

# Guide Specifications for RenewAir EV450IN, HE1XIN, HE1.5XIN, HE2XIN, HE3XIN, HE4XIN, HE6XIN, HE8XIN Indoor Energy Recovery Ventilators

*Prepared for the guidance of architects, consulting engineers and mechanical contractors.*

## Part I - General

### A. Product Specification

1. Energy Recovery Ventilator (ERV) shall be a packaged unit as manufactured by RenewAir and shall transfer both heat and humidity using static plate core technology.

### B. Quality Assurance

1. The energy recovery cores used in these products shall be third party Certified by AHRI under its Standard 1060 for Energy Recovery Ventilators. AHRI published certifications shall confirm manufacture's published performance for airflow, static pressure, temperature and total effectiveness, purge air (OACF) and exhaust air leakage (EATR). Products that are not currently AHRI Certified will not be accepted.
2. Manufacturer shall be able to provide evidence of independent testing of the core by Underwriters Laboratory (UL), verifying a maximum flame spread index (FSI) of 25 and a maximum smoke developed index (SDI) of 50 thereby meeting NFPA 90A and NFPA 90B requirements for materials in a compartment handling air intended for circulation through a duct system. The method of test shall be UL Standard 723.
3. Unit shall be Listed under UL 1812 Standard for Ducted Air to Air Heat Exchangers. Some exceptions to UL Listing may apply.
4. The ERV core shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of ten years from the date of purchase. The balance-of-unit shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of two years from the date of purchase.

## Part II – Performance

### A. Energy Transfer

The ERV shall be capable of transferring both sensible and latent energy between airstreams. Latent energy transfer shall be accomplished by direct water vapor transfer from one airstream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air.

### B. Passive Frost Control

The ERV core shall perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10°F and inside relative humidity below 40%). Occasional more extreme conditions shall not affect the usual function, performance or durability of the core. No condensate drains will be allowed.

### C. Continuous Ventilation

Unit shall have the capacity to operate continuously without the need for bypass, recirculation, pre-heaters or defrost cycles under normal operating conditions.

#### **D. Positive Airstream Separation**

Water vapor transfer shall be through molecular transport by hygroscopic resin and shall not be accomplished by “porous plate” mechanisms. Exhaust and fresh airstreams shall travel at all times in separate passages, and airstreams shall not mix.

#### **E. Laminar Flow**

Airflow through the ERV core shall be laminar over the products entire operating airflow range, avoiding deposition of particulates on the interior of the energy exchange plate material.

### **Part III – Product**

#### **A. Construction**

1. The energy recovery component shall be of fixed-plate cross-flow construction, with no moving parts.
2. No condensate drain pans or drains shall be allowed and unit shall be capable of operating in both winter and summer conditions without generating condensate.
3. The unit case shall be constructed of G90 galvanized, 20-gauge steel, with lapped corners and zinc plated screw fasteners.
4. Access doors shall provide easy access to blowers, ERV cores, and filters. Doors shall have an airtight compression seal using closed cell foam gaskets. Pressure taps, with captive plugs, shall be provided allowing cross-core pressure measurement allowing for accurate airflow measurement.
5. Case walls and doors shall be insulated with 1 inch, 4 pound density, foil/scrim faced, high-density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers, and with minimum R-value of 4.3 (hr·ft<sup>2</sup>·°F/BTU). EV450IN case walls and doors shall be insulated with 7/8 inch, expanded polystyrene foam insulation faced with a cleanable foil face on all exposed surfaces.
6. The ERV cores shall be protected by a MERV-8 rated, 2" nominal, pleated, disposable filter in both airstreams.
7. Unit shall have single-point power connection and a single-point 24 VAC contactor control connection.
8. Blower motors shall be Premium Efficiency, EISA compliant for energy efficiency. The blower motors shall be totally enclosed (TEFC) and be shall be supplied with factory installed motor starters (HE6X and HE8X 208-230/460V models are open drip-proof). Direct drive models (EV450 and HE1X models) shall be EISA-compliant for energy efficiency with open drip proof design and integral thermal protection.
9. Blowers shall be quiet running, forward curve type and be either direct drive (EV450 and HE1X only) or belt drive. HE1.5X shall be backward incline, motorized impeller type packages. HE6X and HE8X units use backward incline, belt drive blower packages. Belt drive motors shall be provided with adjustable pulleys and motor mounts allowing for blower speed adjustment, proper motor shaft orientation and proper belt tensioning.
10. The unit electrical box shall include a factory installed, non-fused disconnect switch and a 24 VAC, Class II transformer/relay package.
11. The ERV shall be provided “inverter-ready” allowing for applications of inverters supplied and installed by others.

**B. Options (Select options based on application requirements)**

1. Provide unit and duct connection orientation per project schedule.
2. Provide double wall construction with 24-gauge galvanized steel liner.
3. Units are available single or three phase at a full range of operating voltages. See project schedule.
4. Provide motor horsepower as specified in project schedule.
5. Provide factory installed disconnect fuses.
6. Provide factory installed filter monitors for each airstream.
7. Provide MERV-13 filters for final installation after construction phase.
8. Provide factory installed Variable Frequency Drives (available for all models HE2XIN and larger) allowing either preset or variable speed operation with appropriate 0-10 volt DC or DDC control signal.
9. Provide ECM controlled motors (available for EV450IN, HE1XIN and HE1.5XIN models) allowing either two preset speeds or variable speed operation with a 0-10 volt DC control signal.
10. Provide factory installed isolation dampers for either or both air streams (available for all models except EV450IN). The insulated dampers shall be of a low leakage design and shall not restrict the airstream, reducing airflow, in any way. The dampers shall be opened with a motor actuator powered by the standard unit transformer package and have a spring return for low off- position power consumption.

**Part IV – Installation****A. Unit Location**

1. Locate and orient unit to provide the shortest and most straight duct connections. Provide service clearances as indicated on the plans. Locate units distant from sound critical occupancies.
2. Provide a poured concrete equipment pad for all floor mounted units. The pad thickness and floor plan dimensions to be determined based on the unit selected, and site structural considerations.
3. Provide a structurally suitable support for the base of any wall mounted or hung units.

**B. Vibration Isolation**

1. Provide rubber or spring type isolators appropriately sized for corner weights of the specific unit.
2. Provide flexible duct connections at unit duct flanges.

**C. Duct Design**

1. All ductwork shall be designed, constructed, supported and sealed in accordance with SMACNA HVAC Duct Construction Standards and pressure classifications.
2. At a minimum all duct runs to the outdoors shall be thermally insulated at levels appropriate to the local climate. A continuous vapor barrier shall also be provided on warm surface of the insulation.

**D. Sound Control**

1. To control sound radiated from the unit:
  - a. Provide acoustic treatment in mechanical room walls and ceilings.
2. To control sound associated with the two blower outlets:

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- a. Provide straight, gradual transition ductwork for a minimum of 2-1/2 duct diameters downstream from the blower outlet for air velocities of less than 2,500 feet per minute.
  - b. Provide continuous acoustic insulation treatment of the duct until after the first elbow or tee.
  - c. Provide engineered sound attenuation ductwork to meet noise criteria (NC) requirements.

#### **E. Test and Balancing**

1. Test and Balancing may not begin until 100% of the installation is complete and fully functional.
2. Follow National Comfort Institute (NCI) air test and balance procedures specific to Heat Recovery Ventilator Balancing Procedure including standard reports to the owner's representative.