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**Mechanical Specifications**

**GENERAL DESCRIPTION – MODULAR HI-RISE FAN COIL UNITS**

**MPY –** Concealed Modular Hi-Rise

**MAY –** Concealed “Ditto” Modular Hi-Rise: “A” Unit

**MBY –** Concealed “Ditto” Modular Hi-Rise: “B” Unit

**MMY –** Concealed “Primary” Modular Hi-Rise

**MSY –** Concealed “Secondary” Modular Hi-Rise

**MXY –** Exposed Modular Hi-Rise

**MPF –** Concealed Modular Hi-Rise with SureFlow® System

**MAF –** Concealed “Ditto” Modular Hi-Rise: “A” Unit with SureFlow® System

**MBF –** Concealed “Ditto” Modular Hi-Rise: “B” Unit with SureFlow® System

**MMF –** Concealed “Primary” Modular Hi-Rise with SureFlow® System

**MSF –** Concealed “Secondary” Modular Hi-Rise with SureFlow® System

**MXF –** Exposed Modular Hi-Rise with SureFlow® System

**PART 1 – GENERAL**

1.1 SUMMARY

A. This section includes fan coil units and accessories.

1.2 SYSTEM DESCRIPTION

A. Vertical Stack Fan Coil Units

B. [2-pipe cooling only] [2-pipe heating only] [2-pipe heat/cool] [2-pipe heat/cool auxiliary electric heat] [2-pipe cool total electric heat] [4-pipe heat/cool] [SureFlow® 1x2-pipe (1 pipe required for supply and return] [SureFlow® 2x4-pipe (2 pipes required, one for heating and one for cooling supply and return)] [SureFlow® 1x2-pipe (1 pipe required for supply and return) with electric heat]

1.3 QUALITY ASSURANCE

A. Fan coils shall be Certified and Listed in accordance with AHRI Standard 440-2019.

B. [Each hydronic coil shall be factory tested for leakage at [350] [400] [450] psig air pressure with coil submerged in water.]

C. Base or “standard” units shall be ETL listed.

D. IEC certified as an ISO 9001:2015 quality management system and ISO14001:2015 environmental management system organization.

1.4 DELIVERY, STORAGE AND HANDLING

A. Unit shall be handled and stored in accordance with the manufacturer’s instructions.

**PART 2 – PRODUCTS**

2.1 MANUFACTURER

A. Basis of design shall be fan coils by International Environmental Corporation.

2.2 CONFIGURATION

A. General:

1. Factory assembled vertical stack fan coil units complete with coil, fan, motor, drain pan, and all required wiring, piping and controls.

2. Cabinet shall be made of heavy 20 gauge galvanized steel.

3. The interior surfaces shall be lined with [1/2˝ thick standard fiberglass] [1/2˝ foil faced] [1/4˝ closed cell] insulation. Insulation and adhesive shall meet NFPA-90A requirements for flame spread and smoke generation.

4. Adhesive shall be certified according to the GREENGUARD Indoor Air Quality (IAQ) Certification for Low Emitting Products. Reference Standard: GGPS.001 GREENGUARD IAQ Standard for Building Materials, Finishes, and Furnishings. Reference Standard: GGPS.002 GREENGUARD Children & SchoolsSM Standard.

5. Units shall have a [galvanized internally coated] [stainless steel externally coated] drain pan with 2-part closed cell foam insulation, extending the entire width of the cabinet. Drain pan shall be factory piped to the drain riser port with a removable/cleanable “p-trap.”

6. All valve package piping to coil(s) shall be factory installed.

7. Units shall have [non-woven synthetic throwaway] [framed permanent washable non-metallic] [pleated MERV 8] filter.

B. MPY, MPF Concealed Modular Hi-Rise Units:

1. Units shall be supplied with dry-wall stop collar(s) for return panel and supply grille installation in locations indicated on the plans.

