

## **GUIDE SPECIFICATION**

*Specifier Notes: This guide specification is written in Construction Specifications Institute (CSI) 3-Part Format in accordance with the CSI Construction Specifications Practice Guide, MasterFormat, SectionFormat, and PageFormat.*

*Specifier Notes: This Section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the Project and local building code. Coordinate this Section with Division 01, other specification sections, and the Drawings. Delete all Specifier Notes after editing this Section.*

*Section numbers and titles are based on MasterFormat 2016 Update.*

## **SECTION 23 57 00**

### **HEAT EXCHANGERS FOR HVAC**

*Specifier Notes: This Section covers Greentek's SOLACE series of Heat Recovery Ventilators. Consult Greentek for assistance in editing this Section as required for the Project.*

#### **PART 1. GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Heat Recovery Ventilators

##### **1.2 RELATED REQUIREMENTS**

*Specifier Notes: Edit the following list of related sections as required for the Project. Limit the list to sections with specific information that the reader might expect to find in this Section but is specified elsewhere.*

- A. Section 23 08 00 – Commissioning of HVAC

##### **1.3 REFERENCE STANDARDS**

*Specifier Notes: List reference standards used elsewhere in this Section, complete with designations and titles. Delete reference standards from the following list not used in the edited Section.*

- A. CSA C22.2, No. 113 – Fans and Ventilators
- B. CSA C439 – Laboratory Methods of Test for Rating the Performance of Heat/Energy-Recovery Ventilators
- C. CSA F326 – Residential Mechanical Ventilation Systems
- D. ENERGY STAR® – Heat/Energy Recovery Ventilators (HRV/ERV)
- E. IEC 60529 – Ingress Protection Test Standard
- F. ISO 9001:2015 – Quality Management Systems – Requirements
- G. NFPA 70 – National Electrical Code (NEC)
- H. UL900 – Standard for Air Filter Units
- I. UL1004 – Standard for Safety Electric Motors
- J. UL1812 – Standard for Ducted Heat Recovery Ventilators

#### **1.4 PREINSTALLATION MEETINGS**

*Specifier Notes: Edit the Preinstallation Meetings article as required for the Project. Delete article if not required.*

- A. Convene preinstallation meeting [1 week] [2 weeks] before start of Work of this Section.
- B. Require attendance of parties directly affecting Work of this Section, including Contractor, Architect, installer, and manufacturer's representative.
- C. Review the Following:
  - a. Materials
  - b. Installation
  - c. Adjusting
  - d. Protection
  - e. Coordination with other Work

#### **1.5 SUBMITTALS**

*Specifier Notes: Edit the Submittals article as required for the Project. Delete submittals not required.*

- A. Comply with Division 01.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details.
  - a. Wiring Diagrams: Indicate wiring for each item of equipment and interconnections between items of equipment.
  - b. Include manufacturer's names, model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
- D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- E. Operation and Maintenance Data:
  - a. Submit manufacturer's operation and maintenance manual; including the following:
    - i. Operation, maintenance, adjustment, and cleaning instructions,
    - ii. Troubleshooting guide,
    - iii. Parts list, and
    - iv. Electrical wiring diagrams if required.
  - b. Provide detailed information required for Owner to properly operate and maintain equipment.
- F. Warranty Documentation: Submit manufacturer's standard warranty.

#### **1.6 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications:
  - a. Manufacturer regularly engaged in the manufacturing of Air Handling Units, Heat, or Energy Recovery Ventilators in the last 10 years.
  - b. ISO 9001 Certified.
- B. Installer's Qualifications:
  - a. Installer regularly engaged in installation of Air Handling Units, Heat, or Energy Recovery Ventilators to that specified for a minimum of 5 years.
  - b. Use persons trained for installation of Air Handling Units, Heat, or Energy Recovery Ventilators.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers, and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
  - a. Store and handle materials in accordance with manufacturer's instructions,
  - b. Keep materials in manufacturer's original, unopened containers, and packaging until installation,
  - c. Store materials in clean, dry area indoors,
  - d. Keep materials from freezing, and
  - e. Protect materials during storage, handling, and installation to prevent damage.

