

# **Quiet Plus<sup>®</sup>, Model ST**

## **Single Duct Terminal Units Guide Specifications**

### **GENERAL**

Furnish and install Warren Technology Quiet Plus<sup>®</sup> model ST single duct (variable or constant volume) terminal units of the sizes and capacities as scheduled. Units shall be pressure independent and shall reset to any flow between its minimum and maximum cataloged airflow as allowed by its controller. Sound data shall be obtained in accordance with ARI/ ADC Test Standard 880.

### **CONSTRUCTION**

All assemblies shall be constructed of heavy gauge galvanized steel, with gauges conforming to the requirements of UL 1995. The assemblies shall be so formed and assembled to have the strength and rigidity to withstand normal handling and operational integrity. The terminal casing shall be mechanically assembled. Unit casing shall be constructed of no less than 20 gauge galvanized steel with round or oval-round inlets sized to accommodate standard flex duct connections. Unit discharge shall be slip and drive construction for field attachment to downstream ductwork.

Unit labels shall be adhered to each unit including model number, airflow (CFM), balancing chart and tagging data.

Unit shall be completely and fully lined internally with 1/2" thick, dual density fiberglass insulation or closed cell elastomeric material per specifications outlined in UL 181 and NFPA 90A. There shall be no cut raw edges of fiberglass insulation exposed to the airflow. Secure lining to prevent delamination, sagging or settling. Closed cell elastomeric material not available with electric heat.

### **PRIMARY AIR VALVE**

The primary air valve shall be Zebra<sup>®</sup> Precision Air Valve, consisting of a sliding pleated plate with multiple alternately spaced orifices and with full linear stroke, open to close. Airflow through the valve shall be laminar throughout the open to close cycle. The valve

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mechanism shall be direct drive, utilizing a pneumatic or 24- VAC bi-directional electric actuator. Damper shaft shall operate over a full 90-degree rotation. The damper shaft shall rotate counter-clockwise to close the damper. The damper actuator shall be mounted on the exterior of the casing. At nominal airflows, both radiated and discharge NC ratings at 1.00 in. WC inlet static pressure drop shall be at most NC 20.

Terminal units 12” in diameter and smaller shall require at least a 35 inch-pound torque actuator. Terminal units 14”and 16” in diameter shall require at least a 50 inch-pound torque actuator. Terminal units 18”and 20” in diameter and smaller shall require at least a 75 inch-pound torque actuator.

### **PRIMARY AIRFLOW SENSOR**

Terminal units shall be equipped with a factory installed Quad-4, four quadrant, multi-port flow sensor. A minimum of 8 pressure-sensing points shall be utilized. The sensor shall develop a differential pressure of 0.05 in. WC at an air velocity of 500 FPM. Furnish external balancing taps to allow field airflow measurements. The sensor shall amplify the differential pressure by at least 2.5 times.

### **HOT WATER COILS**

Casing shall be constructed of a minimum 20 gauge galvanized steel with slip and drive construction for field attachment to downstream ductwork. Coils shall be factory installed. Coil shall be constructed of corrugated aluminum fins mechanically expanded to seamless copper tubes, with a minimum wall thickness of 0.016”, to achieve tight fin to tube bond for optimal heat transfer. Each coil shall be pressurized with high-pressure air (360 psig) under water to assure that there are no leaks. Coils shall be dehydrated by insertion in a 500-degree oven to ensure that they are completely dry inside. The tubing connections shall be capped to ensure that the inside of the coils are clean and dry. Coil shall be rated and certified in accordance with the current edition of ARI Standard 410. Coils shall bear an ARI 410 seal.

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### **ELECTRIC HEATERS**

Electric coil shall be open coil type as manufactured by Warren Technology. Voltage, kW, number of steps, and accessories shall be as shown on the schedule. The minimum airflow per kW shall be 70 CFM. Electric coil elements shall be selected utilizing Warren's computer selected Calculated Wire Temperature, to assure optimum VAV performance. Units shall be UL listed for zero clearance and meet all applicable requirements of the latest National Electric Code and ANSI standards.

