

PRODUCT SPECIFICATION GUIDE EV PREMIUM S, EV PREMIUM+ S (EE-130SW-P555-XB0), EV PREMIUM SH, EV PREMIUM+ SH (EE-130SW-H555-XB0), EV PREMIUM M, EV PREMIUM+ M (EE-230MW-P555-XC0), EV PREMIUM MH, EV PREMIUM+ MH (EE-230MW-H555-XC0), EV PREMIUM L, EV PREMIUM+ L (EE-295LW-P555-XD0), EV PREMIUM LH, EV PREMIUM+ LH (EE-295LW-H555-XD0), EV PREMIUM X, EV PREMIUM+ X (EE-390LW-P555-XD0), EV PREMIUM XH & EV PREMIUM+ XH (EE-390LW-H555-XD0)

**RENEWAIRE MODEL ERV – AIR-TO-AIR ENERGY RECOVERY VENTILATOR
FOR INDOOR INSTALLATION
CSI MASTERFORMAT CATEGORY 23 72 00**

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The unit is typically installed as an element of a building HVAC system.

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SECTION 23 72 00 - AIR-TO-AIR ENERGY RECOVERY VENTILATOR

PART 1 - GENERAL

1.1 SUMMARY

- This section includes air-to-air energy recovery ventilators (ERV) for indoor installation.
- The ERV shall be a packaged unit and shall transfer both sensible and latent energy using static plate core technology.
- Within this document, these units may be referred to as ERV for brevity.

1.2 RELATED

Drawing and general provisions of the contract, including General Requirements Division 01, Division 23, Division 23 Specifications Sections, and common work requirements for HVAC apply to work specified in this section.

- Section 23 09 00: Controls and Instrumentation

1.3 SUBMITTALS

- Product data: For each type or model of ERV, include the following:
 - Home Ventilating Institute (HVI) Certified Performance Data for both Supply Air (SA) and Exhaust Air (EA) with net airflow at varying external static pressures.

- Dimensioned drawings showing front, side and plan views, to include location of attached ductwork and service clearance requirements.
 - Estimated gross weight of each installed unit.
 - Filter types, quantities, and sizes
 - Installation, Operating and Maintenance manual (IOM) for each model.
- Shop drawings: For air-to-air ERVs, include plans, elevations, sections, details, and attachments to other work.
 - Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- Operation and maintenance data for air-to-air ERV.

1.4 QUALITY ASSURANCE

- Source Limitations: Obtain air-to-air ERV with all appurtenant components or accessories from a single manufacturer. ERV manufacturer shall have a minimum of 20 years experience manufacturing ERVs.
- For the actual fabrication, installation, and testing of work under this section, use only thoroughly trained and experienced workers completely familiar with the items required and with the manufacturer's current recommended methods of installation.
- 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 (10) 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 five (5) years from the date of purchase.
- 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 NFPA90A 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.
- Certifications:
 - The ERV shall be certified by the HVI under CSA 439. Both a heating and a cooling test must be run to demonstrate year-round energy recovery.
 - Unit shall be listed under UL 1812 Standard for Ducted Air to Air Heat Exchangers. The unit must pass commercial flammability requirements and shall not be labeled "For Residential Use Only."

1.5 COORDINATION

- Coordinate size and location of all building penetrations required for installation of each ERV and associated electrical systems.
- Coordinate sequencing of construction for associated plumbing, HVAC, electrical supply.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- Available Manufacturers: Subject to compliance with specifications contained within this document, manufacturers offering products that may be incorporated into the work include, but are not limited to:
 - RenewAire
- Manufacturer should be in business for minimum 20 years manufacturing ERVs.

2.2 MANUFACTURED UNITS

- Air-to-air ERV shall be fully assembled at the factory and consist of a fixed-plate cross-flow heat exchanger with no moving parts, an insulated single wall G90 galvanized painted 22-gauge steel cabinet, filter assemblies for both intake and exhaust air, enthalpy core, supply air blower assembly, exhaust air blower assembly and electrical control box with all specified components and internal accessories factory installed and tested and prepared for single-point high voltage connection. Entire unit with the exception of field-installed components shall be assembled and test operated at the factory.
- The ERV shall use an integral mounting flange and hanging bar system to mount the unit per manufacturer's installation manuals to a structurally suitable surface. The units may be mounted in any orientation.
- The ERV shall have pressure taps on the unit door and onboard or accessory adjustable airflow controls for easy airflow balancing of unit.

