

SECTION 23 84 13 - HUMIDIFIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following humidifiers:
 - 1. Steam injection.

1.3 DEFINITION

- A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Detail fabrication and installation of humidifiers. Include piping details, plans, elevations, sections, details of components, manifolds, and attachments to other work.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Coordination Drawings: Detail humidifiers and adjacent equipment. Show support locations, type of support, weight on each support, required clearances, and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For humidifiers to include in operation and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with ARI 640, "Commercial and Industrial Humidifiers."

1.6 COORDINATION

- A. Coordinate location and installation of humidifiers with manifolds in ducts and air-handling units or occupied space. Revise locations and elevations to suit field conditions and to ensure proper humidifier operation.

PART 2 - PRODUCTS

2.1 STEAM-INJECTION HUMIDIFIERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Carel
 - 2. DRI-STEEM Humidifier Company.
 - 3. Pure Humidifier
- B. The steam dispersion panel shall directly inject pressurized boiler steam or evaporative, non-pressurized steam into ducted air for humidification. The factory-assembled steam dispersion panel shall include the following components:
 - 1. Steam supply header/separator
 - 2. Condensate collection header
 - 3. Closely-spaced steam dispersion tubes spanning the distance between the two headers
- C. Each dispersion tube shall be fitted with two rows of steam discharge tubelets inserted into the tube wall, centered on the diametric line, and spaced 1.5" (38 mm) apart. Each tubelet shall be made of a thermal-resin material designed for high steam temperatures. The two rows of tubelets in each dispersion tube shall discharge steam in diametrically opposite directions, perpendicular to airflow.
- D. Each tubelet shall extend through the wall of and into the center of the dispersion tube and contain a steam orifice sized for its required steam capacity.
- E. All tubes and headers shall be 304 stainless steel, and joints shall be Heli-arc welded. Casing shall be 304 stainless steel.
- F. Steam valve and actuator: Valve shall be a normally closed modulating type with modified linear flow. Valve trim shall be stainless steel and valve maximum flow

rate shall not exceed specified humidifier capacity by more than 20%. Actuator shall be a electric type to modulate the steam valve in response to a variable signal demand and be direct acting.

- G. Steam trap(s): Humidifier shall have one or two float/thermostatic trap(s) for applications equal to or below 15 psi steam, or one or two inverted bucket steam trap(s) for applications above 15 psi steam.
- H. Dispersion tubes shall be insulated with a plenum–approved insulating material for in–duct installation and have an R–value not less than 0.5 at a thickness not more than 0.125" (3.2 mm), for minimal increase in dispersion tube diameter.
- I. HUMIDIFIER CONTROL OPTIONS
 - 1. Control input accessory options:
 - 2. Humidistat, electronic, room: Electronic humidistat shall be room–mounted and produce a modulated DC signal output, field–selectable 0 to 10 VDC or 6 to 9 VDC with control action field–selectable to be direct or reverse acting. Set point range 20% to 80% RH, supply voltage 24 DC or 24 AC. Maximum ambient temperature 122 °F (50 °C).
 - 3. Airflow proving switch, sail type: Airflow proving switch shall be a sail–operated electric switch for field installation. Switch makes at 250 fpm (1.3 m/s), and breaks at 75 fpm (0.4 m/s). Maximum operating temperature for sail: 170 °F (77 °C). Maximum operating temperature for switch: 125 °F (52 °C)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine ducts, air-handling units, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before humidifier installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install humidifiers with required clearance for service and maintenance.
- B. Seal humidifier manifold duct or plenum penetrations with flange.
- C. Install humidifier manifolds in metal ducts and casings constructed according to SMACNA's "HVAC Duct Construction Standards, Metal and Flexible."

- D. Install manifold supply piping pitched to drain condensate back to humidifier.
- E. Install drip leg upstream from steam trap a minimum of 12 inches tall for proper operation of trap.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
 - 1. Install piping adjacent to humidifiers to allow service and maintenance.
- B. Install electrical devices and piping specialties furnished by manufacturer but not factory mounted.

3.4 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. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units and retest as specified above.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain humidifiers. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION