ENERGY STAR® Technical Specifications for Residential Heat-Recovery Ventilators and Energy-Recovery Ventilators (H/ERVs)

Version 2.0

Below is the Version 2.0 product specification for ENERGY STAR qualified residential H/ERVs. A product must meet all of the identified criteria to earn the ENERGY STAR.

1) Definitions: Below is a brief description of heat/energy-recovery ventilators and other terms as relevant to ENERGY STAR.

   A. Heat-recovery ventilator (HRV): A factory-assembled packaged unit including fans or blowers that transfers heat between two isolated airstreams.

   B. Energy-recovery ventilator (ERV): A heat-recovery ventilator designed to transfer heat and moisture.

   C. H/ERV: A product that is either an HRV or an ERV as defined in 1A and 1B.

   D. Sensible heat-recovery efficiency (SRE): The apparent effectiveness adjusted per clause 9.3.3 of CSA C439-09 equation 12 to take into account fan energy, leakage (exhaust air transfer), mass and flow imbalance, frost control, and certain other external and internal energy gains and losses.

   E. Total energy-recovery efficiency (TRE): The apparent total (enthalpy) effectiveness adjusted per clause 9.3.3 of CSA C439-09 equation 13 to take into account fan energy, leakage (exhaust air transfer), mass and flow imbalance and certain other external and internal gains and losses.

   F. Net Airflow: The gross airflow during an energy performance test reduced by the measured amount of leakage (identified in C439 as exhaust air transfer ratio (EATR)). Net airflow is the actual amount of outside air supplied by the unit and it is reported in the HVI 911 directory for each energy performance test.

   G. Test Airflow: The net airflow in cubic feet per minute (cfm) (Litres per second L/s) for an energy performance test for which a certified performance rating with -13°F (-25°C), 32°F (0°C), or 95°F (35°C) outdoor air temperature is provided in the current HVI 911 directory of certified performance.

   H. Power Consumption in Watts (W): The average power consumed during a specific energy performance test as reported in the HVI 911 directory.

I. Fan Efficacy (cfm/W) ((L/s)/W): The test airflow listed in the HVI 911 directory during a heating mode energy performance test with 32°F (0°C) supply air temperature divided by the power consumption listed in the HVI 911 directory for the same test. Fan Efficacy in cfm/W ((L/s)/W) shall be rounded to and reported at the nearest one decimal place (tenth) and used to determine compliance with this specification.

J. Standby Power (W): The power consumption determined when the HRV/ERV is not in use, measured in accordance with CSA C439-09. CSA C439-09 references IEC 62301.

K. Certified data: Performance data published in the current edition of the HVI Publication 911: Certified Home Ventilating Products Directory© or an on-line HVI directory of certified products.

L. CSA C439-09: "Standard Laboratory Methods of Test for Rating the Performance of Heat/Energy-Recovery Ventilators".

M. HVI Publication 920: HVI Product Performance Certification Procedure Including Verification and Challenge©. Publication that defines and specifies certain aspects of the procedures, covering such points as the actual testing, the certification process, challenge procedures, etc.

N. HVI 911: HVI Publication 911: Certified Home Ventilating Products Directory©: The Home Ventilating Institute (HVI) publishes a Certified Products Directory that is updated approximately monthly (www.hvi.org).

O. Manufacturer Limited Warranty: Manufacturer limited warranty is an assurance by the ENERGY STAR Participant that purchased system equipment and components are warranted for a certain required period-of-time. The ENERGY STAR Participant is to comply with the warranty requirements as standard for all ENERGY STAR certified models. ENERGY STAR can request the Participant to submit warranty documentation at any time. The exact terms of the limited warranty, given the minimum requirements, shall be determined by the Participant.

