PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Heat wheels.
2. Packaged energy recovery units.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. LEED Submittals:

1. Product Data for Credit EA 4: Documentation required by Credit EA 4 indicating that equipment and refrigerants comply.
2. Product Data for Prerequisite EQ 1: Documentation indicating that units comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."

C. Shop Drawings: For air-to-air energy recovery equipment. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.
3. Detail fabrication and assembly of air-to-air energy recovery equipment.
4. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

D. Coordination Drawings: Plans, elevations, and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Structural members to which equipment or suspension systems will be attached.

E. Field quality-control reports.

F. Operation and Maintenance Data: For air-to-air energy recovery equipment to include in maintenance manuals.

1.05 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. ARI Compliance:

1. Capacity ratings for air-to-air energy recovery equipment shall comply with ARI 1060, "Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment."

C. ASHRAE Compliance:

1. Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

D. NRCA Compliance: Roof curbs for roof-mounted equipment shall be constructed according to recommendations of NRCA.

E. UL Compliance:

1. Packaged heat recovery ventilators shall comply with requirements in UL 1812, "Ducted Heat Recovery Ventilators"; or UL 1815, "Nonducted Heat Recovery Ventilators."

1.06 COORDINATION

A. Coordinate layout and installation of air-to-air energy recovery equipment and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.07 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of air-to-air energy recovery equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Packaged Energy Recovery Units: 18 Months.
2. Warranty Period for Heat Wheels: 5 Years.

1.08 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 of each type of filter specified.
2. Fan Belts: One set of belts for each belt-driven fan in energy recovery units.
3. Wheel Belts: One set of belts for each heat wheel.

PART 2 - PRODUCTS

2.01 HEAT WHEELS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Advanced Thermal Technologies.
2. Airxchange Inc.
3. American Energy Exchange, Inc.
4. Loren Cook Company.
5. SEMCO Incorporated.
6. Trane; American Standard Companies, Inc.

B. Rotor: Aluminum segmented wheel strengthened with radial spokes, with nontoxic, noncorrosive, desiccant coating.

1. Maximum Dry Solid Size for Media to Pass: 600 micrometer.

C. Drive: Fractional horsepower motor and gear reducer, and self-adjusting multilink belt around outside of rotor.

1. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
2. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

D. Controls:

1. Starting relay, factory mounted and wired, and manual motor starter for field wiring.
2. Pilot-Light Indicator: Display rotor rotation and speed.
3. Speed Settings: Adjustable settings for maximum and minimum rotor speed limits.

2.02 PACKAGED ENERGY RECOVERY UNITS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Advanced Thermal Technologies.
2. American Energy Exchange, Inc.
3. Applied Air; Mestek Technology, Inc.
4. Carnes.
5. Des Champs Technologies.
6. Engineered Air.
7. Fairchild Industrial Products Company.
8. Gaylord Industries, Inc.
9. Greenheck Fan Corporation.
10. Loren Cook Company.
11. Mitsubishi Electric & Electronics USA, Inc.; HVAC Advanced Products Division.
12. Mitsubishi Electric Sales Canada Inc.
13. RenewAire LLC.
14. SEMCO Incorporated.

15. Trane; American Standard Companies, Inc.
16. Venmar CES Inc.
17. Wing, L. J.; Mestek Technology, Inc.

B. Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

C. Housing: Manufacturer's standard construction with corrosion-protection coating and exterior finish, hinged access doors with neoprene gaskets for inspection and access to internal parts, minimum ½ - inch thick thermal insulation, knockouts for electrical and piping connections, exterior drain connection, and lifting lugs.

1. Inlet: Weatherproof hood, with damper for exhaust and supply.

   a. Exhaust: Gravity backdraft damper.
   b. Supply: Spring-return, two-position, motor-operated damper.

2. Roof Curb: Factory Fabricated; Refer to Division 07 Section "Roof Accessories" for roof curbs and equipment supports.

D. Heat Recovery Device: Heat wheel.

E. Supply and Exhaust Fans: Forward-curved, centrifugal fan.

1. Motor and Drive: Drive type indicated on Drawings.
2. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
3. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
4. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 26 Sections.
5. Spring isolators on each fan having 1-inch (25-mm) static deflection.

F. Permanent Filters:

1. Comply with UL Class 2.
2. Thickness: 1 inch (25 mm).
3. Media: Aluminum, washable type.
4. Mounting: Located at outside air hood and in the return air plenums.

G. Wiring: Fabricate units with space within housing for electrical conduits. Wire motors and controls so only external connections are required during installation.

1. Outdoor Enclosure: NEMA 250, Type 3R enclosure contains relays, starters, and terminal strip.
2. Include nonfused disconnect switches.

H. Accessories:

1. Roof Curb: Galvanized steel with gasketing, and factory-installed wood nailer; complying with NRCA standards; minimum height of 14 inches (350 mm).
2. Intake weather hood with 2-inch- (50-mm-) thick filters.
3. Exhaust weather hood with birdscreen.
4. Isolation Dampers: Opposed-blade, aluminum dampers with cadmium-plated steel operating rods rotating in sintered bronze or nylon bearings mounted in a single aluminum

frame with operating rods connected with a common linkage, and electric damper operator factory wired. Blades shall have gaskets and edge seals, and shall be mechanically fastened to operating rod.

5. Duct flanges.
6. Hinged access doors with quarter-turn latches.
7. Drain pans for condensate removal.
8. Automatic, in-place, spray-wash system.
9. Weatherproofing for tilt-control system.

2.06 CONTROLS

A. Time Clock: Solid-state, programmable, microprocessor-based unit for mounting in outdoor NEMA 250, Type 3R enclosure with up to eight on/off cycles per day and battery backup protection of program settings against power failure to energize unit.

2.07 CAPACITIES AND CHARACTERISTICS: Refer to Equipment Schedule on Plan Drawings

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine casing insulation materials and filter media before air-to-air energy recovery equipment installation. Reject insulation materials and filter media that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for electrical services to verify actual locations of connections before installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install heat wheels so supply and exhaust airstreams flow in opposite directions and rotation is away from exhaust side to purge section to supply side.

1. Install access doors in both supply and exhaust ducts, both upstream and downstream, for access to wheel surfaces, drive motor, and seals.
2. Access doors and panels are specified in Division 23 Section "Air Duct Accessories."

B. Roof Curb: Install on roof structure or concrete base, level and secure, according to ARI Guideline B. Install air-to-air energy recovery equipment on curbs and coordinate roof penetrations and flashing with roof construction specified in Division 07 Section "Roof Accessories." Secure air-to-air energy recovery equipment to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts.

C. Install wind restraints according to manufacturers' written instructions.

D. Install units with clearances for service and maintenance.

E. Install new filters at completion of equipment installation and before testing, adjusting, and balancing.

3.03 CONNECTIONS

A. Comply with requirements for ductwork specified in Division 23 Section "Metal Ducts."

B. Electrical Connections: Comply with applicable requirements in Division 26 Sections.

1. Install electrical devices furnished with units but not factory mounted.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Adjust seals and purge.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
4. Set initial temperature and humidity set points.
5. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

D. Air-to-air energy recovery equipment will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.05 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air-to-air energy recovery units.

****END OF SECTION****