TVHC Fan Coil Guide Specifications

GENERAL
Furnish and install Titus Model TVHC Vertical Concealed Direct Drive Fan Coil Unit where indicated on the plans and specifications. Units shall be completely factory assembled, tested and shipped as one piece except where noted.

All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating, and air delivery. All unit dimensions for each model and size shall be considered maximums. Units shall be ETL listed in compliance with UL/ANSI Standard 60335-2-40 / CSA C22.2 No. 60335-2-40 and be certified as complying with the latest edition of AHRI Standard 440.

Unit shall be produced in a facility found to conform to the Quality Management System standard:
ISO 9001:2015.

CONSTRUCTION
All units shall be fabricated of heavy gauge galvanized steel, able to meet 125 hour salt spray test per ASTM B-117. Casing shall be internally lined with 1/2" thick fiberglass insulation, rated for a maximum air velocity of 5000 f.p.m. Maximum thermal conductivity shall be .24 (BTU • in) / (hr • ft^2 • °F). Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL 723 and NFPA 90A.

All units shall have a minimum 1" duct collar on the discharge. All access panels shall be fully insulated and attached with standard fasteners on at least two opposite sides. No coil, drain piping, or electrical connections shall pass through any access panel.

Option: Provide foil faced insulation in lieu of matt faced insulation. Foil insulation shall meet or exceed the requirements stated above, and in addition meet ASTM Standards C-665 and C-1136 for mold, mildew, and humidity resistance. Insulation shall be lined with aluminum foil, fiberglass scrim reinforcement, and #30 kraft paper laminated together with a flame-resistant adhesive. All exposed edges shall be sealed to prevent any fibers from reaching the air stream.

Option**:** Provide elastomeric closed cell foam insulation in lieu of standard. Insulation shall meet all requirements of NFPA 90-A flame and smoke spread and melting point, as well as ASTM G-21 for bacterial and fungi resistance. Polyethylene insulation is not acceptable.

Each unit shall be furnished with a one-piece heavy gauge G90 steel drain pan with welded corner construction.

Option: Provide a single wall primary drain pan constructed entirely of heavy gauge type 304 stainless steel for superior corrosion resistance. Stainless steel drain pans shall meet or exceed the requirements stated above.

SOUND
Units shall have published sound power level data tested in accordance with AHRI Standard 350-86.

FAN ASSEMBLY
Unit fan shall be dynamically balanced, forwardly curved, direct drive DWDI wheel with 18-gauge galvanized chromate coated double inlet scroll. Motor shall include torsion flex suspension mount affixed to scroll using permanently attached mounting studs. Motor mount shall be secured with Nylock® lock nuts. Blower scroll shall be mounted to fan bulkhead with 18 gauge mounting rail in a manner to allow no metal-to-metal contact with fan bulkhead.

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Blower motor shall be high efficiency, permanently lubricated sleeve bearing, permanent split-capacitor type with thermal overload protection and three separate horsepower taps. Single speed motors are not acceptable. The fan motor shall be unpluggable from the electrical leads at the motor case for simplified removal.

Option: Provide an electronic (SCR) fan speed controller for aid in balancing the fan capacity. The speed controller shall have a turn down stop to prevent the possibility of harming the motor bearings, and incorporate electrical noise suppression to minimize noise on the incoming power lines.

Option**:** Provide three-speed fixed electrically commutated motor (ECM) or constant torque spoked rotor type adjustable ECM to enhance efficiency and reduce future maintenance, paired with a PWM speed control board ICM Sync (2-10V) or ICM Select (3-speed).

COILS
All unit coils shall be rated in accordance with AHRI 410.

All coils shall be 1/2" O.D. seamless copper tubes with collared and corrugated aluminum fins. All tubes shall be mechanically expanded to provide an efficient bond between tube and fin. All water coils shall be provided with a manual air vent fitting to allow for coil venting. Valve core type vent fittings shall not be accepted.

All chilled water and hot water coils shall have 0.0055" thick aluminum fins and 0.016" tube wall thickness.

All coils shall be hydrostatically tested with air under water at 450 PSIG minimum pressure and rated for a maximum of 450 PSIG working pressure at 200°F.

OPTIONS
Coil casing shall be fabricated from 304 Stainless Steel.

Provide automatic air vents, in lieu of manual air vents.

Fin material shall be (0.0075" thick aluminum) (0.0075" thick copper).

Tube wall thickness shall be 0.025" on chilled water or hot water coils.