P. Asymmetric defrost - A change in the defrost cycle during a low temperature test that increases the duration of a defrost cycle, or the frequency of a defrost cycle, by more than 10% during the low temperature test

Q. Ventilation rate variation - A change in net ventilation rate of 10% or more brought about by automatic control system changes during the non-defrost portion of a low temperature test. Note that this does not include ventilation rate changes that take place during defrost cycles or ventilation rate changes that occur because of frost formation during the test.

R. Disclaimer Label: The disclaimer label is a label that shall include the ENERGY STAR mark. The label shall be available for download from the ENERGY STAR Web site.

2) Certifying Products: In order to qualify as ENERGY STAR, a residential H/ERV must meet the definition in Section 1A or 1B, comply with the testing and minimum performance requirements provided in this specification, and *have a capacity of no greater than 500 cfm (236 L/s)*. H/ERVs with electric resistance heaters are ineligible for ENERGY STAR certification .

Under this specification, products are eligible for ENERGY STAR certification only in Canada.

3) ENERGY STAR Criteria for Certifying Products: Only those products described in Section 2, above, that meet the criteria outlined in Table 1 as applicable may certify for ENERGY STAR. In addition, all ENERGY STAR H/ERVs must meet all the requirements listed in sections 4 to 13 of this specification.

   A. Products to be sold as ENERGY STAR certified must be tested and meet SRE requirements at 32°F (0°C) and -13°F (-25°C).

   B. Products to be sold as ENERGY STAR certified must meet fan efficacy requirements in a test that also meets SRE requirements at 32°F (0°C).

   C. All net supply airflows in tests used to meet SRE and fan efficacy requirements must be within 10% of each other.

Table 1. SRE and Fan Efficacy Minimum Requirements

Climate Zone	Zone Definition	Minimum SRE at 32°F (0°C)	Minimum SRE at -13°F (-25°C)	Minimum Fan Efficacy with 32°F (0°C) supply temperature	
Heating	Canada	65%	60%	SRE < 75%	1.2 cfm/W (0.57 L/s/W)
				SRE ≥ 75%	0.8 cfm/W (0.38 L/s/W)

Additional ENERGY STAR specification calculation requirement:
The SRE and net ventilation rate for the -25°C low temperature test shall be determined from measurements taken during the final 60 hours of the 72 hour nominal test period. The 60h period shall be extended as necessary to allow for analysis of an integral number of complete operating/defrost cycles, e.g., if the HRV/ERV is in a defrost at the end of the 72h test.

4) Quality Assurance Requirements: To assure the quality of ENERGY STAR certified H/ERVs, the following quality assurance requirements must be met for an H/ERV to certify as ENERGY STAR:

   Warranty: Participant shall provide a minimum one-year warranty.

5) Inclusion of Installation Instructions: Picture diagram-type installation instructions shall be included with each certified H/ERV. The instructions shall indicate the following:

   A. How to properly seal the openings to the exterior of the thermal envelope of the building with caulk or other similar material to inhibit air leakage.

   B. Recommended ductwork installation including type, impact of elbows, terminations, sealants, and lengths that will minimize static pressure losses and promote adequate airflow.

   C. Proper installation of vibration deadening materials such as short pieces of flexible duct.

   D. Proper installation of thermal insulation and connecting ducts to minimize heat loss and gain.

6) Consumer Information: Manufacturers must include the following information on the product or in product literature and on the Participant's Web site:

A. “To ensure quiet operation of ENERGY STAR certified HRV/ERVs, each product should be installed using sound attenuation techniques appropriate for the installation.”

B. “The way that your Heat/Energy-recovery ventilator is installed may make a significant difference to the electrical energy that you will use. To minimize the electricity use of the Heat/Energy-recovery ventilator, a stand-alone fully ducted installation is recommended. If you choose a simplified installation that operates your furnace airhandler for room-to-room ventilation, an electrically efficient furnace that has an electronically commutated (EC) variable speed blower motor will minimize your electrical energy consumption and operating cost.”

C. “Installation of a user-accessible control with your product will improve comfort and may significantly reduce the product’s energy use.”