- The onboard airflow setting controls shall be factory installed and tested. Accessory airflow setting controls shall be factory tested.
- The ERV onboard control center or accessory control shall have the ability to set the high and low airflow for the supply and exhaust fans independently of each airstream.
- The onboard or accessory control shall have the capability to set the high and low airflow setting for the supply and exhaust fan using easy to use adjustable airflow dials or digital interface that are clearly labeled outdoor air or return air and high or low for airflow setting.
- The adjustable airflow setting dial shall have the capability to vary the desired airflow in infinite increments for the supply and exhaust airflows. The adjustable airflow setting digital interface shall have the capability to vary the desired airflow in 5 CFM increments or 0% to 100% percent of maximum speed in 1% increments for the supply and exhaust airflows.
- ERV shall have the capability to provide 119 CFM net airflow for EV Premium S/SH and EV Premium+ S/SH, 218 CFM net airflow for EV Premium M/MH and EV Premium+ M/MH, 278 CFM for EV Premium L/LH and EV Premium+ L/LH, and 373 CFM for EV Premium X/XH and EV Premium+ X/XH on the supply air at 0.4" w.g. external static pressure.
- ERV shall have the capability to provide nominal constant volume net airflows in 5 CFM increments from 30 CFM at 0.1" and up to 1.4" w.g. external static pressure to 120 CFM at 0.1" and up to 0.4" w.g. external static pressure for EV Premium+ S/SH, nominal constant volume net airflows in 5 CFM increments from 50 CFM at 0.4" and up to 2.0" w.g. external static pressure to 200 CFM at 0.1" and up to 0.6" w.g. external static pressure for EV Premium+ M/MH, nominal constant volume net airflows in 5 CFM increments from 75 CFM at 0.4" and up to 2.0" w.g. external static pressure to 250 CFM at 0.1" and up to 0.6" w.g. external static pressure for EV Premium+ L/LH, nominal constant volume net airflows in 5 CFM increments from 100 CFM at 0.3" and up to 2.4" w.g. external static pressure to 350 CFM at 0.1" and up to 0.6" w.g. external static pressure for EV Premium+ X/XH.
- ERV shall have the capability to provide 131 CFM net airflow for EV Premium S/SH and EV Premium+ S/SH on the supply air at 0.2" w.g. external static pressure, 233 CFM net airflow for EV Premium M/MH and EV Premium+ M/MH on the supply air at 0.2" w.g. external static pressure, 295 CFM net airflow for EV Premium L/XH and EV Premium+ L/LH on the supply air at 0.2" w.g. external static pressure and and 390 CFM net airflow for EV Premium X/XH and EV Premium+ X/XH on the supply air at 0.2" w.g. external static pressure, the power consumption of the EV Premium S/SH and EV Premium+ S/SH shall be 1.82 CFM/watt at HVI tested and rated performance conditions, the power consumption of the EV Premium M/MH and EV Premium+ M/MH shall be 2.68 CFM/watt at HVI tested and rated performance conditions, the power consumption of the EV Premium L/LH and EV Premium+ L/LH shall be 2.81 CFM/watt at HVI tested and rated performance conditions, and the power consumption of the EV Premium X/XH and EV Premium+ X/XH shall be 2.76 CFM/watt at HVI tested and rated performance conditions. For the EV Premium S/SH and EV Premium+ S/SH at 51 CFM, the SRE shall be 74%. For the EV Premium M/MH and EV Premium+ M/MH at 51 CFM, the SRE shall be 81%. For the EV Premium L/LH and EV Premium+ L/LH at 59 CFM, the SRE shall be 88%. For the EV Premium X/XH and EV Premium+ X/XH at 102 CFM, the SRE shall be 78%.
- 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.
- Unit shall have the capacity to operate continuously without the need for bypass, recirculation, pre-heaters, or defrost cycles under normal operating conditions.
- 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. No metal separators or metal core material shall be acceptable.
- Airflow through the ERV core shall be laminar over the product's entire operating airflow range, avoiding deposition of particulates on the interior of the energy exchange plate material.
- Power rating of the unit shall be 120 volts and 60 Hz.
- The power supply for the EV Premium S, M, L and X and EV Premium+ S, M, L and X units shall be from a 34" line cord while the EV Premium SH, MH, LH and XH and EV Premium+ SH, MH, LH and XH units shall have hard wired line voltage connections.

2.3 CABINET

- Materials: Formed single wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.
- The energy recovery component shall be of fixed-plate cross-flow construction, with no moving parts.
 - Enthalpy core: Energy recovery core shall be of the total enthalpy type, 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. No condensate drains shall be allowed. The energy recovery core shall be designed and constructed to permit cleaning and removal for servicing.
- Outside casing: Shall be constructed of smooth pre-painted or powder coated white 22-gauge steel, with lapped corners and zinc-plated screw fasteners.
- Case walls and doors shall be fully insulated with 1", expanded polystyrene foam insulation either faced or not faced with a cleanable foil face on all exposed surfaces.

- Access door shall provide easy access to blowers, ERV cores, and filters. Access door shall be hinged with airtight closed cell foam gaskets. Doors shall have an airtight compression seal using closed cell foam gaskets.
- The ERV shall have locking door hinges so that the ERV can be installed in multiple orientations.
- Door pressure taps, with captive plugs, shall be provided for cross-core pressure measurement allowing for accurate airflow measurement. Unit shall have (4) pressure ports allow for easy airflow balancing and verification.
- 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.
- EV Premium S/SH, M/MH and L/LH and EV Premium+ S/SH, M/MH and L/LH units shall have factory-supplied 6"/8" round duct collars for easy installation of ductwork to the unit. EV Premium X/XH and EV Premium+ X/XH units shall have factory-supplied 8" oval duct collars for easy installation of ductwork to the unit.
- 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.

