# Price Vertical Concealed Fan Coil Units

# Division 23 – Heating, Ventilating, and Air Conditioning

# Section 23 82 19 – Fan Coil Units

The following specification is for a defined application. Price would be pleased to assist in developing a specification for your specific need.

# PART 1 – GENERAL

##  Section Includes

1. Vertical Concealed Fan Coil Units.

##  Related Requirements

1. Section 01 40 00 - Quality Requirements
2. Section 01 74 19 - Construction Waste Management and Disposal
3. Section 01 78 00 - Closeout Submittals
4. Section 01 79 00 - Demonstration and Training
5. Section 23 09 93 - Sequence of Operations for HVAC Controls.
6. Section 23 21 13 - Hydronic Piping: Connections to heating coils.
7. Section 23 21 14 - Hydronic Specialties: Connections to heating coils.
8. Section 23 31 00 - HVAC Ducts and Casings.
9. Section 23 33 00 - Air Duct Accessories.
10. Section 23 37 00 - Air Outlets and Inlets.
11. Section 23 82 00 - Convection Heating and Cooling Units: Air coils.
12. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

##  Reference Standards

1. All referenced standards and recommended practices in this section pertain to the most recent publication thereof, including all addenda and errata.
2. AHRI 350 - Sound Performance Rating for Non-ducted Indoor Air-conditioning and Heat Pump Equipment
3. AHRI 410 - Standard for Forced-Circulation Air-Cooling and Air-Heating Coils.
4. AHRI 440 - Standard Performance Rating for Room Fan-Coils.
5. ASHRAE 62.1 - Standard for Ventilation for Acceptable Indoor Air Quality.
6. ASHRAE 130 - Standard Methods of Testing for Rating Ducted Air Terminal Units.
7. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
8. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
9. ASTM E488/E488M - Standard Test Methods for Strength of Anchors in Concrete Elements.
10. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
11. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.
12. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
13. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.
14. UL 723 - Test for Surface Burning Characteristics of Building Materials.

##  Administrative Requirements

1. Pre-installation Meeting: Conduct a pre-installation meeting one week prior to the start of the work of this section, and require attendance by all affected installers.
2. Sequencing: Ensure that utility connections are achieved in an orderly and efficient manner.

##  Submittals

1. Product Data shall be provided with data indicating configuration, general assembly, and materials used in fabrication, including catalog performance ratings that indicate airflow, static pressure, NC designation, electrical characteristics, and connection requirements.
2. Shop Drawings shall indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.
3. Manufacturer shall include schedules listing discharge and radiated sound power level for each of second through sixth octave bands at inlet static pressures from 1 to 3 inch water gauge.
4. Certificates shall be issued to certify that the air coil capacities, pressure drops, and selection procedures meet or exceed specified requirements or coils are tested and rated in accordance with AHRI 410.
5. Manufacturer's Installation Instructions shall indicate support and hanging details, installation instructions, recommendations, and service clearances required.
6. Project Record Documents shall record actual locations of units and controls components and locations of access doors.
7. Operation and Maintenance Data shall include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant-volume regulators.
8. Manufacturer’s warranty shall be submitted and ensure forms have been completed in Owner's name and registered with manufacturer.
9. Maintenance Materials shall be furnished for the Owner's use in maintenance of the project.

##  Quality Assurance

1. Manufacturer Qualifications shall be specified in this section, with minimum ten years of documented experience.
2. Product Listing Organization Qualifications: The manufacturer shall be listed with an organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

##  Warranty

1. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
2. Provide 18 month manufacturer warranty from date of shipment for air terminal units, integral sound attenuators, integral heating coils, and integral controls.

