

**SUGGESTED ENGINEERING SPECIFICATIONS
MC ATOMIZING SYSTEM****15781 HUMIDIFIERS****I. GENERAL****A. Scope**

1. Furnish and install as indicated on the drawings and plans, an in-duct [space] atomizing humidification system complete and ready to operate.
2. Furnish owner's manuals and blueprints covering installation, start up, maintenance and operating instructions, complete in every way to permit efficient operation and maintenance of the system.
3. Manufacturer shall warrant the system to be free from defects in materials and workmanship for a period of 2 years after the sale.
4. Manufacturer shall furnish start up and check out of the system after installation, by a qualified factory trained representative.

II. PRODUCT**A. Atomizing Heads And Installation**

1. The system Atomizing Heads shall be constructed of all stainless steel and viton (or silicone), certified for operation on any water including deionized and R/O water. There shall be no copper or brass components in the atomizing heads - to prevent any ionic contamination.
2. The standard Atomizing Heads shall be designed to require only 30 psi of compressed air pressure with no more than 0.12 SCFM (0.15 CFM) per pound per hour of water atomized, and only 5 psi of water pressure. The heads shall individually generate no more than 68 dB at 5 feet distance.
3. The Atomizing Heads shall shut down automatically on loss of air pressure by means of a spring-loaded piston in the head, and shall shut off without dripping even when water pressure is maintained on the heads. On shut down, the piston shall move a stainless steel cleaning pin into the water orifice to clean it and also effect a seal to prevent ambient contamination. Air loss safety by means of a pressure electric switch is not acceptable.
4. The Atomizing Heads shall atomize the water by means of compressed air micro shearing and shall not use ultrasonic resonator cups or devices which require frequent adjustment and may drip. Internal atomization is unacceptable as it may cause internal mineral buildup and resulting increased maintenance.
5. Atomizing Heads shall be capable of producing droplet sizes of 10 micron and less, and shall have a turn down minimum of 100:1 per stage over the entire modulation range. Modulation shall be accomplished by a changing micro shear vacuum at the atomizing head discharge orifice.

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6. Manifolds and Atomizing Heads shall be constructed to fit the air handler or space area, and to provide the minimum capacities shown on the installation drawings.
7. In ducted systems, the manufacturer shall supply heads, factory preassembled on manifolds requiring no field assembly. In area systems, the manufacturer shall supply head assemblies factory preassembled for easy installation.
8. In ducted systems, the atomizing heads shall contain integral slide shutoff valves on every head for air and water shutoff, designed to prevent throttling.

B. System Control Cabinet

1. The system control cabinet shall be NEMA Type 1, constructed of 16 gauge steel, powder coated inside and out to protect against corrosion and to be aesthetically pleasing. NEMA Type 12, 4 or 4X shall be available as an option.
2. All internal electrical controls and components shall be prewired to appropriately marked terminals for field connection. All internal components and the cabinet shall be properly grounded and shielded from any water bearing controls contained in the cabinet.
3. Control cabinet shall be ETL, cETL, or UL, cUL listed as an industrial control enclosure, with all components in place.
4. Dedicated microprocessor controllers shall be used that include all operating functions with full backlit LCD display of humidity and alarms, automatic clean-out cycle, sensor failure alarms, high and low humidity alarms, and a stored history of alarms with date/time stamp.
5. Optionally, the microprocessor controller shall allow connection of an outdoor air temperature sensor for automatic adjustment of indoor relative humidity set point to avoid condensation on windows and building materials.
6. The controller shall have an integral RS422 or RS485 serial port to allow connection to BMS systems with total transfer of information. This shall be complete serial communication of all set points, status and alarms, not just acceptance of a modulating signal. Manufacturer shall have available interface gateways for ModBus, BacNet, LonWorks, TCP/IP and graphic monitoring/control software capable of running in Windows.
7. In ducted systems, manufacturer shall supply a duct mounted air flow proving device to prevent system operation on loss of air flow.
8. The cabinet shall be designed so that the water in the lines can be drained on shut down to prevent freezing of the atomizing liquid lines.

C. Operating Sequence And Control (In-Duct or Air Handler)

1. All humidity and/or temperature sensors shall continuously send their signals to the control cabinet for processing and indication. Sensors shall be of the thin film capacitive type for accuracy and durability. Accuracy shall be $\pm 3\%$ from 0-100%RH. Mechanical humidistats are unacceptable.

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2. On a fall in control air (return air) relative humidity and supply air relative humidity below their controller setpoints, the control logic shall bring the system Atomizing Heads into operation and shall modulate them from 0-100% of capacity as required to satisfy the demand.
3. On approaching either the control air (return air) or supply air setpoints, the control logic shall cause the system Atomizing Heads to decrease their output proportionally from 100-0% until the demand is satisfied while simultaneously decreasing air use and droplet size.
4. Aside from the normal operation of the system, the following events shall cause an immediate and total shutdown of the system:
 - Loss of air flow in the duct
 - Loss of electrical power
 - Loss of incoming air or water pressure

D. Operating Sequence And Control (Room or Open Area)

1. All humidity and/or temperature sensors shall continuously send their signals to the control cabinet for processing and indication. Sensors shall be of the thin film capacitive type for accuracy and durability. Accuracy shall be $\pm 3\%$ from 0-100%RH. Mechanical humidistats are unacceptable.
2. On a fall in room air relative humidity below the controller setpoint, the control logic shall bring the system Atomizing Heads into operation at full capacity. [Optional: Control shall modulate them from 0-100% of capacity as required to satisfy the demand.]
3. On approaching the room air setpoint, the control logic shall cause the system atomizing heads to shut off. [Optional: Control shall decrease their output proportionally from 100-0% until the demand is satisfied while simultaneously decreasing air use and droplet size.]
4. Aside from the normal operation of the system, the following events shall cause an immediate and total shutdown of the system:
 - Loss of electrical power
 - Loss of incoming air or water pressure

E. [Optional] Mist/Mineral Eliminators

1. Provide a mist eliminator system consisting of mist eliminator pads, stainless steel support frame, and drain pan.
2. Mist eliminator pads shall be of a nonhygroscopic material, approved for use in air handlers, and specially treated for anti-bacterial protection. Pressure drop shall not exceed 0.06" at 500 FPM. Maximum airflow capability will be 750 FPM. Bent plate or chevron type eliminators will not work with the small atomized droplets and are not acceptable.
3. Mist eliminator frame and drain pan shall be stainless steel constructed to prevent corrosion with an integral drain connection. Support mechanism shall be a stainless steel back grid to support the eliminator pads without sagging.

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4. Mist eliminator pad shall be capable of stopping and evaporating a 5 micron water droplet without pass through.

III. EXECUTION

A. General

1. Install the system(s) as detailed in the installation drawings and schedules and/or as recommended by the manufacturer.
2. Manufacturer to furnish complete submittal drawings before installation and as built shop drawings and operating manuals after start up of the system and acceptance by the owner.
3. Start up of the system shall be by a qualified, factory trained representative and shall include a training session for owner's maintenance personnel.
4. Air compressors shall have an air or water cooled aftercooler, moisture separator and trap, and a 0.1 micron coalescing filter to insure clean air delivery. Oil in the heads can cause premature mineral buildup. When air temperatures at the atomizing heads will regularly drop below 45 degrees Fahrenheit, a refrigerated or desiccant dryer is also required.
5. A commercial grade 5 micron water filter shall be installed before the system, to filter out rust, sediment and debris.
6. System shall be the MC 2000 Atomizing System as manufactured and distributed by:

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