2.4 BLOWER SECTION

- The impeller type shall be backward-curved.
- Blower assemblies: Shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.

2.5 MOTORS

- The supply and exhaust fans shall be electronically commutated (EC) motors with multispeed capability as standard offering.

2.6 UNIT CONTROLS

- Unit shall have the capacity to operate continuously without the need for bypass, recirculation, pre-heaters, or defrost cycles under normal operating conditions.
- The unit shall be capable of operating continuously or intermittently at the low airflow setting with the ability to go temporarily to the high airflow boost mode.
- The unit shall have an internal 24VAC transformer and relay.
- The EV Premium ERV operates at low airflow mode until one of the following energizes the ERV to operate on a high flow boost mode (as airflows are set during start-up and conditioning).
 - Occupancy Sensor
 - Carbon Dioxide Sensor
 - IAQ Sensor
 - Boost Mode push button switch
 - Proportional Run Time Controller
- The EV Premium+ ERV operates at low airflow mode either operating continuous or intermittent or off until one of the following energizes the ERV to operate on a high flow boost mode (as airflows are set during start-up and conditioning with touchscreen control accessory).
 - Occupancy Sensor
 - Carbon Dioxide Sensor
 - IAQ Sensor
 - Countdown Timer Control
 - Percent Timer (Proportional Run Time Per Hour) Control
 - Touchscreen Control Accessory
 - Modbus
- The EV Premium+ ERV operating mode can be changed with accessory to the following: both supply and exhaust airflow on, standby whereby both supply and exhaust airflow off with exhaust on only capable with activation, supply airflow only on, exhaust airflow only on, and supply and exhaust airflow off.
- The EV Premium+ ERV shall have alerts with either on unit LEDs or with accessory to indicate faults with unit and filter replacement needed.

2.7 FILTER SECTION

- The ERV cores shall be protected by a MERV 8 rated, spun polyester, disposable filter in both airstreams.

- ERV shall have the capability to incorporate an optional 1" thick MERV 13 disposable pleated filters located in the outdoor air airstream.
- All filters shall be accessible from the exterior of the unit.
- The ERV shall have the capability to incorporate an optional 1" thick MERV 13 disposable filter (shipped loose) located in the outdoor airstream, to be installed post construction.

PART 3 – EXECUTION

3.1 EXAMINATION

- Prior to start of installation, examine area and conditions to verify correct location for compliance with installation tolerances and other conditions affecting unit performance. See unit IOM.
- Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. See unit IOM.
- Proceed with installation only after all unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- Installation shall be accomplished in accordance with these written specifications, project drawings, manufacturer's installation instructions as documented in manufacturer's IOM, best practices and all applicable building codes.
- Install unit with clearances for service and maintenance.
- Locate, orient, and connect ductwork per AMCA, ASHRAE, and SMACNA guidelines. Provide service clearances as indicated on the plans. Locate units distant from sound critical occupancies.
- Use factory supplied mounting flange to mount the unit per manufacturer's installation manuals to a structurally suitable surface. The units may be mounted in any orientation.
- Provide flexible duct connections at unit duct flanges.
- To control sound radiated from the unit:
 - Provide acoustic treatment in mechanical room walls and ceilings.
- To control sound associated with the two blower outlets:
 - Utilize insulated, flexible duct.
 - In sound critical applications provide increased duct sizing and consider the use of sound attenuators.

3.3 CONNECTIONS

- In all cases, industry best practices shall be incorporated. Connections are to be made subject to the installation requirements shown above.
- Duct installation and connection requirements are specified in Division 23 of this document.
- Electrical installation requirements are specified in Division 26 of this document.
- All ductwork shall be designed, constructed, supported and sealed in accordance with SMACNA HVAC Duct Construction Standards and pressure classifications.
- 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 both sides of the insulation.

3.4 FIELD QUALITY CONTROL

- Contractor to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to Architect/Engineer in writing. Inspection must include a complete start up checklist to include (as a minimum) the following: Completed start up checklists as found in manufacturer's IOM.

3.5 START-UP SERVICE

- Contractor to perform startup service. Refer to Division 23 "Testing, Adjusting and Balancing" and comply with provisions therein. Refer to the manufacturer's installation, operation and maintenance IOM manual for startup procedure.
- Test and balancing may not begin until 100% of the installation is complete and fully functional. Refer to the manufacturer's installation, operation and maintenance IOM manual for a table and formula to correlate cross-core pressure measurements into an airflow through the core.

- Follow National Environmental Balancing Bureau (NEBB) air test and balance procedures specific to energy recovery devices. Provide balancing reports to owner's representatives.

3.6 DEMONSTRATION AND TRAINING

- Contractor to train owners or owner's maintenance personnel to adjust, operate and maintain the ERV. Refer to Division 01 Section Closeout Procedures and Demonstration and Training.

DUE TO CONTINUING PRODUCT DEVELOPMENT, SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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