1. GENERAL

1.01 SECTION INCLUDES

.1 Energy Recovery Ventilators.

1.02 SUBMITTALS

.1 Submit shop drawings/product data sheets for heat recovery ventilators, including accessories, and all required power and control wiring schematics.

1.03 CLOSEOUT SUBMITTALS

.1 Submit with delivery of each unit a copy of the factory inspection report, and include a copy of each report with O&M Manual project close-out data.

.2 Submit a site inspection and start-up report from manufacturer's representative as specified in Part 3 of this section.

.3 Submit a signed extended warranty direct from manufacturer to Owner covering the energy recovery wheel from material and workmanship defects for an additional 4 years after Contract warranty expires.

.4 Training attendance records.

1.04 MAINTENANCE MATERIAL SUBMITTALS

.1 Supply a spare filter set for each ventilator and store at site where directed prior to Substantial Performance of the Work.

1.05 COORDINATION

.1 Supply reviewed copies of ventilator/curb assembly shop drawings or product data to trade who will cut roof openings for ventilators, and ensure openings are properly located.

1.06 QUALITY ASSURANCE

.1 Energy recovery ventilator manufacturers are to be current members of Air Movement and Control Association International Inc. (AMCA), and fans are to be rated (capacity and sound performance) and certified in accordance with requirements of following standards:

.1 ANSI/AMCA Standard 210, Laboratory Method of Testing Fans for Certified Aerodynamic Performance Rating;

.2 AMCA Standard 211, Product Rating Manual for Fan Air Performance;

.3 ANSI/AMCA Standard 300, Reverberant Room Method for Sound Testing of Fans;

.4 AMCA Standard 311, Product Rating Manual for Fan Sound Performance;

.5 AMCA Standard 99-2408, Operating Limits for Centrifugal Fans;

.6 AHRI Standard 1060, Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment;

.7 ASHRAE 84, Method of Testing Air-to-Air Heat/Energy Exchangers;

.8 UL 1812, Ducted Heat Recovery Ventilators;

.9 CSA or ETL certification for all electrical components.

2. PRODUCTS

2.01 MANUFACTURERS

.1 Greenheck Fan Corp.;

.2 Venmar CES Inc.;

.3 Summeraire Manufacturing;

.4 Carrier Corp.

.5 Lifebreath

.6 Reversomatic Manufacturing Ltd.

.7 RenewAire

.8 Panasonic

2.02 ENERGY RECOVERY VENTILATORS

.1 Factory assembled, internally wired heat recovery ventilators in accordance with drawing schedule, and with AHRI certified energy recovery ratings.

.2 Interior Unit Casings and Frame: Internal frame type casing constructed of heavy-gauge G90 galvanized sheet steel with interior surfaces lined with 25 mm (1") thick, 24 kg/m³ (1-½ lb./ft.³) density coated glass fibre duct lining material meeting 25/50 flame spread/smoke developed ratings when tested in accordance with CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies, and installed with all

exposed edges tucked under flanges. Additional features and requirements as follows:

.1 casings complete with factory sealed metal-to-metal joints, a solid integral base with up-turned lips around bottom openings, separate openings and knock-outs for power and control wiring conduit connections, top panels, where joints are required, are to be equipped with a standing seam, and all metal exposed to weather is to be factory cleaned, primed, and finished with baked enamel;

.2 removable gasketed panels or hinged gasketed access doors provided for access to all interior components;

.3 stainless steel drain pan pitched for positive drainage and equipped with captive condensate drain pipe connection.

.3 Exterior Unit Casings and Frame: Internal frame type double wall weather-proof casing constructed of heavy-gauge G90 galvanized sheet steel, minimum #18 gauge for exterior panels, minimum #24 gauge with interior panels, with 25 mm (1") thick, 24 kg/m³ (1-½ lb./ft.³) density coated glass fibre insulation material meeting 25/50 flame spread/smoke developed ratings when tested in accordance with CAN/ULC S102, Surface Burning Characteristics of Building Materials and Assemblies and secured in place between panels such that it will not sag. Additional features and requirements as follows:

.1 weather-tight casings, complete with factory sealed metal-to-metal joints, a solid integral base with up-turned lips around bottom openings, and separate openings and knock-outs for power and control wiring conduit connections;

.2 removable gasketed panels or hinged gasketed access doors provided for access to all interior components;

.3 stainless steel drain pan pitched for positive drainage and equipped with captive condensate drain pipe connection;

.4 downturned design air intake and exhaust hoods constructed and factory finished as for casings, each with an "A" water penetration classification rating up to 200 mm/hr (8"/hr) rainfall at 22 m/s (50 mph) when tested in accordance with AMCA Standard L-500, and washable aluminium mesh pre-filters;

.5 minimum 200 mm (8") high, full perimeter, galvanized steel insulated roof curb supplied loose with each unit for field assembly, consisting of die-formed sections with gasket material for installation between curb and unit base.

.4 Enthalpy type energy recovery wheel for both sensible and latent heat recovery, designed to ensure laminar air flow, with energy transfer ratings in accordance with ASHRAE 84 and AHRI certified to AHRI 1060, designed to transfer moisture entirely in vapour phase, consisting of removable segments for larger wheels, and complete with:

.1 silica gel desiccant permanently bonded to lightweight polymer media mounted in a stainless steel rotor;

.2 bearings selected for a minimum L-10 life in excess of 400,000 hours;

.3 high-strength urethane drive belt factory installed in a pre-stretched state, and a motor conforming to requirements specified in Section 20 05 00 – Common Work Results for Mechanical;

.4 frost control protection with an electric pre-heater.

