PART 1  GENERAL

1.01  SUBMITTALS

A.  Product Data:
   1.  Terminal Units component and accessories list.
   2.  Ratings and nameplate information.

B.  Quality Assurance Data:
   1.  Certified production test reports or mill test reports.
   2.  Test reports for previous design, and documentation showing previous design ratings and configurations.
   3.  Terminal unit performance and sound rating shall be tested and rated in accordance with ARI 880 “Industry Standard for Air Terminals” and shall bear the ARI certification seal.

C.  VAV units shall be in full compliance with UL-181 and NFPA 90A and shall meet bacteriological standards of ASTM C665. Project Record Documents:
   1.  Shop Drawings:
      a)  Terminal unit ratings, capacities, flows, dimensions and construction materials.
      b)  Wiring and termination drawings.

D.  Operation and Maintenance Data:
   1.  Operating and maintenance procedures.
   2.  Complete set of manufacturers drawings.
   3.  Complete documentation of inspections and tests performed, including any logs, curves, and certificates. Documentation shall note any replacement of equipment or components that failed during testing.
   4.  Spare parts lists.
   5.  Data sheets updated to reflect field installation conditions.

PART 2  PRODUCTS

2.01  VARIABLE-VOLUME AIR TERMINAL UNITS

A.  Manufacturer:
   1.  Anemostat
   2.  Environmental Technologies
   3.  Metal-Aire
   4.  Tempmaster
   5.  Titus
   6.  Trane

B.  Configuration: Diverting-damper assembly inside unit casing with control components located inside a protective metal shroud.

C.  Casing: 0.034-inch steel or 22 gage minimum.
   1.  Casing Lining: 1/2-inch-thick, coated, fibrous-glass duct liner complying with ASTM C 1071; secured with adhesive.
   2.  Air Inlet: Round stub connection for duct attachment.
3. Air Outlet: S-slip and drive connections.
4. Access: Removable panels for access to diverter and other parts requiring service, adjustment, or maintenance; with airtight gasket.
5. Casing shall be solid double wall for healthcare, cleanroom, or lab applications.

D. Hot-Water Heating Coil: Copper tube, mechanically expanded into aluminum-plate fins; leak tested underwater to 200 psig; and factory installed.
E. Sound attenuation section: Included as a factory provided component.
F. Controls: DDC controls provided by section 25 00 00 Integrated Automation. Refer to Section 25 50 00 Integrated Building Automation System (IBAS) for interface requirements.

2.02 CONSTANT-VOLUME (FAN POWERED) AIR TERMINAL UNITS

A. Manufacturers:
   1. Metal-Aire
   2. Anemostat
   3. Environmental Technologies
   4. Tempmaster
   5. Titus
   6. Trane

B. Configuration: Volume-damper assembly and fan in series or in parallel arrangement inside unit casing with control components inside a protective metal shroud.

C. Casing: 0.034-inch steel or 22 gauge minimum.
   1. Casing Lining: 1/2-inch thick, coated, fibrous-glass duct liner complying with ASTM C 1071; secured with adhesive.
   2. Air Inlets: Round stub connections or S-slip and drive connections for duct attachment.
   3. Air Outlet: S-slip and drive connections.
   4. Access: Removable panels for access to dampers and other parts requiring service, adjustment, or maintenance; with airtight gasket and quarter-turn latches.
   5. Casing shall be solid double wall for healthcare, cleanroom, or lab applications.

D. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings.
   1. Maximum Damper Leakage: ARI 880 rated, 3 percent of nominal airflow at 3” wg inlet static pressure.

E. Fan Section: Galvanized-steel plenum, with direct-drive, forward-curved fan with air filter and backdraft damper.
   1. Motor: Multispeed. Comply with requirements in Division 23 Motors.
      a) Speed Control: Infinitely adjustable with pneumatic-electric and electronic controls.
      b) Fan-Motor Assembly Isolation: Rubber isolators.
   2. Air Filter: Refer to specification section 23 40 00 HVAC Air Cleaning Devices.

F. Hot-Water Heating Coil: Copper tube, mechanically expanded into aluminum-plate fins; leak tested underwater to 200 psig; and factory installed.

G. Sound attenuation section: Included as a factory provided component.

H. Factory-Mounted and -Wired Controls: Controllers shall be by Integrated Controls Systems, Inc. provided by the control contractor to be factory mounted. Electrical components shall be mounted in control box with removable cover. Incorporate single-point electrical connection to power source.
1. Control Transformer: Factory mounted for control voltage on electric and electronic control units with terminal strip in control box for field wiring of thermostat and power source.

2. Wiring Terminations: Fan and controls to terminal strip, and terminal lugs shall match quantities, sizes, and materials of branch-circuit conductors. Enclose terminal lugs in terminal box that is sized according to NFPA 70.

3. Disconnect Switch: Factory-mounted, fused type.

I. Control Panel Enclosure:
   1. NEMA 250, Type 1, with access panel sealed from airflow and mounted on side of unit.
   2. Factory-wired control panel in accordance with NEC.

J. Control Sequence:
   1. Refer to Specification Section 23 90 00 Integrated Auto Control Sequences for Facility.
   2. Connect to Integrated Building Automation System. Refer to Section 25 50 00 - Intelligent Building Automation System (IBAS) for interface requirements.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install air terminal units level and plumb. Maintain sufficient clearance for normal service and maintenance.

B. Connect ducts to air terminal units according to Specification Section 23 31 00 HVAC Duct and Casing.

C. Hot-Water Piping: In addition to requirements in Specification Section 23 11 13 Hydronic Piping, connect heating coils to supply with shutoff valve, strainer, control valve, and union or flange; and to return with balancing valve and union or flange.

3.02 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.
   2. Leak Test: After installation, fill water coils and test for leaks. Repair leaks and retest until no leaks exist.
   3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 23 36 00