SECTION 23 82 18

CLEAN STEAM GENERATORS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide Steam Exchange 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 matrials and workmanship for a period of two years after shipment.

E. Products specified below are to be manufactured is an ISO 9001-2000 certified facility.

1.3 Submittals:

A. Submit product data. 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. Differential 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 air-handling units. Revise locations and elevations to suit field conditions and to ensure proper humidifier operation.

PART 2 - PRODUCTS

2.1 STEAM EXCHANGE HUMIDIFIER – SETC

A. Packaged unit, Steam Exchange humidifier operating with boiler steam pressures between 5 psi to 15 psi, with output capacities up to 1050 lbs/hr (477 kg/hr), suitable for immediate, or future, use of all water types. Certified by UL.

B. Methods of distribution require a steam distributor[s] or Short Absorption Manifold [s] for mounting into AHU.

C. Stainless steel heat exchanger[s] shall have fiat surfaces to retard scale build-up. Tubular heat exchangers are not acceptable.

1. Removable heat exchanger[s] with modular, horizontal design for easy handling during maintenance.
2. Large surface area promoting equal distribution across surface area and good heat transfer. Pre-formed welded frame construction to minimize weld area and leakage potential.
3. Heat exchanger[s] are constructed from 316L stainless steel. Copper exchanger[s], Teflon coating, and nickel plating not acceptable.
4. Access through front panel for easy removal of heat exchanger(s) for maintenance.
5. Stainless steel tank lid with gasket, easily removed for maintenance.
6. Float and thermostatic (F & T) trap[s], must be included internal to the unit by the manufacturer.
7. Inlet steam pressure must not exceed 15 psig. Need not meet pressure vessels act.

D. Enclosed cabinet, powder coated steel construction and air gap between cabinet and insulated humidifier tank ensures safe surface temperature.
   1. Evaporation tank and all internal tank components to be constructed of 304 stainless steel.
   2. All tank surfaces shall be insulated with minimum 1” (25 mm) thick insulation and enclosed within unit cabinetry to ensure safe surface temperature, high overall effciency, and fast unit response time. Units with exposed insulation shall not be acceptable.
   3. Maintenance shall not require the removal of the steam distribution lines.
   4. Standard internal drain water cooler to ensure drain water tempering to 140° F (60° C).
   5. Blow-down p-trap, factory installed, enclosed in cabinet, prevents steam leakage to drain. Field installation not acceptable.
   6. Provide easily accessible, primary voltage terminal block, internal to cabinetry, for single point field connection of electrical supply.
   7. Single point connection for pressure steam inlet must be provided. Internal piping from steam valve to heat exchanger[s] must be factory installed and tested. Field piping from the inlet to the exchanger[s] is not allowed.
   8. Humidifier to prevent “back-siphoning” using an internal air gap for supply water, to meet local plumbing codes.
   9. Drain line to include a vacuum breaker to prevent siphon drainage of the tank.

E. Automatic water level control within a separate float chamber, isolated from the boiling action, to prevent false water level indication.
   1. Fill rate must modulate to match capacity demand to ensure consistent output. Fill cycles based on low water only is not acceptable.
   2. System shall fill through the bottom of the tank to reduce steam-quenching effect and noise level. Filling at top of the tank is not acceptable.
   3. Unit water level is to be continuously monitored with a dual magnetic electronic float system, located outside of the boiling water to ensure accurate water level control and reduced

maintenance. Cool fill water is to be supplied into the sensing chamber to keep the device cool. Systems using conductivity probes or floats located within hot reservoir water are not acceptable.

4. Float chamber must be located outside of the tank to keep the floats away from the boiling action. Units with floats in the tank as well as conductivity probes are susceptible to inaccurate water level sensing and failure, will not be considered.
5. Humidifier shall have a dual fill valve to feed water to the tank and float chamber, to reduce scaling and mineral build up on the magnetic floats.
6. Float chamber to include LED indication of five possible water level indications.
7. Ongoing self-diagnostics including periodic float operation and fill/drain rate verification.
8. Positive drainage/blow-down using a drain pump, drawing water from the bottom of the tank, maximizing mineral evacuation (when applicable). Skimmer not acceptable.
9. Blow down interval shall be based on actual steam production, and must be adjustable to compensate for all water conditions, to ensure maximum energy and maintenance efficiency.
10. Pre-cleaning flushing feature shall be provided to reduce maintenance time.
11. Must include end of season blow-down feature to evacuate contained water and minerals after 72 hours with no demand for humidification.

F. Factory mounted, full size, backlit, Uquid Crystal Display provides full operational status. Display to include a keypad for user interface and adjustment of operational parameters including:

1. Unit output (%).
2. Water level in the tank.
3. Modulating control demand status.
4. On/off control and safety (High limit, air proving) circuit status.
5. Actual room and/or duct rh, and humidity set point, when using transducer input[s].
6. Controller configuration (Proportional band and integral) when using transducer input[s].

7. Troubleshooting guide with scroll down menu.
8. Fault indication including date and time history.
9. Maintenance intervals.
10. Fill and drain status.
11. Drain/flush intervals and duration.
12. Date and time.
13. Capacity limitation.
14. 72 hours drain enable/disable.
15. Control type configuration on/off or full modulation when demand signal(s), or transducer input[s] are provided.
16. Up to 10 humidifiers, supplying one AHU or area, can be controlled in series from one modulating humidity control system.
17. Capability of interface to building management system using BACnet or LonTalk protocols.

Note: All operational parameters factory set to reduce field set-up time.

G. Standard of acceptance:

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. 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. 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 23 82 18