2. Return air panel shall be [Stamped] [Stamped with Frame] [Framed Perimeter Panel] [Tall Stamped Panel] [Tall Stamped Panel with Frame] [Tall Stamped Panel with Control Access Door] [Tall Stamped Panel with Frame and Control Access Door], painted with an [Arctic White] [Polar White] [Flat Black] [Ermine Gray] [Champagne Beige] [Toffee Brown] [color determined by Architect] powder-coat finish.

3. [Units shall have an aluminum [double deflection supply air grille(s)] [one double deflection and one double deflection grille with opposed blade damper], with an [Anodized Aluminum] [Arctic White] [Polar White] [Flat Black] [Ermine Gray] [Champagne Beige] [Toffee Brown] [color determined by Architect] powder-coat finish.] [Units shall be supplied with duct flange(s) for supply duct connection.]

4. Conditioned air block off panel shall provide access to the valve package and blower.

5. Removable return air panel shall provide access to the coil and air filter.

6. [Full riser chase.]

C. MAY/MBY, MAF/MBF Ditto Concealed Modular Hi-Rise Units:

1. Units shall be supplied with dry-wall stop collar(s) for return panel and supply grille installation in locations indicated on the plans.

2. Return air panel shall be [Stamped][Stamped with Frame] [Tall Stamped Panel][Tall Stamped Panel with Frame][Tall Stamped Panel with Control Access Door] [Tall Stamped Panel with Frame and Control Access Door], painted with an [Arctic White] [Polar White] [Flat Black] [Ermine Gray] [Champagne Beige] [Toffee Brown] [color determined by Architect] powder-coat finish.

3. [Units shall have an aluminum [double deflection supply air grille(s)] [one double deflection and one double deflection grille with opposed blade damper], with an [Anodized Aluminum] [Arctic White] [Polar White] [Flat Black] [Ermine Gray] [Champagne Beige] [Toffee Brown] [color determined by Architect] powder-coat finish.] [Units shall be supplied with duct flange(s) for supply duct connection.]

4. Conditioned air block off panel shall provide access to the valve package and blower.

5. Removable return air panel shall provide access to the coil and air filter.

6. Two concealed modular hi-rise units shall share a common riser set and will be shipped joined together by a common UL one-hour fire-rated riser chase. Risers required for shipment.

D. MMY/MSY, MMF/MSF Primary/Secondary Concealed Modular Hi-Rise Units:

1. Units shall be supplied with dry-wall stop collar(s) for return panel and supply grille installation in locations indicated on the plans.

2. Return air panel shall be [Stamped Panel] [Stamped Panel with Frame] [Tall Stamped Panel] [Tall Stamped Panel with Frame] [Tall Stamped Panel with Control Access Door] [Tall Stamped Panel with Frame and Control Access Door], painted with an [Arctic White] [Polar White] [Flat Black] [Ermine Gray] [Champagne Beige] [Toffee Brown] [color determined by Architect] powder-coat finish.

3. [Units shall have an aluminum [double deflection supply air grille(s)] [one double deflection and one double deflection grille with opposed blade damper], with an [Anodized Aluminum] [Arctic White] [Polar White] [Flat Black] [Ermine Gray] [Champagne Beige] [Toffee Brown] [color determined by Architect] powder-coat finish.] [Units shall be supplied with duct flange(s) for supply duct connection.]

4. Conditioned air block off panel shall provide access to the valve package and blower.

5. Removable return air panel shall provide access to the coil and air filter.

6. Two concealed modular hi-rise units share a riser set but are shipped separately.

7. MSY unit piping terminated externally.

E. MXY, MXF Exposed Modular Hi-Rise Units:

1. Units shall have a double deflection steel core grille assembly, painted with an [Arctic White] [color determined by Architect] powder-coat finish.

