

- 1 General
  - 1.1 **SUMMARY**
    - .1 Section Includes
      - .1 Labour, Products, equipment and services necessary to complete the Work of this section.
      - .2 Section includes, but is not necessarily limited to, the following:
        - .1 Thermal heat wheel, complete with variable frequency drive (where mentioned), rotation detection system, and temperature control system.
        - .2 Energy Recovery Core Heat Exchanger
  - 1.2 **SUBMITTALS**
    - .1 Shop Drawings
      - .1 Submit Shop Drawings in accordance with Section 01 33 00.
      - .2 Submit the following Product specific information:
        - .1 Manufacturers certified data sheets for unit capacity and rating method.
        - .2 Manufacturer's piping and wiring diagrams.
        - .3 Written verification confirming internal pore diameter distribution in desiccant limits absorption to materials with critical diameters less than or equal to that of water molecule (2.8 angstroms).
    - .2 Operation and Maintenance Data.
      - .1 Submit printed operating instructions and maintenance data in accordance with Section 01 33 00.
- 2 Products
  - 2.1 **ENTHALPY CORE RECOVERY UNIT**
    - .1 General
      - .1 Performance as shown on equipment schedules.
      - .2 Ventilation Type: Static plate, heat and humidity transfer.
      - .3 Unit shall be HVI Tested and Certified per CSA C439 Protocol.
      - .4 It 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.

.2 Unit Cabinet

- .1 Materials: Formed single wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.
- .2 The energy recovery component shall be of fixed-plate cross-flow construction, with no moving parts.
- .3 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.
- .4 Outside casing: Shall be constructed of 22-gauge steel, with lapped corners and zinc-plated screw fasteners. The case shall be finished with smooth pre-painted or powder coat white paint.
- .5 Case walls and doors shall be fully insulated with 1", expanded polystyrene foam insulation faced with a cleanable foil face on all exposed surfaces.
- .6 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.
- .7 The ERV shall have locking door hinges so that the ERV can be installed in multiple orientations.
- .8 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.
- .9 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.
- .10 Unit shall have factory-supplied 6"/8" duct collars for easy installation of ductwork to the unit.
- .11 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.

.3 Blower Section

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

- .4 Motors
    - .1 The supply and exhaust fans shall be electronically commutated (EC) motors with multispeed capability as standard offering.
  - .5 Unit Control
    - .1 Unit shall have the capacity to operate continuously without the need for bypass, recirculation, pre-heaters, or defrost cycles under normal operating conditions.
    - .2 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.
    - .3 The unit shall have an internal 24VAC transformer and relay.
    - .4 The ERV shall be capable of going into low or high airflow mode by any of the following methods.
      - .1 Occupancy Sensor
      - .2 Carbon Dioxide Sensor
      - .3 Boost Mode push button switch
      - .4 Proportional Run Time Controller
  - .6 Filter Section
    - .1 The ERV cores shall be protected by a MERV 8 rated, spun polyester, disposable filter in both airstreams.
    - .2 ERV shall have the capability to incorporate an optional 1" thick MERV 13 disposable pleated filters located in the outdoor air airstream.
    - .3 All filters shall be accessible from the exterior of the unit.
  - .2 Acceptable Manufacturers
    - .1 Renewaire
    - .2 Lifebreath
    - .3 Or Approved Equal
- 2.2 **CONTROL AND MONITORING SYSTEMS (*FUTURE* BAS INTEGRATION)**
- .1 Any vendors that are authorized dealers or distributors of the following control systems are acceptable:
    - .1 Delta Controls
    - .2 Reliable Controls
    - .3 Schneider Electric SmartX Series
    - .4 Distech Controls

- .5 Johnson Controls Facility Explorer
- .6 Honeywell CIPer series, Spyder Models 5 or 7
- .2 BAS System Integration:
  - .1 All control systems must be integrated to the City's J2 Innovations Fluid Integration (FIN) serve, including but not limited to the following:
    - .1 Graphical user interface (monitoring and control)
    - .2 Alarming
    - .3 Data Trending
    - .4 Data Archiving
    - .5 Project Haystack naming convention
  - .2 The installer must be licensed by J2 Innovations to sell, install, program and configure Fluid INtegration (FIN).
  - .3 Building Controllers (BC) must be Tridium Niagara JACE with the Haystack module and driver. The installer must be a licensed Tridium system integrator for any Tridium BCs or embedded or edge Niagara Framework products used. Soft JACE is not accepted.
- .3 Licensing Requirements
  - .1 Licenses shall be provided to and in the name of the City of Toronto.
  - .2 Licenses shall be perpetual, transferrable, assignable and royalty free.
  - .3 **Tridium Licenses shall allow all workbench/supervisor brands complete system access and functionality.**
- .4 **Installer and Manufacturer Qualifications**
  - .1 **Installer shall have an established working relationship with Control System Manufacturer.**
  - .2 **Installer shall have successfully completed control system's control system training. Upon request, installer shall present record of completed training including course outlines.**
  - .3 **It is the intent of these specifications to define an open protocol state-of-the-art distributed computerized Building Management and Control System, which is user friendly, has known reliability, is extremely responsive, and which is to be designed, installed, implemented, and supported by a local office of approved bidders.**
  - .4 **BAS Contractor provides three locations for successful installations of similar open protocol computer-based systems. Sites provided must consist of more than 150 hardware inputs/outputs. Project sites must be local to the location of this project.**

3 Execution

3.1 **EXAMINATION**

1. 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.
2. Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. See unit IOM.
3. Proceed with installation only after all unsatisfactory conditions have been corrected.

.1 Installation

- .1 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.
- .2 Install unit with clearances for service and maintenance.
- .3 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.
- .4 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.
- .5 If vibration isolation is required, utilize factory provided springs as necessary to help provide vibration isolation for the unit.
- .6 Provide flexible duct connections at unit duct flanges.
- .7 To control sound radiated from the unit:
- .8 Provide acoustic treatment in mechanical room walls and ceilings.
- .9 To control sound associated with the two blower outlets:
- .10 Utilize insulated, flexible duct.
- .11 In sound critical applications provide increased duct sizing and consider the use of sound attenuator

.2 Connections

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

- .5 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 Field Quality Control
  - .1 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.
- .4 Start-Up Service
  - .1 Contractor to perform start up 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 start up procedure.
  - .2 Test and balancing may not begin until 100% of the installation is complete and fully functional.
  - .3 Follow National Environmental Balancing Bureau (NEBB) air test and balance procedures specific to energy recovery devices. Provide balancing reports to owner's representatives.
- .5 Demonstration and Training
  - .1 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.

End Of Section