DL TYPE A SPECIFICATION

PART 1 – GENERAL

1.1 Work Included:

a. CONDAIR DL – Pressurized Nozzle and Ceramic Media Humidifier[s]/Cooler[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. UL listed in accordance with UL998– Standard for Safety Humidifiers
b. SGS Institut Fresenius Certification in accordance with VDI 6022
c. ISO 9001-2008.
d. ANSI/NFPA 70 - National Electric Code.
e. AHRI 640, "Standard for Commercial and Industrial Humidifiers"
f. 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 installation or 30 months from manufacturer's ship date, whichever is earlier.

1.3 Related Sections:

1.4 Submittals:

a. Product Data: Including but not limited to product descriptions, models, dimensions, component sizes, rough-in requirements, service sizes, and finishes. Include rated capacities, operating weights, furnished specialties, and accessories.
    a. Submit manufacturer's installation instructions.
    b. Submit operation and maintenance data.
    c. Submit minimum water quality requirements and water pressure requirements.
b. Shop Drawings: For each type of humidification system specified.
    a. Submit details fabrication and installation of humidifiers.
    b. Submit piping details, plans, elevations, sections, details of components, and nozzle and media.
    c. Submit detail of humidifiers and adjacent equipment showing support locations, type of support, weight on each support, and required clearances.
    d. Submit wiring diagrams including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.

1.5 Schedules:

a. Refer to information contained in schedule[s] attached to this specification.
b. Humidifiers to be of type, capacity, and arrangement as listed in schedule[s].
c. Include accessories listed in schedule[s] and those accessories required for type of unit.

PRESSURISED NOZZLE AND CERAMIC MEDIA HUMIDIFIER – CONDAIR DL

PART 2 – PRODUCTS

2.1 The Condair DL, Type A, with Variable Frequency Drive [VFD] booster pump, pressurized nozzle and ceramic media humidifier system

2.2 Pre-engineered system, for air handler/duct application, uses pressurized nozzle technology to directly inject fine mist into the airstream with a ceramic media downstream for mist elimination.

2.3 Except as otherwise indicated, provide humidifiers and ancillary equipment with manufacturer's standard materials and components as indicated by published product information, designed, and constructed by manufacturer for complete installation. Site to provide power line, water to the unit and drain [not by humidifier manufacturer].

2.3 Acceptable Manufacturers: Subject to compliance with requirements, provide the product indicated on drawings/specifications or a comparable product by one of the following:

a. Condair Inc.
b. Condair Ltd.

2.4 Unit[s] shall be complete with:

2.4.1 General

a. Humidifier shall contain nozzle grid, connection hoses, and ceramic media for duct installation and pumps, valves, controls, and other mechanical components shall be provided in a separate module for installation external to the air stream.
b. Humidifier minimum installation length of 23.6” [distance from nozzle grid to ceramic media] while maintaining >80% water absorption efficiency
c. Humidifier accepts reverse osmosis and de-ionized water [0.5µS - 15µS].
d. Electronic controller, which monitors the operation of the system, controls output levels and initiates self-cleaning and flush cycles to ensure hygiene operation.
e. Humidifier powered by 200-240 volts single phase power supply.
f. Hydraulic system to supply water to the pressurized nozzles with 7 stages of control. 15 or 31 stage control is available as an option.
g. Control panel includes BTL Certified BACnet IP and BACet MS/TP, Modbus RTU [RS485 interface], and Modbus TCP [RJ45 Ethernet] as standard. Lonworks available as an option.

2.4.2 Nozzle Grid

a. Pre-assembled nozzle grid sections with color coded nozzle assemblies for easy connection to staging solenoid valves.
b. Pressurized nozzles to operate between 43.5 and 101.5 psi [3-7 bar].

c. 316SS Pressurized nozzles with capacities of: 3.3 lb/hr [1.5 l/hr], 5.5 lb/hr [2.5 l/hr], 6.6 lb/hr [3.0 l/hr], 8.8 lb/hr [4.0 l/hr], or 11 lb/hr [5.0 l/hr]
d. Nozzles spray angles can be adjusted into [4] positions to prevent condensing on AHU walls.
e. Threaded nozzle connections. All other connections to be push fit quick connections.

2.4.3 Ceramic Media

a. Media shall be made of porous ceramic material, absolutely free of fiberglass.
b. Replacement of media shall be achieved by individual removable tiles.
c. No tools required for media removal.
d. Rate of Evaporation: Dependent on the air volume, air temperature, and installation distance from nozzle grid.