FILTER
All units shall be furnished with a minimum 1" nominal throwaway filter. Provide optional 2" filter rack with 2" throwaway filter where indicated. Filters shall be tight fitting to prevent air bypass.

Option**:** Provide MERV 8 or MERV 13, 1" or 2" filter.

DISCHARGE PLENUM SECTION
Provide a fully insulated integral discharge plenum section, complete with double deflection supply grille. Discharge plenum sections shipped loose for field installation to the units are not acceptable.

MIXING BOX SECTION
Provide a fully insulated integral mixing box section, complete with return and outside air dampers. Mixing box sections shipped loose for field installation to the units are not acceptable.

ELECTRICAL
Units shall be furnished with a single point power location and electrical junction box for motor and other electrical terminations.

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ELECTRIC HEAT SECTION
Provide an integral electric resistance heating assembly with the heating capacity, voltage, kilowatts, and stages as shown in the schedule.

The heater assembly shall be designed and rated for installation to the air handling unit without the use of duct extensions or transitions between the unit and the heater assembly. The heater shall be factory assembled and completely wired for single point power connection.

The heater and unit assembly shall be listed for zero clearance and shall meet all NEC requirements and be ETL listed with the unit as an assembly in compliance with UL/ANSI Standard 60335-2-40 / CSA C22.2 No. 60335-2-40, or UL 1995/CSA C22.2 No 236. (UL 60335-2-40).

All heating elements shall be open coil design using Ni-Chrome wire mounted in ceramic insulators and housed in an insulated heavy gauge galvanized steel housing. All elements shall terminate in a machine staked stainless steel terminal secured with stainless steel hardware for corrosion resistance. The element support brackets shall be spaced no greater than 3-1/2" on center. All internal wiring shall be rated for 105°C minimum.

All heaters shall include overtemperature protection, and shall be interlocked with the fan. All heater elements shall be single stage unless noted otherwise on the plans.

An incoming line power distribution block shall be provided. The power distribution block shall be designed to accept incoming power wiring capable of carrying 125% of the calculated load current.

A manual reset secondary thermal limit is standard

PIPING PACKAGE OPTIONS

Provide a non-insulated, standard factory assembled valve piping package (1/2", 3/4", 1") or piping package parts kit (1¼", 1½") to consist of a 2-way or 3-way, on/off, motorized electric control valve, unions, and two ball isolation valves. Control valves are piped normally closed to the coil. Maximum entering water temperature on the control valve shall be 200°F. Maximum operating pressure shall be 450 PSIG.

Option: Provide 24V floating point modulating control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package (1/2", 3/4", 1") or piping package parts kit (1¼", 1½").

Option: Provide 0-10V proportional control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package (1/2", 3/4", 1") or piping package parts kit (1¼", 1½").

Option: Provide either a fixed or adjustable flow control device for each piping package.

Option: Normally Open in lieu of Normally Closed on/off valves.

Option: Provide y-strainers, and/or pressure-temperature ports for each piping package.

1/2", 3/4", and 1" Piping packages shall be completely factory assembled, including interconnecting pipe, and shipped separate from the unit for field installation onto the coil, so as to minimize the risk of freight damage.

1¼" and 1½" Piping packages shall ship as a parts kit, including instructions, for field assembly and installation. 1¼" and 1½" Piping packages shall include unions with integrated P/T ports as a standard feature.

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THERMOSTATS

Provide a "**D"** Series Standalone Digital Non-Programmable thermostat with LCD display for 2-pipe or 4 pipe configurations and on/off actuators.

Option: Provide a "**P"** Series Standalone Digital Programmable thermostat with LCD display for 2-pipe or 4 pipe configurations and on/off actuators.

Option: Provide a "**N"** Series Standalone or BACnet capable Digital Programmable thermostat with LCD touchscreen display, usb configuration available, built-in occupancy and humidity sensors, plug and play with Verasys and MAP access tool, for 2-pipe or 4 pipe configurations and on/off actuators.

Option: Provide a "**F"** Series Standalone or BACnet capable Digital Programmable thermostat with LCD touchscreen display, usb configuration available, built-in occupancy and humidity sensors, plug and play with Verasys and MAP access tool, for 2-pipe or 4 pipe configurations and floating/modulating actuators.

Option: Provide a "**V"** Series Standalone or BACnet capable Digital Programmable thermostat with LCD touchscreen display, usb configuration available, built-in occupancy and humidity sensors, plug and play with Verasys and MAP access tool, for 2-pipe or 4 pipe configurations and proportional actuators.