## 1.8 WARRANTY

Warranty Period: 7 years on motor, 5 years on electrical components and core.

## PART 2. PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturer: Systemair MFG Inc., 50 Kanalfakt Way, Bouctouche, New Brunswick E4S 3M5, Canada  
For Canada: Toll Free 800-565-3548, CANADAsupport@Greentek.net  
For USA: Toll Free 800-747-1762, USsupport@Greentek.net  
*Specifier Notes: Specify if substitutions will be permitted*
- B. Substitutions: [Not permitted] [Comply with Division 01]  
Single Source: Provide materials from single manufacturer

### 2.2 HEAT RECOVERY VENTILATORS

*Specifier Notes: Specify required model. Consult Greentek for assistance in determining the Heat Recovery Ventilator model for the specific application. EC Motors could help your apply for LEED credits. Brackets denote options.*

- A. [Heat Recovery Ventilators: SOLACE 1.2H]
  - a. Indoor, compact, residential Heat Recovery Ventilators
  - b. General
    - i. Each Unit or Group of Units: Capable of operating in any mode independently or dependently of other systems
    - ii. Listed under CSA C22.2, No. 113/UL 1812
    - iii. ENERGY STAR® certified
    - iv. Wiring: NFPA 70
    - v. Performance: As scheduled on the Drawings
    - vi. Equipped with a control system
    - vii. Performs all functions necessary for operation
    - viii. Capable of changing modes with no interruption to system operation
    - ix. Capable of transferring sensible heat between the fresh and stale air streams

- x. Capable of operating in winter and summer conditions without imbalance or loss of ventilation capacity greater than specified in design
- c. Unit Cabinet
  - i. Single Wall Cabinet:
    - 1. 22-gauge galvanized corrosion resistant steel casing
    - 2. Seams: Sealed, requiring no caulking in field
    - 3. Duct Connections: 5-inch (127mm) round plastic duct connections
  - ii. Insulation within a Single Wall:
    - 1. .75-in. (20-mm) of high-density expanded polystyrene
    - 2. Material approved for use as per CSA C22.2, No. 113 / UL1812
- d. Cabinet Doors & Panels
  - i. 22-gauge pre-painted door
  - ii. .75-in. (20-mm) of high-density expanded polystyrene
- e. Fans
  - i. Factory-balanced fans with backward curved blades
  - ii. Fan Motors:
    - 1. Maintenance-free, permanently lubricated, sealed ball bearings
    - 2. Thermal overload protected (TOP)
    - 3. UL listed to UL1004 and/or UL2111, CSA C22.2 No. 77 and No.100
    - 4. IP Protection: Class 44 according to IEC 60529
- f. Separate fan motor assemblies for supply and exhaust airstreams
- g. Heat recovery core
  - i. Construction: Polymeric transfer media contained by an aluminum frame. Materials approved for use as per CSA C22.2, No. 113 / UL1812
  - ii. Construction type: Counter-flow
  - iii. Recovery type: Sensible energy transfer only
  - iv. Recovery effectiveness documented in accordance with CSA C439 as part of the Heat Recovery Ventilator
  - v. Freeze tolerant and water washable
- h. Air filters
  - i. Supply and exhaust air protected by 2 MERV 3, UL900 certified, washable electrostatic panel type air filters
  - ii. Optional MERV 8 supply air filters can be added and used along with the standard MERV 3
- i. Frost prevention
  - i. Frost prevention sequence (pre-set) initiated if the outdoor air temperature falls below the set point of 23°F (-5°C)