2. Return air panel shall be Stamped Panel [with Control Access Door] painted with an [Arctic White] [Polar White] [Flat Black] [Ermine Gray] [Champagne Beige] [Toffee Brown] [color determined by Architect] powder-coat finish.

3. Integral return-air panel with stamped grille and chrome-plated 1/4 turn fasteners and double-deflection steel core supply grille assembly come standard.

4. Cabinet shall be painted with an [Arctic White] [Polar White] [Flat Black] [Ermine Gray] [Champagne Beige] [Toffee Brown] [color determined by Architect] powder-coat finish.

5. Full riser chase included.

2.3 CERTIFICATION

A. Safety Agency:

Units shall be listed by ETL indicating the units comply with the minimum requirements of the U.S. and Canadian national product safety standard, ANSI/UL Standard 1995, and with CAN/CSA C22.2 No. 236.

B. Capacities:

Fan coil capacities are certified and listed in accordance with AHRI Standard 440-2019.

2.4 MATERIALS

A. Coils:

1. All coils shall have 1/2˝ copper tubes, [manual] [automatic] air vent(s), and [aluminum fins, galvanized end sheet] [aluminum fins, stainless steel end sheets] [copper fins, stainless steel end sheets], 14 fins per inch spacing, galvanized end sheets. Coil fins shall be mechanically bonded to copper tubes. [SureFlow® coils shall be designed for use with a circulator matched for SureFlow® applications.]

2. Copper tubes must comply with ASTM B-75.

3. Fin thickness shall be 0.0045˝.

4. Tube thickness shall be 0.016˝.

5. Coil rows shall be as indicated on the drawings.

B. Valves:

1. For installation in a [2-pipe] [4-pipe] system, unit shall be equipped with:

A. Valve size shall be [1/2”] [3/4”], as shown on the drawings. [Heating valve size shall be ½”.][SureFlow® valve size shall be ¾”.]

B. [1] [2] [4] manual ball valves for service

C. [1] [2] motorized control valve, 300 psig service (non-SureFlow® application):

a. Primary - [25 psid close-off paddle-type] [150 psid normally closed ball-type] [150 psid normally open ball-type] [35 psid floating] [35 psid proportional] with quick-release actuator.

b. Secondary - [25 psid close-off paddle-type] [150 psid normally closed ball-type] [150 psid normally open ball-type] [35 psid floating] [35 psid proportional] with quick-release actuator

D. [1] [2] low watt SureFlow® circulator:

a. Circulator shall be rated at 200 psig with fluid temperatures between 40⁰F and 190⁰F.

b. Circulator shall include spring-type check valve with minimum 10”W.G. resistance.

c. Circulator shall be line voltage and factory wired.

d. Shall include a support bracket for factory mounted circulators, condensate baffle and removable cartridge that includes all moving parts.

2. Valve package shall be equipped with specialty devices as indicated on the drawings.

A. Coil connections – [unions at the coil] [standard factory arrangement]

B. Flow Controls (non-SureFlow® only)

a. Primary - [Return fixed flow control shall be specified on the equipment schedule.] [Circuit setter pressure ports] [Circuit setter P-T ports] [Not supplied]

b. Secondary - [Return fixed flow control shall be specified on the equipment schedule.] [Circuit setter pressure ports] [Circuit setter P-T ports] [Not supplied]

C. Hoses (non-SureFlow® only) - [24” braided stainless hoses manufactured of EPDM with integral internal Kevlar fabric reinforcement. Hoses shall be rated to fire and smoke standard per ASTM E 84-00 and (NFPA 255, ANSI/UL 723 & UBC 8-1).] [Not supplied]

D. Service Fittings

a. Primary - [Supply P-T port] [Return P-T port] [Supply and Return P-T port] [Pressure port] [Not supplied]

b. Secondary - [Supply P-T port] [Return P-T port] [Supply and Return P-T port] [Pressure port] [Not supplied]

