SECTION 23 72 10 **–** ENERGY RECOVERY

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Work of this Section shall consist of the labor, materials and equipment required for installation of energy recovery equipment.

1.2 RELATED SECTIONS

A. Section 23 00 50, HVAC Basic Materials.

B. Section 23 05 48.13, Vibration Controls for HVAC.

C. Section 23 05 13, Common Motors Requirements for HVAC Equipment.

D. Section 23 09 10, Building Automation System.

E. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

1.3 SUBMITTALS

A. Submit for approval in accordance with specified submittal procedures:

1. Packaged Energy Recovery Ventilators

B. Manufacturer's published fan curve data shall be included with submittal data for energy recovery units. Fan curve information shall include operating point, RPM curve for operating point, minimum and maximum RPM curves for fan, system curve and brake horsepower curves. Tabular fan performance charts are not an acceptable substitute for fan curve data. Submittals for energy recovery equipment will be returned without Engineer's review if the fan curve data is not included with the submittal.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of air-handling units and components.

C. ARI Certification: Air-handling units and their components shall be factory tested according to ARI 430, "Central-Station Air-Handling Units," and shall be listed and labeled by ARI.

D. Fan ratings shall be AMCA certified.

1.5 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set for each air-handling unit.
2. Fan Belts: One set for each air-handling unit fan.

PART 2 - PRODUCTS

2.1 PACKAGED ENERGY RECOVERY VENTILATOR, TYPE ERV

A. Acceptable Manufacturer: Greenheck Fan Corp.(Basis of Design, Model ERV-20-15L) , or AAON, Ruskin, Munters.

B. General:

1. Listing: ANSI/UL 1995, Heating and Cooling Equipment.
2. Energy Transfer Ratings, Energy Recovery Wheel: ARI Certified.
3. Ventilators Certification: AMCA Certified Rating Seals for Air Performance.

C. Cabinet:

1. Material: Galvanized Steel.
2. Insulation: Manufacturer’s standard internal insulation, complying with ASHRAE 62.1.
3. Duct Connections: Extended collar or flange, or designated exterior cabinet surface, designed for attaching field-installed ductwork.
4. Mounting: Manufacturer-designed provisions for field installation.
5. Internal Access: Removable panels or hinged doors of adequate size for field access to internal components for inspection, cleaning, service, and replacement.

D. Energy Recovery Wheel:

1. Type: Enthalpy for both sensible and latent heat; designed to insure laminar flow. Energy recovery device shall transfer moisture entirely in the vapor phase.
2. Energy Transfer Ratings: ARI Certified to Standard 1060 and bear the ARI certification symbol for ARI Air-to Air Energy Recovery Ventilation Equipment Certification Program based on ARI 1060. Ratings “in accordance with 1060” without certification will not acceptable.
3. Desiccant: Silica gel with polymer media mounted in a stainless steel rotor for corrosion resistance. Wheels with sprayed on desiccant coatings or with desiccant applied after wheel formation will not be acceptable.
4. Wheel Design: Removable segments (for wheels greater than 26 inches in diameter) with silica gel desiccant permanently bonded to wheel media to retain latent heat recovery after cleaning.
5. Drive Belt: High strength urethane, factory installed in a pre-stretched state, eliminating the need for field belt tension adjustment. Link style belts will not be acceptable.
6. Frost Control: Factory programmed speed controller controlled by outdoor air temperature sensor and wheel pressure drop sensor to modulate wheel speed for frost control mode. Both sensors shall be satisfied to employ frost control.
7. Warranty: 5 years.

E. Fans:

1. Type: Centrifugal, double width, double inlet, single fan forward curved type.
2. Wheels: Statically and dynamically balanced.
3. Shafts and Bearings: Ground and polished steel shafts mounted in lubricated, sealed ball bearing pillow blocks with lubrication fittings. Bearings shall be selected for a minimum (L10) life in excess of 100,000 hours at a maximum cataloged operating speeds.
4. Separate motors for exhaust shall allow independent balancing of exhaust and supply airflows.
5. Speed controllers on direct-drive fans shall allow independent balancing of exhaust and supply airflows. Fan and motor assemblies shall be mounted to unit base with neoprene isolators.
6. Fans shall be located in draw-through position in reference to the energy recovery wheel.

F. Motors:

1. Type: Permanently lubricated, heavy duty type, matched to the fan. Refer to Section 23 05 05.
2. Mounting: Belt-drive motors factory mounted to an adjustable motor plate having two heavy-duty adjusting bolts for alignment and belt tension.
3. Drives: Sized for a minimum of 150% of driven horsepower. Pulleys shall be of the fully machined cast type, keyed and securely attached to the fan wheel and motor shafts; 10 horsepower and less shall be supplied with an adjustable drive pulley.

G. Filters:

1. Supply and Exhaust Air Filters: 2-inch thick pleated fiberglass, minimum MERV 8 (30-35% efficient) and tested to meet UL Class 2.
2. Filter Racks: Die-formed galvanized steel.

H. Dampers:

1. Insulated, low leakage type, opposed blade.
2. Installed on outside air intake and exhaust discharge.

I. Electrical:

1. All internal electrical components shall be factory wired for single point power connection.
2. All electrical components shall be UL Listed, Approved or Classified where applicable and wired in compliance with the National Electrical Code.
3. Factory mounted fused disconnect switch for power to units.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install energy recovery equipment in accordance with equipment manufacturer's recommendations. Submit manufacturer's printed installation instructions with operating and maintenance data at completion of Work.

B. Install units level to prohibit excessive vibration and insure longer life.

C. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fans have been test run under observation. Replace temporary filters used during construction with new, clean filters prior to start of air system testing and balancing.

3.2 FIELD QUALITY CONTROL

A. Upon completion of installation of units, and after motor has been energized with normal power source, perform the following tests and inspections with the assistance of a factory-authorized service representative to demonstrate compliance with requirements:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, make final alignments of pulleys and belt tension, and install belt guards.
5. Adjust damper linkages for proper damper operation.
6. Verify lubrication for bearings and other moving parts.
7. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.

B. See Section 23 05 93 for testing, adjusting, and balancing procedures.

1. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.
2. Prepare test and inspection reports.

C. Remove and replace malfunctioning units that cannot be satisfactorily corrected and retest as specified above.

END OF SECTION