- j. Electrical 1 Phase Input Voltage
    - i. Electrical Power: 120 VAC, 1 Phase, 60 Hz, MOP 15A
    - ii. Internal Electrical Components:
      - 1. Factory wired for single-point power connection
      - 2. UL Listed or Recognized and CSA Certified or Accepted where applicable and wired in compliance with the National Electrical Code
  - k. Electrical Box Components: Accessible without stopping unit or opening doors
  - l. Electrical Box:
    - i. Isolated from airflow paths
    - ii. Protect integral wires and connections
  - m. Serviceability
    - i. Access Panel: Hinged and/or screwed access panel on front of unit
    - ii. Heat recovery cores, filters, and motors: serviceable from front of unit
    - iii. Fan Assemblies: mounted on removable sliding base
    - iv. Heat recovery cores and filters: slides out of cabinet
- B. [Heat Recovery Ventilators: SOLACE 1.5H]
- a. Indoor, compact, residential Heat Recovery Ventilators
  - b. General
    - i. Each Unit or Group of Units: Capable of operating in any mode independently or dependently of other systems
    - ii. Listed under CSA C22.2, No. 113/UL 1812
    - iii. ENERGY STAR® certified
    - iv. Wiring: NFPA 70
    - v. Performance: As scheduled on the Drawings
    - vi. Equipped with a control system
    - vii. Performs all functions necessary for operation
    - viii. Capable of changing modes with no interruption to system operation
    - ix. Capable of transferring sensible heat between the fresh and stale air streams
    - x. Capable of operating in winter and summer conditions without imbalance or loss of ventilation capacity greater than specified in design
  - c. Unit Cabinet
    - i. Single Wall Cabinet:
      - 1. 22-gauge galvanized corrosion resistant steel casing
      - 2. Seams: Sealed, requiring no caulking in field
      - 3. Duct Connections: 6-inch (152mm) round plastic duct connections
    - ii. Insulation within a Single Wall:
      - 1. .75-in. (20-mm) of high-density expanded polystyrene
      - 2. Material approved for use as per CSA C22.2, No. 113 / UL1812
  - d. Cabinet Doors & Panels

- i. 22-gauge pre-painted door
  - ii. .75-in. (20-mm) of high-density expanded polystyrene
- e. Fans
  - i. Factory-balanced fans with backward curved blades
  - ii. Fan Motors:
    - 1. Maintenance-free, permanently lubricated, sealed ball bearings
    - 2. Thermal overload protected (TOP)
    - 3. UL listed to UL1004 and/or UL2111, CSA C22.2 No. 77 and No.100
    - 4. IP Protection: Class 44 according to IEC 60529
- f. Separate fan motor assemblies for supply and exhaust airstreams
- g. Heat recovery core
  - i. Construction: Polymeric transfer media contained by an aluminum frame. Materials approved for use as per CSA C22.2, No. 113 / UL1812
  - ii. Construction type: Counter-flow
  - iii. Recovery type: Sensible energy transfer only
  - iv. Recovery effectiveness documented in accordance with CSA C439 as part of the Heat Recovery Ventilator
  - v. Freeze tolerant and water washable
- h. Air filters
  - i. Supply and exhaust air protected by 2 MERV 3, UL900 certified, washable electrostatic panel type air filters
  - ii. Optional MERV 8 or MERV 13 supply air filters can be added and used along with the standard MERV 3
- i. Frost prevention
  - i. Frost prevention sequence (pre-set) initiated if the outdoor air temperature falls below the set point of 23°F (-5°C)
- j. Electrical 1 Phase Input Voltage
  - i. Electrical Power: 120 VAC, 1 Phase, 60 Hz, MOP 15A
  - ii. Internal Electrical Components:
    - 1. Factory wired for single-point power connection
    - 2. UL Listed or Recognized and CSA Certified or Accepted where applicable and wired in compliance with the National Electrical Code
- k. Electrical Box Components: Accessible without stopping unit or opening doors
- l. Electrical Box:
  - i. Isolated from airflow paths