E. Strainer

a. Primary - [Y- Strainer] [Y-Strainer with blowdown] [Not supplied]

b. Secondary - [Y- Strainer] [Y-Strainer with blowdown] [Not supplied]

F. Balance Valve

a. Primary - [Return line only] [3-way bypass] [Not supplied]

b. Secondary - [Return line only] [3-way bypass] [Not supplied]

C. Fans:

1. Fans shall be direct-drive, double-width fan wheels with forward-curved blades.

2. Blower wheels shall be statically and dynamically balanced.

3. Scrolls and fan wheels shall be constructed of galvanized steel.

4. Shall be easily removable.

D. Motors:

1. [Motors shall be 3-speed, single phase, 60 Hz constant-torque ECM motors with means for [potentiometer field adjustment of each speed] [variable 0-10V input] [4 speed solid state potentiometer field adjustment], for [115] [208] [230] [277] volts, permanently lubricated ball bearings.]

2. Motors shall be connected with quick connect electrical plugs.

3. Motors shall have internal thermal overload protection with automatic reset.

E. Controls and Safeties:

1. Controls Voltage:

a. Unit shall be equipped with [24VAC] control.

2. Control Package shall be equipped with specialty devices listed below:

a. [24V condensate overflow switch.] [No condensate overflow swich]

b. [Thermostat]

i. [24VAC digital thermostat] [Wi-Fi] [7-day programmable] [BACnet] [Thermostat control by others]

c. [3-speed, 4-position fan switch on a wall plate for field installation.]

F. Operating Characteristics:

1. [A 2-pipe system shall be capable of providing heating or cooling as determined by the operating mode of the central water supply system. [Pipe temperature sensor shall control the sequence of the thermostat, as indicated on the drawings.]] [2-pipe with total electric heat shall be capable of providing heating and cooling on demand.] [A 4-pipe system shall be capable of providing heating and cooling on demand.]

G. Electrical Requirements

1. Standard unit shall operate on [115] [208] [230] [277] volts, single phase, 60 Hz electrical power, and all exposed wiring shall be in flexible conduit.

H. Options and Accessories:

1. Unit shall be equipped with nichrome wire strip electric heaters for total or auxiliary electric heat as specified on the equipment schedule.

a. Heaters shall be protected by an automatic reset safety cutout switch and a fusible link. Single power source fusing shall be factory installed.

b. Heater capacity shall be as specified on the equipment schedule.

c. Heaters shall be single phase [120] [208] [240] [277] volts as specified on the equipment schedule.

d. For auxiliary electric heat, unit controls shall include an aquastat to verify system mode.

2. [Service switch with lock-out & tag-out features shall be factory installed.] [No Service Switch furnished.]

3. Incoming power [fused] [non-fused].

4. [[24 VAC bipolar ionizer] [No bipolar ionizer supplied.]

5. [Outside air shall be provided with [Manual 5” x 7” sliding damper] [4” square sliding damper assembly] [ 4” square motorized damper assembly].

6. [One cabinet upsize (17” to 20”) or (20” to 24”)] [Double cabinet upsize (17” to 24”).]

7. [Cabinet Height shall be [79”] [80”] [81”] [82”] [83”] [84”] [85”] [86”] [87”] [88”].]

8. [Full riser chase (MPY only).]

9. Risers

a. [Risers shall be factory installed, [piped to valve package with hard copper] [hose kit factory installed between riser and valve package]

a. [Risers shall be shipped loose, [hose kit shipped inside unit] and bundled by unit and crated by floor.]

a. [Risers shall not be supplied, [piping terminates internally, hoses ship inside unit] [piping terminates externally, swaged and braced for shipment].

b. Riser diameter shall be specified on equipment drawings.

c. Riser insulation thickness shall be specified on equipment drawings

d. Drain riser shall be minimum 1in. diameter Type M copper.

e. Length of risers shall be as specified on equipment drawings.

f. Riser extensions shall be specified on equipment drawings.

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