

# Suggested Specifications

## Price Air Volume Control Valves

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

#### Section 23 36 00 – Air Terminal 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**

##### **1.01 Section Includes**

- A. Air volume control valves.

##### **1.02 Related Requirements**

- A. Section 23 09 93 - Sequence of Operations for HVAC Controls.
- B. Section 23 31 00 - HVAC Ducts and Casings.
- C. Section 23 33 00 - Air Duct Accessories.
- D. Section 23 37 00 - Air Outlets and Inlets.

##### **1.03 Reference Standards**

- A. All referenced standards and recommended practices in this section pertain to the most recent publication thereof, including all addenda and errata.
- B. AHRI 410 - Standard for Forced-Circulation Air-Cooling and Air-Heating Coils.
- C. AHRI 880 - Performance Rating of Air Terminals.
- D. AHRI 885 - Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets.
- E. ASHRAE Standard 130 - Methods of Testing for Rating Ducted Air Terminal Units.
- F. ASTM E488/E488M - Standard Test Methods for Strength of Anchors in Concrete Elements.
- G. NFPA 70 - National Electrical Code.
- H. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.
- I. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.
- J. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.

##### **1.04 Administrative Requirements**

- A. 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.
- B. Sequencing: Ensure that utility connections are achieved in an orderly and efficient manner.

##### **1.05 Submittals**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. 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.
- C. Shop drawings shall indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.
  - 1. 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 4 inch water gauge.
- D. 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.
- E. Manufacturer's Installation Instructions shall indicate support and hanging details, installation instructions, recommendations, and service clearances required.
- F. Project record documents shall record actual locations of units and controls components and locations of access doors.
- G. 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.
- H. Manufacturer's warranty shall be submitted and ensure forms have been completed in Owner's name and registered with manufacturer.
- I. Maintenance materials shall be furnished for the Owner's use in maintenance of the project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

##### **1.06 Quality Assurance**

- A. Manufacturer qualifications shall be specified in this section, with minimum ten years of documented experience.
- B. 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.

##### **1.07 Warranty**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

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- B. 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 Air Volume Control Valves

- A. Basis of Design: Price Industries, Inc.
  - 1. Laboratory Control Valve: RDV/SS (direct digital controls).
  - 2. General Exhaust Control Valve: RDV (direct digital controls).
  - 3. General Exhaust Control Valve with Silencer: RDVQ (direct digital controls).
- B. Performance Requirements:
  - 1. The assemblies shall be pressure independent and shall reset to any airflow between zero and the maximum cataloged air volume. Sound ratings of air distribution assemblies: Not to exceed \_\_\_\_ NC at \_\_\_\_ inches water gauge inlet static pressure, with a downstream static pressure of \_\_\_\_ inches water gauge.
  - 2. Use attenuation values found in AHRI 885.
- C. General:
  - 1. The terminal units shall be factory-assembled, AHRI 880 rated and bearing the AHRI seal for an air volume control terminal with damper assembly and flow sensor.

### 2.02 Laboratory Control Valve

- A. Laboratory Control Valve (RDV/SS):
  - 1. Construction:
    - a. The unit casing shall be constructed from a minimum 24 gauge, 0.025 inch Type 304 stainless steel.
    - b. The damper shall be constructed from minimum 22 gauge, 0.032 inch Type 316 stainless steel with polyethylene damper shaft bearings and damper gasket.
    - c. The damper shaft shall be type 304 stainless steel.
    - d. The damper, seal, and bearing system shall be tested to 1.25 million cycles, or the equivalent of 100 full open/closures per day for 35 years, with no visible signs of wear, tear, or failure of the damper assembly after such testing.
    - e. The controls enclosure shall be constructed from minimum 22 gauge, 0.032 inch zinc-coated steel.
    - f. The controls enclosure mounting bracket shall be zinc-coated steel.
    - g. The differential pressure airflow sensor shall measure total, static, and velocity pressures, and shall be mounted to the inlet valve.
      - i. The airflow sensor shall be a differential pressure airflow device measuring total and static pressures, and mounted to the inlet valve.
      - ii. Plastic parts shall be fire-resistant, complying with UL 94.
      - iii. The airflow sensor shall be RoHS (Restriction of Hazardous Substances) compliant. Materials containing polybrominated compounds shall not be acceptable.
      - iv. Control tubing shall be protected by grommets at the wall of the airflow sensor's housing.
      - v. The airflow sensor shall be furnished with twelve total pressure sensing ports and four static pressure sensing ports, and shall include a center averaging chamber that amplifies the sensed airflow signal.
      - vi. The airflow sensor signal accuracy shall be plus or minus five percent throughout terminal operating range.
    - h. Air Leakage: The terminal unit air leakage rate with the damper in the full-closed position shall not exceed two percent of the nominal catalog rating at three inches water gauge inlet static pressure when tested in accordance with ASHRAE 130.
    - i. The terminal unit silencer (RDVQ/SS model only) shall be constructed from minimum 24 gauge, 0.025 inch (0.64 mm), type 304 stainless steel, mechanically fastened in the following configuration (**select one**):
      - i. Absorptive: The silencer section shall be packed with fiberglass media which meets the requirement of NFPA90A. Fiberglass media shall be wrapped with [Tedlar film] or [fiberglass cloth] to provide fiberglass protection suitable for the application.
      - ii. Packless: The silencer section shall contain no absorptive media, and shall be constructed solely of solid and perforated metal.
- B. Electrical Requirements:
  - 1. Single duct terminal units shall be provided with single-point power connection.
  - 2. The terminal unit equipment wiring shall comply with the requirements of NFPA 70.
- C. Controls:
  - 1. See Section 23 09 13 - Instrumentation and Control Devices for HVAC: Thermostats and actuators for controls requirements.
- D. Controls Sequence:

