**Price Fan Columns**

**Division 23 – Heating, Ventilating, and Air Conditioning**

**Section 23 73 00 – Indoor Central-Station Air-Handling 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**

* 1. **Summary**
1. This section includes [hydronic heating], [heating with chilled water cooling], [hydronic cooling] units for indoor applications.

**1.02 Related Documents**

1. Section 01 30 00 – Administrative Requirements
2. Section 01 40 00 – Quality Requirements
3. Section 01 60 00 – Product Requirements
4. Section 01 74 19 – Construction/Demolition Waste Management and Disposal
5. Section 01 78 00 – Closeout Submittals
6. Section 01 79 00 – Demonstration and Training
7. Section 23 30 00 – HVAC Air Distribution
8. Section 23 32 00 – Air Plenums and Chases
	1. **Reference Standards**
9. All referenced standards and recommended practices in this section pertain to the most recent publication thereof, including all addenda and errata.
10. AMCA Standard 204 - Balance Quality and Vibration Levels for Fans
11. AMCA Standard 300 – Reverberant Room Method for Sound Testing of Fans
12. ASTM Standard D610 – Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
13. ASTM Standard D714 – Standard Test Method for Evaluating Degree of Blistering of Paints
14. ASTM Standard D1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
15. ASTM Standard D1654 – Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
16. ASTM Standard D4752 – Standard Practice for Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub
17. ASTM Standard E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
18. NFPA Standard 70A, Article 100 – National Electrical Code

**1.04 Coordination**

1. Sequencing: Ensure that utility connections are achieved in an orderly and efficient manner.
2. Coordinate all system connections and building penetrations including electrical and duct connections, and structural requirements.

**1.05 Submittals**

1. See Section 01 30 00 – Administrative Requirements for submittal procedures.
2. Product Data:
	* + 1. Provide data indicating dimensions, duct and service connections, accessories, controls, electrical nameplate data, and wiring diagrams.
			2. The performance schedule shall include the following information:
				1. Unit weight
				2. Heating capacity (if applicable):
3. Delivery temperature
4. Temperature rise
5. Airflow
6. External static pressure.
	* + - 1. Cooling capacity (if applicable):

Rated cooling output

Cooling coil entering temperature (wet bulb and dry bulb)

Cooling coil discharge temperature (wet bulb and dry bulb)

* + - * 1. Mixed discharge air temperature (wet bulb and dry bulb)
				2. Electrical Characteristics:

Horsepower

Voltage

Maximum Overcurrent Protection (MOP) and Minimum Circuit Ampacity (MCA)

1. Shop Drawings:
	* 1. Provide general layout drawings with plan and elevation views including relevant dimensions to include duct, piping, and electrical service connection locations for the following items:
			+ 1. Provide roof curb mounting details.
				2. Provide electrical schematics including field wiring connections.
				3. Provide gas piping connection details.
				4. Provide component details including construction method and materials.

**1.06 Quality Assurance**

1. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum ten years of documented experience.
2. Safety Listings: The entire unit shall be listed per ETL, UL, or CSA.

**1.07 Warranty**

1. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
2. Provide 12 month manufacturer warranty from date of shipment.

**PART 2 – PRODUCTS**

**2.01 General**

1. Basis of Design: Price Industries, Inc.
2. Price Fan Column [Price PFC]

**2.02 Fan Column Units**

1. Description:
2. Furnish and install Price model PFC fan column units in the sizes, configurations and capacities indicated on the plans.
3. The fan column unit [with chilled water coil] or [with hot water coil] shall be factory assembled and tested.
4. Units shall include insulated steel cabinet with steel base, fan and motor assembly, filter rack, bypass damper, primary air damper, variable frequency drive, and disconnect.
5. Unit Performance:
	1. Sound ratings shall be determined based on testing the entire unit for inlet and outlet sound power in a third party AMCA certified lab per AMCA standard 300.
	2. Air performance ratings shall be determined based on testing the entire unit in a third party AMCA certified lab in accordance with AMCA standard 210.
	3. Maximum sound power will be presented by each octave band for the specific design operating point and for the unit specific 4-way, 3-way, or 2-way discharge. The maximum sound power should not exceed the values below:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | LwA(dBA) |
| Supply |  |  |  |  |  |  |  |  |  |
| Return |  |  |  |  |  |  |  |  |  |

