

**SECTION 23 84 00  
HUMIDITY CONTROL EQUIPMENT**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies humidification equipment for preconditioning of existing and new air conditioning systems.

**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.
- D. Section 23 21 13, HYDRONIC PIPING: Requirements for field hot water piping.
- E. Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING: Requirements for field steam and condensate piping.
- F. Section 23 82 16, AIR COILS: Requirements for run-around system coils.
- G. Section 23 31 00, HVAC DUCTS AND CASINGS: Requirements for sheet metal ducts and fittings.
- H. Section 23 40 00, HVAC AIR CLEANING DEVICES: Requirements for filters including efficiency.
- I. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Requirements for controls and instrumentation.
- J. Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC: Requirements for testing, adjusting and balancing of HVAC system.
- K. Section 23 05 12, GENERAL MOTOR REQUIREMENTS FOR HVAC AND STEAM GENERATION EQUIPMENT: Requirements for HVAC motors.

**1.3 QUALITY ASSURANCE**

- A. Refer to the GENERAL CONDITIONS.
- B. Refer to specification Section 01 00 00, GENERAL REQUIREMENTS for performance tests and instructions to VA personnel.
- C. Refer to paragraph, QUALITY ASSURANCE, in specification Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

- D. Unit(s) shall be provided by a manufacturer who has been manufacturing desiccant dehumidifiers and have been in satisfactory service for at least five (5) years.

**1.4 SUBMITTALS**

- A. Submit in accordance with specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
1. Technical data on design operating inlet and outlet conditions, air flows with diagram showing air volumes and conditions throughout the system, dehumidification capacity, filtration and fan motor and electrical power data.
  2. A general arrangement diagram with overall dimensions showing all major components with overall dimensions, utility and duct work connections, bolting arrangement, operating weight and required service and equipment removal clearances.
  3. Control diagrams for preconditioning of existing and new air conditioning systems, electric circuits interface all control set points.
- C. Certificate: Evidence of satisfactory performance on three similar installations.
- D. Provide installation, operating and maintenance instructions, in accordance with Article, INSTRUCTIONS, in specification Section 01 00 00, GENERAL REQUIREMENTS.
- E. Performance test report: In accordance with PART 3.

**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)  
410-01.....Forced-Circulation Air-Cooling and Air-Heating Coils
- C. Air Movement and Control Association (AMCA):  
210-99.....Laboratory Methods of Testing Fans for Aerodynamic Performance Rating (ANSI)
- D. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

52.2-07.....METHOD OF TESTING General Ventilation Air  
Cleaning Devices for Removal Efficiency by  
Particle Size (ANSI)

62.1-07.....Ventilation for Acceptable Indoor Air  
Quality (ANSI)

E. American Bearing Manufacturers Association (ABMA)  
9-1990 (R2000).....Load Ratings and Fatigue Life for Ball  
Bearings (ANSI)

F. National Fire Protection Association (NFPA)  
90A-02.....Standard for the Installation of Air-  
Conditioning and Ventilating Systems

70-05.....National Electrical Code

#### **1.6 WARRANTY**

A. Product shall be warranted to be free from defects in materials  
and fabrication for a period of two years after installation or 27  
months from ship date.

### **PART 2 - PRODUCTS**

#### **2.1 HUMIDIFICATION UNITS**

A. General: Units shall be complete, factory assembled, and tested;  
and of sizes, arrangements, capacities, and performance as  
scheduled and as specified herein suitable; and for indoor  
installation preconditioning of existing and new air conditioning  
systems for humidifying air.

B. Dispersion Tube/Manifold: 304 stainless steel tubes and headers.  
Galvanized metal casing for air handling unit mounting. Steam  
supply header/separator, a condensate collection header and a bank  
of closely spaced steam dispersion tubes spanning the two headers.  
Tubes fitted with non-metallic discharge tubelets spaced 1 ½ inch  
apart. Each tubelet to have steam orifice properly sized. Steam  
absorption not to exceed 12 inches downstream of manifold.

C. Steam Separator: ASTM A 666, Type 304 stainless steel with  
separate humidifier control valve.

D. Humidifier Control Valve:

1. Actuator: Normally closed electric modulating with spring  
return.

2. Actuator: As specified in Section 230900 "Instrumentation and Control for HVAC."
- E. Steam Trap: Inverted-bucket type, sized for a minimum of 3 times the maximum rated condensate flow of humidifier at 1/2-psig inlet pressure.
- F. Accessories:
1. Duct-mounting, high-limit humidistat.
  2. Aquastat mounted on steam condensate return piping to prevent cold operation of humidifier.
  3. In-line strainer.
  4. Airflow switches for preventing humidifier operation without airflow.
- G. Condensate management:
1. Steam supply header/separator with integral condensate heat exchanger shall provide atmospheric condensate vaporizing and pressurized condensate return.
  2. All dispersion tube-generated condensate that falls to the heat exchanger in the header shall be vaporized into humidification steam.
  3. As condensate is vaporized in the header, pressurized condensate created in the heat exchanger shall return to main without need for additional pumps, valves, or controls.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Follow equipment manufacturer's written instructions for handling.
- B. Examine air-handling units and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- C. Examine roughing-in for piping systems to verify actual locations of piping connections before humidifier installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Install humidifiers with required clearance for service and maintenance.
- F. Seal humidifier manifold plenum penetrations with flange.

- G. Install stainless-steel drain pan under each manifold mounted in air handling unit section.
- H. Install manifold supply piping pitched to drain condensate back to humidifier.
- I. Install drip leg upstream from steam trap a minimum of 12 inches tall for proper operation of trap.

### **3.2 CONNECTIONS**

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to humidifiers to allow service and maintenance.
- C. Install shutoff valve, strainer and union in humidifier supply line.
- D. Install electrical devices and piping specialties furnished by manufacturer but not factory mounted.
- E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

### **3.3 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Tests and Inspections:
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace malfunctioning units and retest as specified above.

### **3.4 INSTRUCTIONS**

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

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