2.4.3 Droplet Separator

a. Additional droplet separator required if air velocity exceeds the allowable limit.
    a. DL without additional mist eliminator allows velocities operation up to 492 fpm [2.5 m/s].
    b. DL with additional mist eliminator allows velocities operation up to 787 fpm [4.0 m/s].

2.4.5 Hydraulic Assembly

a. Packaged Hydraulic Assembly shall be installed external to airstream and include all components required for circulation water including; optional pump, Hygiene Plus canister, staging valves, sensors, and drainage system.
b. A maximum of 31 stage control shall be available as an option, 7 stage standard and controlled by up to [5] 24Vdc solenoid valves.
c. VFD controlled pump in DL Type A systems.
d. Optional sterile filter.
e. Water jet pump to allow for draining of the nozzle supply lines.
f. The hydraulic unit shall include a Hygiene Plus canister to actively does the supply water with silver ions as a means of bacteria control.
g. Inlet valve, pressure gauge and sensor to ensure correct supply water pressure of 43.5-101.5 psi [3-5 bar].
h. Standard conductivity sensor to monitor supply water conductivity. Control panel to trigger alarm if conductivity increases above allowable limit.

2.4.6 Management System

a. Microprocessor control using a proportional-integral method for interpreting analog signals from a humidistat and or building control systems.

b. The controller determines which stages should be activated to meet humidification loads.
c. The controller activates self-maintenance cycles. This includes controlled flushing of the water supply lines and drain cycles to maintain cleanliness of the water loop.
d. Control panel complete with on/off switch, auto drain switch, and LCD touch screen for fault, maintenance, and operational indication.

2.4.7 Control panel with backlit Touch Screen Display to have the following functionality:

a. Service indicator and LED power on.
b. Intuitive touch screen back-lit graphic display.
c. Display of relative humidity and set point.
d. Display of operating hours.
e. Capacity output.
f. Real-time date and time.
g. Error history indication.
h. Limited capacity adjustment.
i. Inlet flush and line purging.
j. Adjustable maintenance intervals and alarms.
k. Remote relay testing.
l. Modbus standard host protocol.
m. Terminal block installed for easy field connection[s].

2.4.8 Humidity Control Methods

a. Humidistat/thermostat or BMS control.
b. Accepts standard modulating control signals.
c. On/Off, 24 VAC safety loop for On/Off control, air proving, and/or high limit.

2.5 Aerosol Breakdown and Hygiene Control

a. Management System capable of real-time flushing, purging and cleaning cycles via the Management System control panel. In the event of no call for humidity, humidifier shall drain all water from the nozzle supply lines.
b. Humidifier Operation: Aerosol-free operation guaranteed under maximum air velocity of 787 fpm [4.0 m/s].

2.6 Optional DL unit features/accessories include:

a. Secondary droplet seperator.
b. 15 or 31 Stage step control.
c. Remote fault indication board.
d. Integrated sterile filter.
e. Leak detection sensor.

f. Silicone free.
g. Compressed air flushing connections.
h. External valve block with additional auxiliary outlet valve [type A systems only].
i. On/Off digital duct high limit humidistat.
j. Air proving switch.
k. 10V Digital Duct Humidistat package.
l. 0 - 10V Digital Wall Humidistat.
m. 2-10V Digital Wall Humidity Sensor.
n. 2-10V Duct Humidity Sensor.

PART 3 – EXAMINATION

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. If preparation is the responsibility of another installer, notify the engineer of deviations from the manufacturer's recommended installation tolerances and conditions.
d. Do not proceed with installation until substrates have been properly prepared and deviations are corrected.
e. Commencement of installation constitutes acceptance of conditions.

3.2 Installation:

a. Install humidifiers and components per manufacturers' instructions, with approved shop drawings and manufacturer's recommendations.
b. Seal humidifier duct penetrations with flange.
c. Install with required clearance for service and maintenance.

3.3 Commissioning, Testing, and Adjusting:

a. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections.
b. Test Results: Reported in writing to the engineer.

i. Leak Test: After installation, charge the system and test for leaks. Repair leaks and retest until no leaks exist.
ii. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation. Remediate any malfunctioning units and retest.
iii. 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.
    i. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
    ii. Review data in maintenance manuals.
    iii. Schedule training with Owner, through the engineer, with at least seven days advance notice.

3.5 Protection and Cleaning:

a. Protect humidification system components from damage until the date of substantial completion.
b. Repair or replace damaged components that cannot be repaired.
c. Remove temporary protective coverings and excess materials.