

## **Mechanical Specifications**

### **Capacity Fan Coil Units, Vertical Direct Drive**

Model FDV

#### **General**

Furnish and install Vertical Direct Drive High Capacity Fan Coil Units where indicated on the plans and in the specifications, with required mounting components and accessories. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. Units shall be ETL certified for the United States and Canada in compliance with UL/ANSI Standard 1995 and CSA C22.2 No. 236-95, and where applicable, be certified as complying with ARI Standard 440-2008.

#### **Construction**

Cabinet panels shall be fabricated of 18-gauge galvanized channel formed steel panels. Cabinet design shall include 4 corner posts for superior strength allowing front, back and connection opposing side panels to be removable for service access. [Panels to have interior 24-gauge galvanized steel layer, forming a double wall construction.]

All plenum panels shall be insulated with ½" thick 2 lb density matt-faced fiberglass [½" thick foil faced fiberglass with scrim and taped edges to prevent any fibers from reaching the airstream] [½" thick elastomeric closed cell foam insulation]. Insulation shall conform to NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21.

Units shall have a minimum 1" duct collar on the return and/or discharge.

#### **Sound**

Units shall have published sound power level data tested in accordance with ARI Standard 260 for ducted units.

#### **Power**

Units shall not exceed scheduled power consumption.

#### **Fan and motor**

Unit fan shall be dynamically balanced, forward curved, DWDI centrifugal type constructed of galvanized steel with aluminum blower wheel for corrosion resistance. Motors shall be permanent split-capacitor [electronically commutated high efficiency, programmable brushless DC], totally enclosed, tap wound for 3-speed, permanently lubricated sleeve bearing, type with automatic reset integral thermal overload protection. Shaded pole motors are not acceptable. Single speed motors are not acceptable. Prior to shipping, all motors shall be assembled, factory tested and installed in the unit.

The fan/motor assembly shall be constructed of 16-gauge galvanized steel and installed in a z-channel mounting frame for ease of sliding fan/motor deck in and out through the front panel.

Each fan/motor assembly shall be fastened by no more than 2 forward facing screws. [The motor shall have a quick connect to allow service and removal without the need for tools.]

### **Drain pan**

Primary condensate drain pan shall be single wall, 18-gauge epoxy powder coat painted, galvanized steel for corrosion resistance and extend under the entire coil section. Drain pans shall be of one piece construction and be positively sloped in 2 directions for condensate removal.

Drain pan to be easily removable by sliding out from c-channel and shall be fastened by no more than 2 screws. Drain pan access that requires the removal of coils is not acceptable.

The primary drain pan shall be externally insulated with elastomeric closed cell foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Internally sprayed insulation will not be acceptable.

- Option: Provide a primary drain pan constructed entirely of 20-gauge stainless steel for superior corrosion resistance.

### **Coils**

All cooling and heating coils shall optimize rows to meet the specified capacity. Coils shall have 1/2" OD seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and aluminum fin. Minimum copper tube thickness shall be 0.016".

Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover. Minimum fin thickness shall be 0.0045". Lanced fins shall not be acceptable.

All coils shall be tested at 350 PSIG air pressure under water, and rated for a maximum 300 PSIG working pressure at 200°F. Coils shall be circuited for counter flow to maximize unit efficiency.

Coil casing shall be fabricated from galvanized steel [stainless steel].

Heating coils shall be furnished in the re-heat position.

Steam coils shall be standard single tube steam type suitable for temperatures above 35°F and 15 PSIG steam pressure.

All water coils shall be provided with a manual air vent [automatic air vent] fitting to allow for coil venting.

### **Filters**

Unit shall be furnished with a minimum 2" pleated MERV 7 filter. Filters shall be tight fitting to prevent air bypass.

## Electrical

Units shall be furnished with single point power connection. Provide an electrical control board for motor and other electrical terminations using spade connectors.

- Option: Provide 24 VAC fan relays with 40 VA transformer as integral part of control board. Fan relays designed to operate in conjunction with factory provided [field provided] 24 V thermostat. Fan relays designed to accept 120, 208, 220, 230, or 277 V input power. Relays shall operate with generic non-digital [digital, non-programmable] [digital, programmable] thermostat designed to control up to three independently energized fan speeds.
- Option: Provide a service disconnect switch to isolate power from the unit during maintenance.
- Option: Provide a manual motor starter to provide overload protection for the motor.

Primary internal wiring and testing shall be conducted at the factory. All units shall be shipped with wiring diagrams.

## Electric heat

Furnish an electric resistance heating assembly as an integral part of the fan coil unit, with the heating capacity, voltage and kilowatts scheduled.

The heater and unit assembly shall be listed for zero clearance and meet all NEC requirements, and be ETL listed with the unit as an assembly in compliance with UL/ANSI Standard 1995.

All heating elements shall be finned tubular electric heating elements, constructed of nickel-plated steel fins spirally wound over a heating element, metallurgically bonded by furnace brazing. Coil terminals are constructed of nickel-plated steel with epoxy end seal. Electric heating elements shall be located in the reheat position and shall be non-accessible to room occupants.

Elements terminated with stainless-steel machine-staked terminals secured with stainless-steel hardware.

All heaters shall include over temperature protection consisting of an automatic reset primary thermal limit safety switch and back-up secondary thermal limit safety device. All heaters shall be single stage.

Separate fusing is provided for each element for overcurrent protection.

All internal wiring shall be rated for 105°C minimum.

## Piping packages

Provide a standard factory assembled valve piping package to consist of a 2 or 3-way, on/off, motorized electric control valve and two ball isolation valves.

Control valves shall be piped normally closed to the coil. Maximum entering water temperature on the control valve shall be 200°F, and maximum operating pressure shall be 300 PSIG.

- Option: Unions shall be provided to allow easy removal of piping package from unit without the need for brazing or cutting pipe.
- Option: Provide 3-wire floating point modulating control valve (fail-in-place), in lieu of standard 2-position control valve with factory assembled valve piping package.
- Option: Provide proportional 0-10 VDC modulating control valve, in lieu of standard 2-position control valve with factory assembled valve piping package.
- Option: Provide high pressure close-off actuator for 2 or 3-way on/off control valve. Maximum close-off pressure is 75 PSIG.
- Option: Provide an adjustable flow control device for each piping package.
- Option: Provide a fixed flow control device for each piping package.
- Option: Provide pressure-temperature ports (P/T) for each piping package to allow measurement across the coil.

Piping packages shall be completely factory assembled including interconnecting pipe, factory tested for leaks and shipped loose for field installation.

Units shall be manufactured in accordance with ISO 9001:2008 standards established and maintained by Zehnder Rittling.