

**SECTION 15XXX**  
**HUMIDIFIERS**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. NORTEC AIRFOG atomizing nozzle humidifier[s] as indicated on drawing[s] and as indicated on schedule[s].
- B. Complete and operable humidification system [which meets applicable building codes].
- C. Equipment start-up and project inspection by qualified factory trained representative.

**1.2 QUALITY ASSURANCE**

- A. Manufacturer: For each product specified, provide components by same manufacturer throughout.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authority having jurisdiction, and marked for intended use.
- C. Comply with ARI 640, "Standard for Commercial and Industrial Humidifiers."
- D. Products shall be supported with a warranty that ensures the product will be free from defects in materials and workmanship for a period of two years after shipment.
- E. Commissioning of a system or systems specified in this section is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's operation and maintenance personnel, is required in cooperation with the Commissioning Authority. Project Closeout is dependent on successful completion of all commissioning procedures, documentation, and issue closure. Refer to Project Closeout, Section 01700, for substantial completion details. Refer to Section 01810, Commissioning, for detailed commissioning requirements.
- F. Products specified below are to be manufactured in an ISO 9001-2000 certified facility.

**1.3 SUBMITTALS**

- A. Submit product data under provisions of Section 15010. Include product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes. Include rated capacities, operating weights, furnished specialties, and accessories.
- B. Submit manufacturer's installation instructions.
- C. Submit operation and maintenance data.
- D. Submit coordination drawings. Detail fabrication and installation of humidifiers. Include piping details, plans, elevations, sections, details of components, and dispersion tubes. Detail humidifiers and adjacent equipment. Show support locations, type of support, weight on each support, and required clearances.
- E. Submit wiring diagrams including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
- F. Submit minimum water quality requirements and water pressure requirements.

#### **1.4 EXTRA MATERIALS**

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

#### **1.5 REFERENCES**

- A. ANSI/NFPA 70 - National Electrical Code.

#### **1.6 COORDINATION**

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

XXXXX OR XXXXX

- A. Coordinate location and installation of humidifier in the space it serves with the electrical, mechanical, and plumbing contractors.

### **PART 2 - PRODUCTS**

#### **2.1 AIRFOG ATOMIZING MODEL AFE**

- A. AIRFOG AFE atomizing nozzle system using compressed air to atomize water, drawn through a vacuum valve at atmospheric pressure, within the air stream.
- B. Built-up system, for direct space application, requiring AFE control panel[s], vacuum valve[s], pilot operated air regulator[s] and AFE nozzle[s].
- C. System to be complete with:
  - 1. Operating and safety controls to ensure an automatic and fail safe system.
  - 2. Nozzles to shut down automatically on loss of air pressure without dripping even when water pressure is maintained to system.
  - 3. Linear output adjustment as air pressure is reduced to nozzle and continues to produce droplets no larger than 10 microns in size as air pressure reduces.
  - 4. Vacuum valve to provide water supply to nozzles at atmospheric pressure.
  - 5. Pilot operated air regulator to allow variable supply air pressure to nozzles.
  - 6. Control panel with built-in air pressure regulator, repeat cycle timer, on/off switch, pilot light and air pressure gauge.
- D. Atomizing nozzle to be:
  - 1. Constructed of stainless steel.
  - 2. Complete with air operated piston to activate plunger and pin to clean water orifice each time system cycles off.
  - 3. Serviceable without removal from system.
  - 4. Without obstructions after orifice, which may collect dust, water or foreign matter.
- E. Control panel to include:
  - 1. NEMA 12 construction.
  - 2. Cabinet to allow user full front access with keyed lock.
  - 3. Adjustable repeat cycle timer, for cleaning action of nozzle.
  - 4. Compressed air pilot line operation only. No direct water line connections to control panel permitted.

5. On/off switch complete with pilot light.
6. Solenoid valve to shut down system on loss of electrical power.
7. Controls to provide safety shut-down of system for:
  - a. Loss of air pressure.
  - b. Loss of electric power.
8. Internal factory wiring and piping.
9. Connection for pilot tubing to pilot operated water regulator at vacuum valve, and pilot operated air regulator.
10. External 120/24 Vac plug-in transformer for internal power.

F. Vacuum Valve to include:

1. Adjustable water pressure regulator.
2. Pilot operated water regulator as safety to interrupt supply water pressure when supply air pressure is lost.

G. Performance:

1. Water pressure: 10 psig [69 kPa] minimum.
2. Working water pressure: atmospheric.
3. Air pressure: 90 psig [621 kPa] minimum, 150 psig maximum [1035 kPa].
4. Working air pressure: 0-70 psig [0-483 kPa].
5. Nozzle compressed air consumption: 1.8 cfm @ 70 psig [51 L/m @ 483 kPa].
6. Nozzle mist output: 14 lbs/hr @ 70 psig [6.4 kg/h @ 483 kPa].

H. Optional accessories:

1. Refer to options schedule.

## **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 and steam dispersion panels per manufacturers' instructions.
- B. Seal humidifier dispersion-tube duct penetrations with flange.
- C. Install with required clearance for service and maintenance.

### **3.3 TESTING**

- A. System verification testing is part of the commissioning process. Verification testing shall be performed by the Contractor and witnessed and documented by the Commissioning Authority. Refer to section 01810, Commissioning, for system verification tests and commissioning requirements.

XXXXX OR XXXXX

- A. **Manufacturer's Field Service:** Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.
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 unit operation. Remove malfunctioning units, replace with new units, and retest.
  3. **Test and adjust controls and safeties.** Replace damaged and malfunctioning controls and equipment.

### **3.4 TRAINING**

- A. Training of the Owner's operation and maintenance personnel is required in cooperation with the Commissioning Authority. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems. The instruction shall be scheduled in coordination with the Commissioning Authority after submission and approval of formal training plans. Refer to System Demonstrations, section 01670, for contractor training requirements. Refer to section 01810, Commissioning, for further contractor training requirements.

XXXXX OR XXXXX

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain humidifiers.
1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
  2. Review data in maintenance manuals. Refer to Division 1 Section "Contract Closeout."
  3. Review data in maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
  4. Schedule training with Owner, through Architect, with at least seven days advance notice.

**END OF SECTION**