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**Product specifications for Ventacity Systems model VS1000 RT packaged rooftop heat recovery ventilator for indoor or outdoor installation**

**CSI MasterFormat Category 23-72-00**

**Part 1 – GENERAL**

**1.01 SUMMARY**

- A. Packaged air-to-air heat recovery ventilation units (HRV) including
  - 1. Frame
  - 2. Case
  - 3. Fans
  - 4. Counter flow fixed plate exchanger
  - 5. Filters
  - 6. Dampers
  - 7. Electrical wiring and controls
  - 8. Service accessories

**1.02 RELATED SECTIONS**

- A. Related CSI MasterFormat sections include:
  - 1. Division 1 Plumbing
  - 2. Division 27 Electrical
  - 3. Section 23 01 00 Operation and Maintenance of HVAC Systems
  - 3. Section 23 05 00 Common Work Results for HVAC
  - 4. Section 23 07 00 HVAC Insulation
  - 5. Section 23 08 00 Commissioning of HVAC
  - 6. Section 23 09 00 Instrumentation and Control for HVAC
  - 7. Section 23 31 00 HVAC Ductwork and Casings
  - 8. Section 23 33 00 Air Duct Accessories

**1.03 SUBMITTALS**

- A. For each model, submit under the provisions of Division 01 – General Requirements.
- B. Product data, Submittal shall include the following:
  - 1. Supply and exhaust fan performance curves
  - 2. Heat recovery exchanger performance curves for summer and winter conditions
  - 3. Motor and fan types
  - 4. Electrical characteristics
  - 5. Gross weight of complete unit
  - 6. Dimensional drawings of each unit including ductwork connections
  - 7. Casework type, metal thickness, and insulation type and thickness
  - 8. Quality Assurance compliance documentation

## 9. Installation, Operation, and Maintenance Manual

#### **1.04 QUALITY ASSURANCE**

A. Manufacturer Qualifications:

1. Manufacturer shall regularly engage in the production of heat recovery ventilation equipment.

B. Product Certifications:

1. Whole unit shall be third-party tested and certified to comply with UL 1812 and CSA C22.2 No. 113.
2. Unit shall be certified by the Passive House Institute with a minimum heat recovery efficiency of 82%.

C. Warranty:

1. The heat recovery core shall be warranted against any manufacturing defects or improper workmanship under normal usage for a period of ten years from the unit's date code.
2. The complete heat recovery ventilator shall be warranted against any manufacturing defects or improper workmanship for a period of two years from the date of installation.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store in manufacturer's packaging. Upon delivery confirm all components are present and undamaged by shipping. Products to be installed indoors shall be stored in a dry heated location.

#### **1.06 COORDINATION**

- A. Coordinate any required building penetrations for proper size and location with appropriate trades.
- B. Coordinate associated plumbing, electrical and roofing systems for installation.
- C. Coordinate proper sequencing of construction with all associated trades.

#### **1.07 EXTRA MATERIALS**

- A. Provide one set of replacement filters, MERV 13 on intake air stream, MERV 8 on return air stream

### **PART 2 – PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Acceptable Manufacturer: Ventacity Systems Inc, Portland OR [www.ventacity.com](http://www.ventacity.com) 503-208-7331
- B. Substitutions: Equipment with equivalent performance, construction, and certifications to the specified products are acceptable subject to approval by the engineers

#### **2.02 GENERAL**

- A. Construction: HRV shall be a prepackaged unit that is fully assembled at the factory and shall include: insulated double wall metal cabinet, rain louvers, motorized intake and exhaust dampers, counter flow fixed plate heat recovery core, ECM motors, direct drive fan assemblies, frost control pre-heater assembly, modulating bypass damper assembly, intake air and return air filter assemblies, temperature and pressure sensors, and control panel assembly. All components to be

factory tested and powered by a single electrical connection.

B. Name Plates: Provide permanent nameplate containing manufacturer name, model number, serial number, voltage, FCA and MCA information.

C. Weight: Unit weight shall not exceed 620 lbs.

### **2.03 CABINET**

A. Cabinet shall be constructed of double-wall insulated panels with thermal breaks to minimize thermal Bridging.

1. Panels shall be constructed of 0.31" to 0.8" thick galvanized steel. Exterior wall shall be powder coated.
2. Insulation should be 2-inch thick of rigid thermoset with 0.013 BTU/(hr-ft-°F) thermal conductivity. Side panels shall also have 0.5" thick K-Flex Eco insulation.
3. Panels shall be attached with M8 SHCS fasteners.
4. Panels shall be sealed and thermally broken with Soft Polyethylene seals, K-Flex Eco, and Poron UL50E periodic recompression rated gasket material.
5. Air intake and exhaust locations shall be protected from water infiltration by integrated louvers constructed of 0.3" thick powder coated galvanized steel with a blade angle of 35 degrees with a secondary 1" 60 degree turn-down lip.
6. Supply air and return air shall be configurable for down or end ducting connections.

B. Doors and access panels shall be constructed of the same materials as the panels

1. Doors and access panels shall allow for all routine maintenance and repairs.
2. Filters shall be accessible for filter changes through a latched and hinged door.
3. Doors and access panels shall be sealed for air tightness with K-Flex Eco, and Poron UL50E periodic recompression rated gasket material.

### **2.04 FANS**

A. Fans shall be electronically commutated motor (ECM) integrated direct-drive fan & motor assemblies by EBM Pabst.

1. Fan assemblies shall be approved by UL 2111 and CSA C22.2 No. 77
2. Motors shall be protection class 1 with internally wired thermal overload protector.
3. Motors shall be variable speed.
4. Motors shall have sealed ball bearings for maintenance free operation.
5. Impellers shall be backwardly curved centrifugal assemblies with factory balancing.
6. Impellers shall be constructed of polypropylene plastic.
7. Each airstream shall have an independently controlled fan/motor assembly.
8. Fans shall be mounted downstream of the heat recovery core.

### **2.05 HEAT RECOVERY CORE**

A. Heat exchange core shall be of fixed plate parallel counter flow design.

1. Core construction shall be of aluminum plates with 1,500 square feet of surface area.
2. Core shall be removable for cleaning and maintenance.
3. Core shall be gasketed for air sealing to prevent cross-flow contamination with soft polyethylene seal material.
4. Core shall be protected from freezing and frost build-up with a factory installed 6kW modulating electric resistance preheater located in the intake air stream and controlled by the exhaust air temperature. Return air bypass through the core and into the supply

air stream for frost protection is not allowed.

## 2.06 POWER AND CONTROLS

### A. Power:

1. Unit shall be powered by *choose one* (240 VAC, single phase, 60 Hz power) (208/240 VAC, three phase, 60 Hz power)
2. Provide a NEMA 3R Rainproof fused interrupt box type of disconnect switch rated for *choose one* (240 VAC, single phase, 60 Hz power)
3. Unit shall be powered with a single point field connection to power supply.

### B. Controls:

1. The HRV shall have the ability to be controlled by a factory provided control system or be able to be monitored and controlled by a building management system (BMS).
2. The HRV shall be provided with a factory controls interface panel for remote control and operation of the unit pre-wired to the HRV.
3. The control system shall be able to connect to a BMS through Modbus RTU connection protocols.

### C. Sensors: The following sensors shall be included in the HRV:

1. Temperature sensors located in each airstream
2. Pressure sensors located on both sides of each filter, on the inlet and outlet of each fan, in the supply airstream, and outside of the HRV casing.
3. Safety disconnect sensor in the outside air pre-heater
4. *Optional sensors, choose* (Room CO2) (Duct CO2) (Room Relative Humidity) (Occupancy)

## 2.07 DAMPERS

### A. Bypass damper: The HRV shall have a fully modulating bypass damper assembly to close off intake air through the core and direct it around the core to the supply air side.

1. The damper opening bypass chamber shall be interlinked to the damper closing airflow through the core.
2. The dampers shall be constructed of double-wall 14 gage galvanized sheet metal.
3. The damper blades shall be air sealed upon closing with polymer extrusion blade seals
4. The damper actuator shall be fully modulating with a closing torque of 17.5 in-lb (2 N-m).

### B. Intake and exhaust dampers: The HRV shall include integrated dampers on the intake and exhaust to close these openings for stand-by mode operation or when the unit is powered off.

1. The dampers shall be motorized two-position parallel blade dampers.
2. Upon start-up, the dampers shall open before the fans operate.
3. The dampers shall automatically close in the event of loss of power to the HRV.
4. The dampers shall be constructed of double wall extruded aluminum.
5. The damper blades shall be air sealed upon closing with polymer extrusion blade seals
6. The damper actuator shall have a closing torque of 17.5 in-lb (2 N-m).

## 2.08 FILTERS

### A. Filter Racks:

1. Filter racks shall be constructed of 0.031" thick galvanized steel designed to hold a 2" thick return filter and 4" thick supply filter.
2. Filter racks shall be accessible for changing filters through a latched access door.

B. Filters:

1. The outdoor air shall be filtered with a 4" thick mini-pleat MERV 13 filter.
2. The return air shall be filtered with a 2" thick pleated MERV 8 filter.
3. The HRV shall have one set of filters pre-installed in the factory.
4. Contractor shall provide one set of replacement filters.

## **2.09 VIBRATION ISOLATION**

- A. Mount the HRV onto Curb or stand using a gasket of neoprene material 0.5" thickness and 1.25" width for whole unit vibration protection.
- B. Connect supply and return ductwork to the HRV using flexible connections for vibration isolation.

## **PART 3 – EXECUTION**

### **3.01 EXAMINATION**

- A. Verification of conditions:
  1. Prior to installation, examine installation site to verify that location is accurate, ductwork penetrations (if required) are correctly sized and located and the roof curb or stand is correct. Consult units IOM to verify correct conditions for installation.
  2. Verify that electrical rough-in is of the proper size and location for the unit. Consult unit IOM for requirements.
  3. Verify that any plumbing rough-in required for condensate routing is of the proper size and location. Consult unit IOM for requirements.
  4. Proceed with installation only once any deficiencies in conditions have been rectified.

### **3.02 INSTALLATION**

- A. Installation shall be performed in accordance with these specifications, engineered mechanical drawings, manufacturer's instructions in the unit IOM, local building code and trade best practices.

### **3.03 CLEANING**

- A. Clean all filters, air chambers, interior exposed surfaces and exterior faces. Ensure that any loose materials shipped with unit have been removed from the inside. All cleaning must take place prior to commissioning of the unit.

### **3.04 SYSTEM START-UP**

- A. Retain a manufacturer's authorized representative to provide start-up service and commissioning of the HRV. Coordinate with controls commissioning and air flow testing and balancing as necessary.