- ii. Protect integral wires and connections
- m. Serviceability
  - i. Access Panel: Hinged and/or screwed access panel on front of unit
  - ii. Heat recovery cores, filters, and motors: serviceable from front of unit
  - iii. Fan Assemblies: mounted on removable sliding base
  - iv. Heat recovery cores and filters: slides out of cabinet
- C. [Heat Recovery Ventilators: SOLACE 2.0H]
  - a. Indoor, compact, residential Heat Recovery Ventilators
  - b. General
    - i. Each Unit or Group of Units: Capable of operating in any mode independently or dependently of other systems
    - ii. Listed under CSA C22.2, No. 113/UL 1812
    - iii. ENERGY STAR® certified
    - iv. Wiring: NFPA 70
    - v. Performance: As scheduled on the Drawings
    - vi. Equipped with a control system
    - vii. Performs all functions necessary for operation
    - viii. Capable of changing modes with no interruption to system operation
    - ix. Capable of transferring sensible heat between the fresh and stale air streams
    - x. Capable of operating in winter and summer conditions without imbalance or loss of ventilation capacity greater than specified in design
  - c. Unit Cabinet
    - i. Single Wall Cabinet:
      - 1. 22-gauge galvanized corrosion resistant steel casing
      - 2. Seams: Sealed, requiring no caulking in field
      - 3. Duct Connections: 6-inch (152mm) round plastic duct connections
    - ii. Insulation within a Single Wall:
      - 1. .75-in. (20-mm) of high-density expanded polystyrene
      - 2. Material approved for use as per CSA C22.2, No. 113 / UL1812
  - d. Cabinet Doors & Panels
    - i. 22-gauge pre-painted door
    - ii. .75-in. (20-mm) of high-density expanded polystyrene
  - e. Fans
    - i. Factory-balanced fans with backward curved blades
    - ii. Fan Motors:
      - 1. Maintenance-free, permanently lubricated, sealed ball bearings
      - 2. Thermal overload protected (TOP)
      - 3. UL listed to UL1004 and/or UL2111, CSA C22.2 No. 77 and No.100
      - 4. IP Protection: Class 44 according to IEC 60529

- f. Separate fan motor assemblies for supply and exhaust airstreams
  - g. Heat recovery core
    - i. Construction: Polymeric transfer media contained by an aluminum frame. Materials approved for use as per CSA C22.2, No. 113 / UL1812
    - ii. Construction type: Counter-flow
    - iii. Recovery type: Sensible energy transfer only
    - iv. Recovery effectiveness documented in accordance with CSA C439 as part of the Heat Recovery Ventilator
    - v. Freeze tolerant and water washable
  - h. Air filters
    - i. Supply and exhaust air protected by 2 MERV 3, UL900 certified, washable electrostatic panel type air filters
    - ii. Optional MERV 8 or MERV 13 supply air filters can be added and used along with the standard MERV 3
  - i. Frost prevention
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  - j. Electrical 1 Phase Input Voltage
    - i. Electrical Power: 120 VAC, 1 Phase, 60 Hz, MOP 15A
    - ii. Internal Electrical Components:
      - 1. Factory wired for single-point power connection
      - 2. UL Listed or Recognized and CSA Certified or Accepted where applicable and wired in compliance with the National Electrical Code
  - k. Electrical Box Components: Accessible without stopping unit or opening doors
  - l. Electrical Box:
    - i. Isolated from airflow paths
    - ii. Protect integral wires and connections
  - m. Serviceability
    - i. Access Panel: Hinged and/or screwed access panel on front of unit
    - ii. Heat recovery cores, filters, and motors: serviceable from front of unit
    - iii. Fan Assemblies: mounted on removable sliding base
    - iv. Heat recovery cores and filters: slides out of cabinet
- D. [Heat Recovery Ventilators: SOLACE 1.5H-EC]
- a. Indoor, compact, residential Heat Recovery Ventilators
  - b. General



