. **Warranty:** Partner shall provide a minimum one-year warranty for a product to qualify for the ENERGY STAR.
- D. **Fan Sound Levels:** Residential bath and utility ventilating fans and range hoods shall meet the sound levels provided in Table 4, below. There is no sound requirement for single or multi-port in-line fans.

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.C. of this specification.

- a. Bathroom and utility room fans with more than one speed shall 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 shall 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.
 - b. Range hoods shall be tested and meet the sound level requirements of this specification in each possible configuration (e.g., vertical, horizontal). The Partner shall report to EPA the sound level at each configuration.
- E. **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 percentages presented in Table 5, below, 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	70%

500 cfm	
---------	--

F. Significant Digits and Rounding:

- a. All calculations shall be carried out with actual measured or observed values. Only the final result of a calculation shall be rounded. Unless otherwise directed below, calculated results shall be rounded to the nearest significant digit as expressed in the corresponding specification limit.
- b. Unless otherwise specified, compliance with specification limit shall be evaluated using exact values without any benefit from rounding.
- c. When calculating efficacy for ENERGY STAR qualification, fan cfm shall be rounded down to the nearest whole cfm.
- d. Fan motor electrical power shall be rounded up to, 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.

4) Test Requirements:

- A. Representative Models shall be selected for testing per the following requirements:
 - a. For qualification of an individual product model, the representative product shall be equivalent to that which is intended to be marketed and labeled as ENERGY STAR.
 - b. For qualification of a product family, the base model shall serve as the representative model.
- B. When testing residential ventilating fans, the following test methods shall be used to determine ENERGY STAR qualification:

Table 6: Test Methods for ENERGY STAR Qualification	
ENERGY STAR Requirements	Test Method Reference
Airflow Rating (cfm) ^{1,2}	ANSI/AMCA 210-07 "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating" or HVI 916-09 "Airflow Test Procedure".
Sound Rating (sone) ³	HVI 915-06 "Procedure for Loudness Rating of Residential Fan Products", or ANSI/AMCA Standard 300-08 "Reverberant Room Method for Sound Testing of Fans" and AMCA Publication 311-05 "Certified Ratings Program - Product Rating Manual for Fan Sound Performance" (spherical sones method only)
Lighting Requirements	See references provided in Tables 2 and 3, above.

Note: 1) Airflow certification cannot be performed for geometrically similar fans tested at other speeds or sizes.
 2) Fan testing setup shall conform to HVI 916, Test Setups and Diagrams.
 3) Fan testing setup shall conform to HVI 915, Test Setups.

- C. **Static Pressure Reference Measurements:** Ventilating fan performance characteristics such as motor wattage, cfm, and sones shall be collected 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:
 - a. Ducted products (products with one duct such as bathroom and utility room fans): 0.1 in. w.g. static pressure

1. Products shall be tested at 0.25 in. w.g. static pressure for airflow (cfm)
 2. Sound levels and wattage do not need to be tested at 0.25 in. w.g. static pressure
- b. Ducted range hoods shall be tested at working speed as defined in HVI 916.
 - c. Direct discharge (non-ducted) products shall be tested at 0.03 in. w.g. static pressure
 - d. In-line ventilating fans shall be tested at 0.20 in. w.g. static pressure (wattage and cfm only)

5) 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:

- 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.
- Recommended ductwork types, elbows (including radii), terminations, sealants, and lengths that will minimize static pressure losses and promote adequate airflow.
- Proper installation of vibration deadening materials such as short pieces of flexible duct.
- Proper installation of insulation around the fan to minimize building heat loss and gain.

In-Line Fan (Additional) Installation Instructions: Manufacturers shall 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 shall be installed using sound attenuation techniques appropriate for the installation. For bathroom and general ventilation applications, at least 8 feet of insulated flexible duct shall 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 shall be installed between the range hood and the fan.

6) Effective Date: The ENERGY STAR Residential Ventilating Fans specification shall take effect on **January 15, 2009**. To qualify for ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect on its date of manufacture. 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.

7) Future Specification Revisions: EPA 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. In the event of a specification revision, please note that the ENERGY STAR qualification is not automatically granted for the life of a product model.