

**SECTION 23 72 00**  
**AIR-TO-AIR ENERGY RECOVERY EQUIPMENT**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This Section specifies air to air heat pipe heat exchanger and air-to-air plate heat exchanger

**1.2 RELATED WORK**

- A. Section 01 00 00, GENERAL REQUIREMENTS: Requirements for pre-test of equipment.
- B. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic requirements for non-structural equipment.
- C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION: General mechanical requirements and items, which are common to more than one section of Division 23.
- H. Section 23 31 00, HVAC DUCTS AND CASINGS: Requirements for sheet metal ducts and fittings.
- I. Section 23 40 00, HVAC AIR CLEANING DEVICES: Requirements for filters used before heat recovery coils.
- J. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Requirements for controls and instrumentation.
- K. Section 23 05 93, TESTING, ADJUSTING AND BALANCING FOR HVAC: Requirements for testing, adjusting and balancing of HVAC system.

**1.3 QUALITY ASSURANCE**

- A. Refer to specification Section 01 00 00, GENERAL REQUIREMENTS for performance tests and instructions to VA personnel.
- B. Refer to paragraph QUALITY ASSURANCE in specification Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- C. Performance Criteria: Heat recovery equipment shall be provided by a manufacturer who has been manufacturing such equipment and the equipment has a good track record for at least 5 years.
- D. Performance Test: In accordance with PART 3.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Heat Pipe Heat Exchanger
  - 3. Plate Heat Exchanger
- C. Certificate: Submit, simultaneously with shop drawings, an evidence of satisfactory service of the equipment on three similar installations.

- D. Submit type, size, arrangement and performance details. Present application ratings in the form of tables, charts or curves.
- E. Provide installation, operating and maintenance instructions, in accordance with Article, INSTRUCTIONS, in Section 01 00 00, GENERAL REQUIREMENTS.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Air Conditioning and Refrigeration Institute (ARI)  
ARI 1060-2005.....Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Heat Equipment
- C. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE):  
15-07.....Safety Standard for Refrigeration Systems (ANSI)  
52.1-92.....Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter  
52.2-07.....Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size  
84-91.....Method of Testing Air-to-Air Heat Exchangers
- D. American Society for Testing and materials (ASTM)  
D635-06.....Standard Test Method for Rate of Burning and/ or Extent and Time of Burning of Plastics in a Horizontal Position  
E84-07.....Standard Test Method for Surface Burning Characteristics of Building Materials
- E. Underwriters Laboratories, Inc (UL)  
1812-95 (Rev. 2006).....Standard for Ducted Heat Recovery Ventilators  
1815-01 (Rev. 2006).....Standard for Nonducted Heat Recovery Ventilators

#### **PART 2 - PRODUCTS**

##### **2.1 AIR-TO-AIR HEAT PIPE HEAT EXCHANGERS N/A**

##### **2.2 ROTARY AIR-TO-AIR HEAT EXCHANGER: N/A**

##### **2.3 AIR-TO-AIR PLATE HEAT EXCHANGER**

- A. Comply with UL Standards.
- B. Plates: Corrugated 0.53 mm (0.021 inch) diamond embossed aluminum, stainless steel spacing as recommended by the manufacturer.

- C. Bedding: Thermosetting reinforced resin. Provide plate seal-off and passage separation at top, bottom and center divider. The resins shall be self-extinguishing type in accordance with ASTM D635.
- D. Casing and End Strips: Casing of 1.6 mm (16 gage) galvanized steel, except casings for corrosive air streams shall be stainless steel. End strips of the same material as exchanger plates. Ends of unit exchanger plates shall be sealed with high temperature silicon sealant prior to installation of end strip for corrosive air streams provide welded end strips to avoid cross contaminations.
- E. Casings shall have integral flanges for flanged duct connections and shall have lifting holes or lugs.
- F. Drain Pan: Same material as unit casing. Drain-pan surface shall be covered with molded ABS, and shall have drain connections on exhaust and supply side. Comply with requirements in ASHRAE 62.1-2004.
- G. Accessories: Furnish where indicated on the drawings.
  - 1. Face and Bypass Dampers: Manufacturer's standard, complete with operators, with factory-installed controls to operate face-and-bypass dampers during summer and winter.
- H. Water Wash: Automatic system with spray manifold to individual spray tubes or traversing type with stainless-steel-screw operating mechanism and electric motor drive; activated by time clock with detergent injection.
- I. Extended-Surface, Disposable Panel Filters: Comply with NFPA 90A.
  - 1. Filter-Holding Frames: Arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lift out from access plenum.
  - 2. Filter Type: Factory-fabricated, dry, extended-surface type.
  - 3. Media Thickness: 50 mm (2 inches)
  - 4. Initial Resistance: \_\_\_\_\_ Pa (.4 inches wg).
  - 5. Recommended Final Resistance: \_\_\_\_\_ Pa (.6 inches wg).
  - 6. Arrestance (According to ASHRAE 52.1): 90.
  - 7. MERV (ASHRAE 52.2): 7.
  - 8. Filter Media: Fibrous material formed into deep-V-shaped pleats with antimicrobial agent and held by self-supporting wire grid.
  - 9. Media-Grid Frame: Nonflammable cardboard.
  - 10. Mounting Frames: Welded, galvanized steel with gaskets and fasteners, suitable for bolting together into built-up filter banks.

**2.4 RUN-AROUND ENERGY RECOVERY SYSTEM (RAERS)****2.5 AIR FILTERS**

Air Filters: MERV rating of 7, as indicated on the drawings. Comply with requirements in specification Section 23 40 00, HVAC AIR CLEANING DEVICES.

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Follow the equipment manufacturer's instructions for handling and installation, and setting up of ductwork for makeup and exhaust air steamers for maximum efficiency.
- C. Seal ductwork tightly to avoid air leakage.
- D. Install units with adequate spacing and access for cleaning and maintenance of heat recovery coils as well as filters.
- E. Brace heat recovery equipment installed in projects in the Seismic area according to specification Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.
- F. Secure outdoor heat recovery equipment to withstand a wind velocity of \_\_\_\_\_km/h (110 mph).

**3.2 FIELD QUALITY CONTROL**

- A. Operational Test: Perform tests as per manufacturer's written instructions for proper and safe operation of the heat recovery system.
  - 1. 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.
- B. Replace damaged and malfunctioning controls and equipment.
- C. Set initial temperature and humidity set points. Set field-adjustable switches and circuit-breaker trip ranges as indicated.
- D. Prepare test and inspection reports to the Senior Resident Engineer in accordance with specification Section 01 00 00, GENERAL REQUIREMENTS.

**3.3 INSTRUCTIONS**

Provide services of manufacturer's technical representative for four hours to instruct VA personnel in operation and maintenance of heat recovery equipment.

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