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  - iii. ENERGY STAR® certified
  - iv. Wiring: NFPA 70
  - v. Performance: As scheduled on the Drawings
  - vi. Equipped with a control system
  - vii. Performs all functions necessary for operation
  - viii. Capable of changing modes with no interruption to system operation
  - ix. Capable of transferring sensible heat between the fresh and stale air streams
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  - ii. .75-in. (20-mm) of high-density expanded polystyrene
- e. Fans
  - i. Factory-balanced fans with backward curved blades
  - ii. Fan Motors:
    - 1. Electronically commutated (EC) external rotor motors
    - 2. Maintenance-free, permanently lubricated, sealed ball bearings
    - 3. Thermal overload protected (TOP)
    - 4. UL listed to UL1004 and/or UL2111, CSA C22.2 No. 77 and No.100
    - 5. IP Protection: Class 54 according to IEC 60529
- f. Separate fan motor assemblies for supply and exhaust airstreams
- g. Heat recovery core
  - i. Construction: Polymeric transfer media contained by an aluminum frame. Materials approved for use as per CSA C22.2, No. 113 / UL1812
  - ii. Construction type: Counter-flow
  - iii. Recovery type: Sensible energy transfer only
  - iv. Recovery effectiveness documented in accordance with CSA C439 as part of the Heat Recovery Ventilator
  - v. Freeze tolerant and water washable

- h. Air filters
    - i. Supply and exhaust air protected by 2 MERV 3, UL900 certified, washable electrostatic panel type air filters
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    - ii. Internal Electrical Components:
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  - k. Electrical Box Components: Accessible without stopping unit or opening doors
  - l. Electrical Box:
    - i. Isolated from airflow paths
    - ii. Protect integral wires and connections
  - m. Serviceability
    - i. Access Panel: Hinged and/or screwed access panel on front of unit
    - ii. Heat recovery cores, filters, and motors: serviceable from front of unit
    - iii. Fan Assemblies: mounted on removable sliding base
    - iv. Heat recovery cores and filters: slides out of cabinet
- E. [Heat Recovery Ventilators: SOLACE 2.5H-EC]
- a. Indoor, compact, residential Heat Recovery Ventilators
  - b. General
    - i. Each Unit or Group of Units: Capable of operating in any mode independently or dependently of other systems
    - ii. Listed under CSA C22.2, No. 113/UL 1812
    - iii. ENERGY STAR® certified
    - iv. Wiring: NFPA 70
    - v. Performance: As scheduled on the Drawings
    - vi. Equipped with a control system
    - vii. Performs all functions necessary for operation
    - viii. Capable of changing modes with no interruption to system operation
    - ix. Capable of transferring sensible heat between the fresh and stale air streams

- x. Capable of operating in winter and summer conditions without imbalance or loss of ventilation capacity greater than specified in design
- c. Unit Cabinet
  - i. Single Wall Cabinet:
    - 1. 22-gauge galvanized corrosion resistant steel casing
    - 2. Seams: Sealed, requiring no caulking in field
    - 3. Duct Connections: 5-inch (127mm) round plastic duct connections
  - ii. Insulation within a Single Wall:
    - 1. .75-in. (20-mm) of high-density expanded polystyrene
    - 2. Material approved for use as per CSA C22.2, No. 113 / UL1812
- d. Cabinet Doors & Panels
  - i. 22-gauge pre-painted door
  - ii. .75-in. (20-mm) of high-density expanded polystyrene
- e. Fans
  - i. Factory-balanced fans with backward curved blades
  - ii. Fan Motors:
    - 1. Electronically commutated (EC) external rotor motors
    - 2. Maintenance-free, permanently lubricated, sealed ball bearings
    - 3. Thermal overload protected (TOP)
    - 4. UL listed to UL1004 and/or UL2111, CSA C22.2 No. 77 and No.100
    - 5. IP Protection: Class 54 according to IEC 60529
- f. Separate fan motor assemblies for supply and exhaust airstreams
- g. Heat recovery core
  - i. Construction: Polymeric transfer media contained by an aluminum frame. Materials approved for use as per CSA C22.2, No. 113 / UL1812
  - ii. Construction type: Counter-flow
  - iii. Recovery type: Sensible energy transfer only
  - iv. Recovery effectiveness documented in accordance with CSA C439 as part of the Heat Recovery Ventilator
  - v. Freeze tolerant and water washable
- h. Air filters
  - i. Supply and exhaust air protected by 2 MERV 3, UL900 certified, washable electrostatic panel type air filters
  - ii. Optional MERV 8 or MERV 13 supply air filters can be added and used along with the standard MERV 3
- i. Frost prevention