Heating elements shall be high-grade nickel-chrome. Element temperatures shall not exceed 400°F below the melting point of the element alloy when energized with design voltage in still, free air at 75°F. Heater frames and control boxes shall be constructed of 20 gauge galvanized steel or heavier. Mounting assemblies for the element support insulators shall pass between the insulators permitting free expansion of the insulators under high temperature conditions without cracking or breaking. All necessary controls for recycling shall be provided in heaters of more than 48 amps.

Electric coil shall have a single point electrical connection. Electric coil shall include an automatic reset thermal cutout, backup thermal cutout, de-energizing magnetic contactors, transformer for 24-volt controls, power terminal block and airflow switch.

All electric coils shall be furnished with chatter and rapid-cycle resistant technology, incorporating an AC to DC rectifier for DC magnetic relays. Relays shall not chatter or rapid-cycle under brownout conditions, and shall not re-energize until at least 5 seconds immediately after a power loss has ended. Electric coils with 480 VAC power supply and a current draw greater than 12 shall be furnished with standard AC magnetic contactors.

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(Optional) Electric coils shall include a fused or non-fused door interlocking disconnect switch, fuse block, mercury contactors, manual reset secondary limit or SCR controls (0-10 VDC or 4-20 mA signal) all mounted and wired within the controls enclosure.

### **OPTIONS**

#### **ACCESS PANELS**

Access panels shall be provided in the terminal unit's casing to allow visual inspection of damper plates and/or for cleaning of the hot water coil.

#### **RX FIBERGLASS INSULATION**

Dual-density, ½" thick, internal fiberglass insulation, with a Permacote<sup>®</sup> acrylic coating, formulated with an anti-microbial agent to protect the coating from microbial growth. Insulation shall meet NFPA 90A and B, UL 181, ASTM C, 1338, G 21, and G 22 as required in ASTM C 1071. Insulation shall be rated to a maximum air velocity of 5,000 FPM when tested per UL 181, Section 17.

#### **FOIL FACED INSULATION**

Dual-density, ½" thick fiberglass insulation which meets UL 181 and NFPA 90A. There shall be no cut raw edges of fiberglass insulation exposed to the airflow. Secure lining to prevent delamination, sagging or settling. Insulation shall be covered with a flame retardant vapor barrier facing consisting of .00035" (9 micron) aluminum foil, fiberglass reinforcing yarn and natural kraft paper laminated together with a flame retardant adhesive. All insulation edges shall be covered with foil or metal tape. Insulation foil shall meet ASTM-D781 for puncture resistance, ASTM D-2020 for mold and mildew resistance and ASTM C-1136-90 requirements for insulation facings.

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### **DOUBLE WALL CONSTRUCTION**

Unit shall be completely and fully lined internally with 1/2" thick, dual density fiberglass insulation or closed cell elastomeric material per specifications outlined in UL 181 and NFPA 90A. Insulation shall be enclosed between the unit casing and a double wall sheet metal cover, gauge 26 galvanized steel, extending over the fiberglass and liner edges.

### **PERFORATED METAL CONSTRUCTION**

Unit shall be completely and fully lined internally with 1/2" thick, dual density fiberglass insulation or closed cell elastomeric material per specifications outlined in UL 181 and NFPA 90A. Insulation shall be enclosed between the unit casing and a perforated sheet metal cover, gauge 26 galvanized steel, extending over the fiberglass and liner edges

### **1" INTERNAL INSULATION**

Unit shall be completely and fully lined internally with 1" thick, dual density fiberglass insulation or closed cell elastomeric material per specifications outlined in UL 181 and NFPA 90A. There shall be no cut raw edges of fiberglass insulation exposed to the airflow. Secure lining to prevent delamination, sagging or settling.

### **FACTORY INSTALLATION OF CONTROLS AND ACTUATORS**

Controls contractor shall furnish controls, actuators, footprints, installation instructions and a point to point wiring diagram to Warren Technology prior to manufacturing. Field installation of actuators by non-factory certified technicians shall void the Zebra<sup>®</sup> damper warranty.