# PART 2 – PRODUCTS

## 2.01 Vertical Concealed Fan Coil Units

1. Basis of Design: Price Industries, Inc.
2. Vertical Concealed Fan Coil Unit: Model FCVC
3. Performance Requirements:
	1. Units shall have published sound power level data tested in accordance with AHRI 350.
	2. Units shall be ETL listed in compliance with UL/ANSI 1995, and performance certified with the latest edition of AHRI 440.
4. General:
	1. Furnish and install Price FCVC Fan Coil Units where indicated on the plans and in the specifications.
	2. Units shall be completely factory assembled, tested and shipped as two pieces. The drain pan shall be shipped loose for field installation by others.
	3. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery.
	4. All unit dimensions for each model and size shall be considered maximums.
5. Construction:
	1. Unit Casing
		1. The unit casing shall be fabricated of 20 gauge galvanized steel panels.
		2. All exterior panels shall be insulated with 1/2 inch thick insulation rated for a maximum air velocity of 3600 feet per minute.
	2. Discharge Collar:
		1. All units shall have a minimum one inch duct collar on the discharge.
	3. Liners:
		1. Standard:
			1. Fiberglass Liner – FG
				1. Insulation shall conform to UL 181 for erosion and NFPA 90A for flame spread (25) and smoke developed (50) rating per ASTM E-84 and UL 723, in accordance with ASHRAE 62.1, and ASTM C1071.
				2. The insulation shall be secured with adhesive.
				3. Insulation edges exposed to the airstream shall be coated with NFPA approved sealant.
		2. Optional Liners:
			1. Closed Cell Polymeric Foam Insulation – FF
				1. Insulation shall conform to UL 181 for erosion and 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.
				2. The insulation shall be secured with adhesive.
			2. Foil Board Insulation – FB
				1. Insulation shall conform to UL 181 for erosion and 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.
				2. The insulation shall be secured with adhesive.
				3. Insulation edges exposed to the airstream shall be coated with NFPA approved sealant.
	4. Unit Mounting:
		1. Units shall be designed for floor mounting, and shall be complete with integral wall mounting brackets which allow the unit to be bolted to the wall structure.
		2. (**Optional**) Units shall be equipped with leveling legs to provide one inch of floor mounted leveling adjustment.
	5. Blower:
		1. The blower shall be a dynamically balanced, forward curved, double width/double inlet (DWDI) centrifugal type, constructed of zinc coated galvanized steel for corrosion resistance.
	6. Motor:
		1. All motors shall be UL and CSA listed with automatic reset thermal overload protection.
		2. Motors shall be three-speed, single phase, 60 Hertz permanent split capacitor (PSC) type with permanently lubricated sleeve bearings.
		3. (**Optional**) Motors shall have quick connectors to allow service and removal without the need for tools.
	7. Drain Pans:
		1. All units shall be supplied with a primary condensate drain pan with single wall, galvanized steel construction for corrosion resistance.
		2. An angled drain channel shall extend under the entire cooling coil, and shall be adequately sloped towards the primary drain pan.
		3. Drain pans shall be of one-piece construction and be positively sloped for condensate removal.
		4. Drain pans shall be externally insulated with fire retardant 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 zero with no observed growth per UL 181.
		5. (**Optional**): Provide primary drain pan with type 304 stainless steel construction for superior corrosion resistance. Stainless steel drain pans shall be externally insulated and meet or exceed the requirements stated above.
		6. (**Optional**): Provide a secondary drain connection on the drain pan for condensate overflow.
	8. Filters:
		1. All units shall be furnished with a minimum one inch thick nominal glass fiber throwaway filter.
		2. The filter shall have a Minimum Efficiency Reporting Value (MERV) of MERV3.
	9. Electrical:
		1. Units shall be furnished with single point power connection.
		2. Units shall be furnished with an electrical junction box with terminal strip for the motor and other electrical terminations.
	10. Unit Options:
		1. Electronically Commutated Motor (ECM):
			1. The unit shall be supplied with an electronically commutated motor (ECM), complete with a single phase integrated controller/inverter that operates the wound stator and senses motor position to electronically commutate the stator.
			2. The motor rotor shall be permanent magnet type with near zero rotor losses.
			3. The motor shall be permanently lubricated with ball bearings, maintaining a minimum of 70% efficiency over its entire operating range.
			4. The ECM shall be furnished with factory programming (**select one**):
6. Three-speed (3SPD) Motor Operation:
7. Motor shall be provided with speed control harness which includes three separate 24 VAC speed taps, corresponding to High, Medium, and Low speed, respectively.
8. Option: provide FC-PS4 fan switching relay to convert a 0-10 VDC signal to 3-speed operation.
9. Modulating (MOD) Pressure Independent Flow Program
10. A pressure independent flow program shall be provided to allow the ECM to compensate for fluctuations in external static pressure, providing constant airflow.
11. The air volume flow rate shall be maintained to within five percent of desired flow in a system with up to 0.50 inches water gauge of external static pressure.
12. The motor shall be supplied complete with a manual fan speed controller for field adjustment of fan air flow set-point.
13. The speed controller shall accept as standard a [0-10 VDC], or [0-20 mA] signal for remote fan adjustment from a building automation system.
	* 1. Water Cooling and Heating Coils:
			1. All water coils shall be rated and certified in accordance with the current edition of AHRI 410, and shall bear the AHRI seal on the unit casing.
			2. All cooling and heating coils shall optimize rows and fins per inch to meet the specified capacity.
			3. Coils shall have seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and fin.
			4. Fins shall have a high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover.
			5. All water coils shall be hydrostatically tested to a minimum 390 pounds per square inch, with a minimum burst pressure of 1800 pounds per square inch at ambient temperature. All water coils are rated for a maximum of 300 pounds per square inch working pressure at 200 degrees Fahrenheit.
			6. Cooling and heating coils shall be in separate coil casings for servicing if required.

# PART 3 – EXECUTION

## 3.01 Examination

1. Verify that conditions are suitable for installation.
2. Verify that field measurements are as shown on the drawings.

## 3.02 Installation

1. Install the fan coils in accordance with the manufacturer's instructions.
2. See drawings for the size(s) and duct location(s) of the fan coils.
3. Do not support the fan coils from the ductwork.
4. Connect the fan coils to the ductwork in accordance with Section 23 31 00.
5. Install heating coils in accordance with Section 23 82 00.
6. Verify that electric power is available and of the correct characteristics.

## 3.03 Field Quality Control

1. See Section 01 40 00 - Quality Requirements, for additional quality requirements.

## 3.04 Cleaning

1. See Section 01 74 19 - Construction Waste Management and Disposal for additional cleaning requirements.

## 3.05 Closeout Activities

1. See Section 01 78 00 - Closeout Submittals for closeout submittals.
2. See Section 01 79 00 - Demonstration and Training for additional closeout requirements.