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1. See Section 23 09 93 - Sequence of Operations for HVAC Controls for controls sequence requirements

## 2.03 General Exhaust Control Valve

### A. General Exhaust Control Valve (RDV, RDVQ):

1. Construction:
  - a. The unit casing shall be constructed from a minimum 22 gauge, 0.032 inch zinc-coated steel.
  - b. The damper assembly shall be heavy-gauge, galvanized steel with a solid shaft rotating in bearings.
  - c. The damper shaft shall incorporate a visual position indicator etched into the end of the damper shaft to clearly indicate damper position over the full range of 90 degrees.
  - d. The 18 gauge damper assembly shall incorporate a peripheral gasket on the damper blades for tight airflow shutoff.
  - e. Air leakage past the closed damper shall not exceed two percent of the unit maximum airflow at three inches water gauge inlet static pressure, tested in accordance with ASHRAE 130.
  - f. The damper, seal and bearing system shall be tested to 1.25 million cycles, or the equivalent of 100 full open/closures per day for 35 years, with no visible signs of wear, tear, or failure of the damper assembly after such testing.
  - g. The controls enclosure shall be constructed from minimum 22 gauge, 0.032 inch zinc-coated steel.
    - i. The controls enclosure mounting bracket shall be zinc-coated steel.
  - h. Airflow Sensor
    - i. The airflow sensor shall be a differential pressure airflow device measuring total, static, and velocity pressures, mounted to the inlet valve.
    - ii. Plastic parts shall be fire-resistant, complying with UL 94.
    - iii. The airflow sensor shall be RoHS (Restriction of Hazardous Substances) compliant. Materials containing polybrominated compounds shall not be acceptable.
    - iv. Control tubing shall be protected by grommets at the wall of the airflow sensor's housing.
    - v. The airflow sensor shall be furnished with twelve total pressure sensing ports, and include a center averaging chamber that amplifies the sensed airflow signal.
    - vi. The airflow sensor signal accuracy shall be plus or minus five percent throughout terminal operating range.

2. Silencer (RDVQ model only): Minimum 22 gauge, 0.032 inch, galvanized steel, mechanically fastened in the following configuration (**select one**):

1. Absorptive:
  - a. Media shall be of acoustic quality, shot-free glass fiber insulation with long, resilient fibers bonded with a thermosetting resin. Glass fiber density and compression shall be as required to insure conformance with laboratory test data.
  - b. Media shall be packed with a minimum of 15 percent compression during silencer assembly.
  - c. Media shall be resilient such that it will not pull apart during normal applications, and shall resist settling, breakdown, and sagging from vibration. Media shall not rot, mildew, or otherwise deteriorate, and shall have sufficient flexibility to readily form around corners and curved surfaces.
  - d. Media shall not cause or accelerate corrosion of aluminum or steel.
  - e. Mineral wool is not permitted as a substitute for glass fiber.
  - f. Media protection shall be (select one):
    - i. Glass fiber cloth: The media shall be encapsulated by glass fiber cloth to help prevent shedding, erosion and impregnation of the glass fiber.
    - ii. The acoustic media shall be completely wrapped with polymer film to help prevent shedding, erosion and impregnation.
      1. The wrapped acoustic media shall be separated from the perforated metal by a factory-installed acoustically transparent spacer.
      2. The spacer shall be flame retardant and erosion resistant.
      3. Mesh, screen or corrugated perforated liner will not be acceptable as a substitute for the specified spacer.
      4. Silencer manufacturer shall provide a written test report showing silencer assemblies have Class 1 flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested according to ASTM E 84, NFPA 255 or UL 723.
2. Packless: The silencer section shall contain no absorptive media, and shall be constructed solely of solid and perforated metal. Attenuation shall be achieved with controlled impedance membranes and broadly tuned resonators.

### E. Electrical Requirements:

1. Single duct terminal units shall be provided with single-point power connection.
2. The terminal unit equipment wiring shall comply with the requirements of NFPA 70.

### F. Controls:

1. See Section 23 09 13 - Instrumentation and Control Devices for HVAC: Thermostats and actuators for controls requirements.

### G. Controls Sequence:

1. See Section 23 09 93 - Sequence of Operations for HVAC Controls for controls sequence requirements

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## 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

- A. Install in accordance with manufacturer's instructions.
- B. Install the inlets of air terminal units and airflow sensors a minimum of three duct diameters from elbows, transitions, and duct takeoffs.
- C. See drawings for the size(s) and duct location(s) of the air terminal units.
- D. Provide ceiling access doors or locate units above easily removable ceiling components.
- E. Support units individually from the structure.
- F. Embed anchors in concrete in accordance with ASTM E488/E488M.
- G. Do not support from ductwork.
- H. Connect to ductwork in accordance with Section 23 31 00.
- I. Verify that electric power is available and of the correct characteristics.

### 3.03 Adjusting

- A. Ensure damper operator attached to assembly allows full modulation of flow range from 100 percent of design flow to zero.

### 3.04 Field Quality Control

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

### 3.05 Cleaning

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

### 3.06 Closeout Activities

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