.5 Enthalpy core shall be of total enthalpy and shall be removable from the cabinet. The core media shall be a corrugated fiber membrane in a galvanized steel framework and can be removable for servicing. Performance criteria are to be as specified in AHRI Standard 1060. Core shall be complete with:

.1 a galvanized steel framework (designed to produce laminar air flow through the core)

.2 frost control protection in the form of timed exhaust. Control system shall include an outdoor air thermostat to initiate frost control sequence.

.3 a five-year warranty.

.6 Dampers: Backdraft dampers for the discharge air streams shall be factory installed.

.7 Disposable glass fibre media filters, ULC listed Class 2, side removable, 50 mm (2") thick, pleated, MERV 8 rating, factory or field installed in a die-formed galvanized steel filter rack at air intake opening.

.8 Centrifugal, draw-through within reference to the energy recovery wheel, double width and inlet exhaust and supply fans with forward curved blades, belt driven or direct driven as indicated, statically and dynamically balanced, mounted to unit base with neoprene vibration isolation, and equipped with:

.1 ground and polished steel fan shafts mounted in permanently lubricated sealed ball bearing pillow blocks selected for a minimum L-10 life in excess of 200,00 hours at maximum operating speed;

.2 motors and where indicated, belt drives conforming to requirements specified in Section 20 05 00 – Common Work Results for Mechanical.

.9 Each ventilator is to be equipped with a sealed and factory pre-wired control box containing terminal blocks for power and control wiring connections, integral door interlocking disconnect switch, an overload protected contactor for each motor, fuses, and 24 VAC secondary control transformer.

.10 Control system in accordance with drawing control schematic/sequence, and to include if indicated, all required hardware and circuitry for connection into building automation system using protocol as specified with the system.

.11 Factory supplied, mounted, and wired variable frequency drives conforming to requirements of Section 20 05 13.13 - Variable Frequency Drives for Mechanical Equipment.

.12 Auxiliary coil(s) rated and certified in accordance with AHRI Standard 410, Forced-Circulation Air-Cooling and Air-Heating Coils, drainable, designed and constructed to meet requirements of the ASME Code Category "H" as a registered fitting, and complete with a CRN. Coil data, performance, and specific features not specified below are to be in accordance with drawing detail. Each coil is to be complete with:

.1 slide in/slide out galvanized steel mounting framework;

.2 16 mm (5/8") O.D. seamless copper tubes with 1.24 mm (1/16") thick tube walls;

.3 aluminum fins mechanically bonded to tubes;

.4 welded Schedule 40 ASTM A53 seamless steel pipe headers with same end supply and return connections, and 9.5 mm (3/8") tappings for an air vent and a drain valve;

.5 flanged #14 gauge type 304 stainless steel casing designed to drain off standing water;

.6 for cooling coils only, an insulated stainless steel drain pan sloped for positive drainage from all points and equipped with a captive drain pipe connection coupling.

.13 Factory secured seismic restraint connection hardware.

.14 Factory assembled, internally wired heat recovery ventilators in accordance with drawing schedule, and with AHRI certified energy recovery ratings.

.15 Casing: Formed single wall insulated metal cabinet, fabricated to permit access to internal components for maintenance. Access door shall provide easy access to blowers, core, and filters. Access door shall be hinged with airtight closed cell foam gaskets.

.16 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.

.17 Heat Exchanger Core: Fixed-plate cross-flow construction, with no moving parts. Core shall be designed and constructed to permit cleaning and removal for servicing.

.18 Motor: High efficiency, variable speed motor to allow for multiple fan speeds

.19 Filters: MERV-8 rated, spun polyester, disposable filter in both airstreams

.20 Control system in accordance with drawing control schematic/sequence, The unit shall be capable of operating continuously or intermittently at the low airflow (adj.) setting with the ability to go temporarily to the high airflow (adj.).

.21 Frost Control: Core shall have a means of preventing the buildup of excess frost within unit

3. EXECUTION

3.01 INSTALLATION

.1 Provide heat recovery ventilators.

.2 For suspended units, provide galvanized steel mounting brackets with vibration isolators and suspend each unit, level, and plumb, by means of hanger rods. Provide supplementary support steel as required.

.3 Secure each indoor floor mounted ventilator in place, level and plumb, on neoprene-steel-neoprene vibration isolation pads on a concrete housekeeping pad.

.4 Supply an assembled roof curb for each outdoor roof mounted ventilator and hand to roof trade at site on roof. Carefully locate and size roof openings. Provide gasket material supplied with curb on perimeter of curb and secure ventilator in place.

.5 Brace and secure each unit in accordance with requirements specified in Section 20 05 48.16 - Seismic Controls for Mechanical Systems.

.6 For ventilators with auxiliary hydronic coils, connect each coil to system valved hydronic piping with flexible connectors in accordance with Section 23 21 00 - Hydronic Piping and Pumps. Provide trapped condensate drainage piping connection to cooling coil condensate drain pans in accordance with Section 22 13 00 – Facility Sanitary Sewerage.

.7 Coordinate power wiring connection and provision of a disconnect switch for each ventilator in accordance with electrical work Specification where power wiring is specified.

.8 Use factory supplied mounting flange to mount the unit per manufacturer's installation manuals to a structurally suitable surface. Provide service clearances as indicated in manufacturer's installation manual.

3.02 SYSTEM STARTUP

.1 For equipment/system manufacturer certification requirements, refer to Section 20 05 00 – Common Work Results for Mechanical.

.2 For equipment/system start-up requirements, refer to Section 20 05 00 – Common Work Results for Mechanical.

3.03 CLOSEOUT ACTIVITIES

.1 Include for a ½ day on-site heat recovery ventilator operation demonstration and training session. Training is to be a full review of all components including, but not limited to, a full heat recovery ventilator internal inspection, construction details, operation, maintenance, abnormal events, and setting up controls.

End of Section