1. Cabinet:
2. The cabinet exterior shall have [18] or [16] gauge [galvanized] or [painted galvanized] steel construction. Panel seams shall be turned inward.
3. The casing shall be internally insulated with 2 inch, nominal 3 pound density glass fiber insulation. The panels shall have an inner liner constructed of [22], [20], or [18] gauge perforated galvanized steel.
4. The casing base shall be minimum 16 gauge galvanized steel and shall include removable lifting provisions for forklifts.
5. Access Doors:
	* + 1. Access doors shall be double wall [18] or [16] gauge galvanized steel to match the cabinet construction, mounted in a flange frame.
			2. The access doors shall be 2 inches thick and fully insulated with the same insulation used in the cabinet.
			3. Access door frames shall include automotive bulb style rubber gasketing.
			4. Access doors shall include handles and clasps that do not require tools to open door.
			5. Access doors shall be provided for inlet and fan sections. Inlet section shall be a hinged type door and the fan section shall be removable doors. Screwed panels are not acceptable.
6. Discharge Plenum:
	1. The casing shall have a sound attenuating discharge plenum with 4 openings. Each opening can be closed off in the field, down to 2 openings, with factory provided block-offs to customize the distribution pattern based on the job requirements.
7. Dampers:
	1. A coil bypass damper shall be factory mounted to the side of the inlet section, and a primary air damper shall be factory mounted to the top of the inlet section.
	2. All unit dampers shall be constructed with a galvanized steel hat channel frame with staked corners. The damper blades shall be 16-18 gauge Triple-Vee roll-formed galvanized steel, with linkages installed in the frame outside of the airstream.
	3. [Optional]: All dampers shall have extruded heavy gauge 6063 aluminum frame that includes jamb seals. Blades shall be airfoil shaped extruded aluminum and include rubber blade seals. Linkage shall be installed in the frame outside of the airstream.
	4. [Optional]: All dampers shall have extruded heavy gauge 6063 aluminum frame that includes jamb seals. Blades shall be airfoil shaped extruded aluminum and include rubber blade seals. Damper blades shall be insulated with expanded polyurethane foam providing R-2.29 and include a thermal break. Linkage shall be installed in the frame outside of the airstream.
8. Insulation:
	1. The casing shall be internally insulated with 2 inch thick mineral stone wool type insulation with a density of 2.8 pounds per cubic foot. The insulation shall not absorb or hold water and shall not promote mold or fungi growth. The insulation shall have the following surface burning characteristics:
		* + 1. Insulation shall be tested and rated in accordance with ASTM C423, and shall have a maximum flame/smoke spread of 0 when tested in accordance with ASTM E84.
				2. Insulation shall be a type approved by NFPA having a minimal K-value of 0.28.
9. Filters:
	1. The unit shall include external two inch filter racks with galvanized steel construction. The filters shall be accessible from outside of the unit.
	2. [Supply one set of MERV 8 pleated filters.] or [Supply one set of MERV 13 pleated filters.]
	3. [Optional]: The unit shall include external 4 inch filter racks with galvanized steel construction. The filters shall be accessible from outside the unit, and shall include one set of MERV 13 pleated filters.
10. Fans:
	1. The fans shall be airfoil bladed plenum fans with AMCA certified air and sound performance. The fans shall be mounted vertically with direct drive motors driven by variable frequency drives.
	2. The fans shall be dynamically tested to AMCA 204 Fan Application Category BV-3.
	3. The fan and motor assembly shall be mounted to a support frame with two inch deflection spring hanger isolation. Six rolling elements shall be mounted to the support frame to allow the fan to slide out from the unit for service.
	4. The fan shall be sealed with a lip type seal around the fan inlet panel to prevent recirculation. The sealing method shall not impede airflow at the inlet and shall not require a separate bulkhead. The seal shall not require removal to slide the fan out.
11. Fan Motor:
	1. Fan motors shall be NEMA rated high efficiency Open Drip Proof (OPD) type. [Optional]: Fan motors shall be NEMA rated high efficiency Totally Enclosed Fan Cooled (TEFC) type.
	2. The fan and motor assembly shall be removable onto available service cart.
	3. The fan shall be supplied with a piezo ring for presenting the airflow via available transducer and display.
	4. The fan motor shall be controlled via VFD, which shall be factory provided and installed. The VFD shall be plenum rated and mounted to the exterior of the unit. The VFD shall be factory programmed with the appropriate speed for job specific speed requirements.
12. Cooling Coil:
	1. Where indicated, the unit shall include aluminum fin copper tube type chilled water coil. The water coil shall be certified in accordance with AHRI 410 and units shall bear an AHRI 410 label.
	2. The cooling coil shall be mounted in a rack over a 304 stainless steel double sloped condensate pan.
	3. The condensate pan shall include a standard drain, and an overflow drain as secondary protection in the event the primary drain becomes obstructed, supplied in accordance with UL 1995 requirements
	4. Coils taller than 42 inches shall be provided with an intermediate drain pan that drains into the main drain pan.
	5. The water coil shall be leak tested under water to a minimum 390 pounds per square inch, with a minimum burst pressure of 1800 pounds per square inch, and shall withstand a maximum operating fluid temperature of 250°F (121°C).

**PART 3 – EXECUTION**

**3.01 Examination**

A. Verify that conditions are suitable for installation.

B. Verify that field measurements are as shown on the drawings.

**3.02 Installation**

1. Install equipment in accordance with the manufacturer’s instructions, specifications, best practices, and all applicable building codes.
2. Maintain sufficient clearance for normal services, maintenance, or in accordance with construction drawings.
3. Connect to ductwork in accordance with Section 23 31 00.

**3.03 Start-Up Service**

1. Engage factory authorized service technician to start up and commission units. Provide start up report to the owner.

**3.04 Delivery, Storage and Handling**

1. Storage and protection.
	1. Store equipment away from construction areas in a clean, dry place, off the ground and protected from weather, water, and physical damage.
	2. Keep factory shipping packaging in place until the unit is ready to be installed.
2. Rigging:
	1. Follow manufacturer’s instructions for rigging and placement of equipment.
	2. The entire unit shall be one piece or of segmented construction to allow for ingress to the construction site as dictated by the job site conditions. The individual sections shall be rigged into place on one common perimeter base.
	3. The sections shall allow for fork truck transportation and not utilize lifting lugs.
	4. Rig package units to comply with manufacturer’s rigging and installation instructions for unloading package units and moving them to their final location.
3. Handling:
	1. Handle package units and components carefully to prevent damage. Replace damaged package units or components.

**3.04 Field Quality Control**

1. See Section 01 40 00 – Quality Requirements for additional requirements.

**3.05 Cleaning**

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

**3.06 Closeout Activities**

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