1. The label shall begin:
   “This product earned the ENERGY STAR by meeting strict energy efficiency guidelines set by Natural Resources Canada and the US EPA. It meets ENERGY STAR requirements only when used in Canada.”

2. The placement of this statement must be adjacent to the ENERGY STAR mark and any text describing the ENERGY STAR program and/or certified products.

   The disclaimer label will be available for Participants to download from the ENERGY STAR Web site with other ENERGY STAR marks. It shall be at least 3” x 2” in size, and may be vertical or horizontal. The Participant may enlarge it for larger product packaging surfaces if so desired.

   The disclaimer label shall be clearly displayed on the same side as the ENERGY STAR mark on the product and product packaging, in the installation/instruction manual, and on the Participant’s Web site where information about ENERGY STAR certified models is displayed.

7) Product Testing and Certification: Manufacturers are required to perform tests, according to the requirements included in this specification, and then submit certifying model information for approval. Each certifying model must be tested in accordance with CSA C439 and certified by HVI, or another such organization as approved by NRCan (see Section 9, Requirements of Organizations Certifying Products for ENERGY STAR). Certification testing includes both initial qualification testing, as well as ongoing verification testing. Furthermore, manufacturers must submit copies of the full 72h lab reports to NRCan via HVI. The lab report must be received by NRCan before any model can appear on NRCan’s list of certified models.

8) Verification and Challenge Testing: The Participant shall be subject to the verification and challenge testing procedures of the organization that certifies its H/ERV products, and ensure that the certification organization shares with NRCan the results of this testing.

9) Requirements of Organizations Certifying Products for ENERGY STAR Certification : This specification does not grant any organization the exclusive right to certify the performance of an H/ERV product for ENERGY STAR certification . NRCan will maintain a list of organizations authorized under this specification. As NRCan approves certification organizations, it will add them to this list. NRCan will consider the following elements when

reviewing a certification organization for inclusion on this list:

A. Laboratory Requirements:

Laboratory accreditation: To test H/ERV 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 or CAN-P-4E. Laboratories must be specifically qualified to carry out tests to determine whether H/ERVs meet key product criteria as outlined in this document. A laboratory's Scope of Accreditation must reflect its specific competence to carry out the applicable test procedures referenced in CSA C439.

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 Participant which models will be tested or where they will be obtained. Where this is not possible, and the products must be procured from the Participant, 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 Participant's certified base model products that are ENERGY STAR certified undergo verification testing every five years. The proportion or number of a Participant's products to be tested annually may be determined by the certification organization.

4. Resolution of failures: The organization shall have in place a procedure to resolve product failures, and provide NRCan 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 9.B, Verification procedure requirements.

D. Certification of base-derived or similar products: The certification organization shall not certify an ENERGY STAR certified 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 H/ERV program Participants, and must be submitted in this format to NRCan for its review.

G. Reporting results to NRCan: The certification organization shall report to NRCan on an annual basis the outcomes of verification and challenge testing for all ENERGY STAR certified products certified by the organization.

10) Effective Date: The date from which products must meet the requirements specified under Version 2.0 of the H/ERV specification will be defined as the effective date of the agreement.

A. Certifying and Marking products under the Version 2.0 specification: The effective date of version 2.0 ENERGY STAR Technical Specifications for H/ERVs is **March 1st, 2015.** All products must meet Version 2.0 requirements to certify for ENERGY STAR.

11) Future Specification Revisions: The US EPA and Natural Resources Canada reserve the right to change the criteria should technological and/or market changes affect the usefulness of this specification to consumers, industry, or the environment. It is anticipated that a more stringent H/ERV Specification will be developed within five years of the effective date of this Specification. This will provide H/ERV ENERGY STAR Participants with some lead-time to improve the overall performance of their products while allowing them to benefit from ENERGY STAR market development programs.

For the purpose of this specification, Canada is deemed to be in zone 6 or higher.