- i. Frost prevention sequence (pre-set) initiated if the outdoor air temperature falls below the set point of 23°F (-5°C)
  - j. Electrical 1 Phase Input Voltage
    - i. Electrical Power: 120 VAC, 1 Phase, 60 Hz, MOP 15A
    - ii. Internal Electrical Components:
      - 1. Factory wired for single-point power connection
      - 2. UL Listed or Recognized and CSA Certified or Accepted where applicable and wired in compliance with the National Electrical Code
  - k. Electrical Box Components: Accessible without stopping unit or opening doors
  - l. Electrical Box:
    - i. Isolated from airflow paths
    - ii. Protect integral wires and connections
  - m. Serviceability
    - i. Access Panel: Hinged and/or screwed access panel on front of unit
    - ii. Heat recovery cores, filters, and motors: serviceable from front of unit
    - iii. Fan Assemblies: mounted on removable sliding base
      - i. Heat recovery cores and filters: slides out of cabinet

## 2.3 ACCESSORIES

*Specifier Notes: Delete accessories not required.*

- A. [TVOC Sensing Control: model STS IAQ]
- B. [TVOC Sensing Control w/o control: model STS AirSync]
- C. [Multi-function Control: model EHC 2.0/EHC 2.5]
- D. [Push-button Timer: model T4 Timer/T5 Timer]
- E. [Dehumidistat: model RD-1]
- F. [SOLACE 1.2H]
  - a. [Replacement Filter: model MERV3]
  - b. [Filter: model MERV8]
- G. [SOLACE 1.5H]
  - a. [Replacement Filter: model MERV3]
  - b. [Filter: model MERV8]
  - c. [Filter: model MERV13]
- H. [SOLACE 1.5H-EC]
  - a. [Replacement Filter: model MERV3]
  - b. [Filter: model MERV8]
  - c. [Filter: model MERV13]
- I. [SOLACE 2.0H]
  - a. [Replacement Filter: model MERV3]
  - b. [Filter: model MERV8]

- c. [Filter: model MERV13]
- J. [SOLACE 2.5H-EC]
  - a. [Replacement Filter: model MERV3]
  - b. [Filter: model MERV8]
  - c. [Filter: model MERV13]

## **2.4 ASSEMBLY**

- A. Factory assembled and wired heat recovery ventilators

## **2.5 SOURCE QUALITY CONTROL**

- A. Run test at factory

## **PART 3. EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas to receive heat recovery ventilators
- B. Notify Architect of conditions that would adversely affect installation or subsequent use
- C. Do not begin installation until unacceptable conditions are corrected

### **3.2 PREPARATION**

- A. Prepare surfaces where heat recovery ventilators are to be mounted
- B. Ensure surfaces are flat, level, plumb, and can support weight of heat recovery ventilators

### **3.3 INSTALLATION**

- A. Install heat recovery ventilators in accordance with manufacturer's instructions at locations indicated on the Drawings
- B. Unit is typically hung by using metal mounting bracket supplied with unit.
- C. Optional chain kit available
- D. Install heat recovery ventilators in accordance with NFPA 70
- E. Do not expose electronic components to temperatures below 32 degrees F (0 degrees C) or above 122 degrees F (50 degrees C).

### **3.4 ADJUSTING**

- A. Adjust heat recovery ventilators for proper operation in accordance with manufacturer's instructions

### **3.5 DEMONSTRATION**

- A. Demonstrate that heat recovery ventilators function properly in every respect
- B. Provide hands-on demonstrations of operation of system components and complete system, including user-level program changes and function
- C. Provide instruction and training by factory-trained and certified representative of manufacturer

### **3.6 PROTECTION**

- A. **Protect installed heat recovery ventilators from damage during construction**

**END OF SECTION**