



DESIGN REQUIREMENTS

AIR TERMINAL UNITS

GENERAL INFORMATION

- 1.1 This section applies to constant volume and variable air volume terminal boxes.

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- 2.1 Air terminal units shall be located in corridors directly above the suspended ceilings, with unobstructed access for maintenance and removal.
- 2.2 Do not oversize terminal units by more than 20 percent.
- 2.3 All terminal units shall be permanently marked with the room number of the occupied space served.
- 2.4 In general, minimum settings on VAV boxes shall be minimum 20 percent of peak air flow, unless minimum ventilation requirements exceed this value.
- 2.5 The reheat coil shall be sized to meet the temperature at maximum design flow.
- 2.6 Provide no more than 11 fins per inch on reheat coils. (8 fin/inch is preferred).
- 2.7 Air terminal units radiating higher than the project specific noise levels shall be insulated with 2" thick 4 lbs. density board insulation, with removable access cut-outs.
- 2.8 The motor assembly shall be capable of operating in an early morning warm-up procedure without being fitted with additional controls.
- 2.9 Terminal boxes shall be shipped with factory-mounted DDC controller and protective sheet metal enclosure.
- 2.10 Engineer shall coordinate 120V/24V actuators with electrical trades and include all power/control wiring requirements in contract documents.
- 2.11 Design of laboratory supply and exhaust terminal units shall be reviewed with the Columbia University Project Manager.
- 2.12 Coordinate selection of terminal units with acoustical engineer throughout entire range of operation.

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2.13 Equipment Requirements – Constant Volume and Variable Air Volume

- a. (Constant Volume Terminal Box Only) The units shall be pressure independent and shall maintain to any cfm setting within $\pm 5\%$ regardless of changes in upstream static pressure.
- b. (Variable Air Volume (VAV) Terminal Box Only) The units shall be pressure independent and shall reset cfm air volume within $\pm 5\%$ of required air flow, as determined by the space thermostat, regardless of changes in system air pressure. Devices utilizing cfm limiters will not be acceptable.
- c. The internal resistance of the terminal shall not exceed 0.4 inch w.g. for all sizes when handling maximum air volume shown on schedules.
- d. A flow sensor shall be incorporated within the terminal. Differential pressure taps (separate from the control pressure taps) shall be provided for air flow measurement with a 0-1 inch gauge. Each terminal shall have a flow chart attached.
- e. The units shall be designed, installed and field adjusted, if necessary, to maintain controlled pressure independent air flow.
- f. Features to accommodate field calibration and readjustment of air volume settings shall include gauge taps for balancing with a standard pressure gauge and adjustable flow settings at the controller. Air units to be provided with access doors for access to interior of unit.
- g. Unit casing shall be 22 gauge galvanized steel with round or flat oval inlets meeting SMACNA or ASHRAE standards. Outlets shall be rectangular with slip and drive connections. In the fully closed position, air leakage past the closed damper shall not exceed 3% of the nominal catalog rating at 3" inlet static pressure, as rated by the Air Diffusion Council test procedure.
- h. All units shall be lined with $\frac{3}{4}$ ", 1½ lb. density fiberglass insulation. Edges shall be sealed against air flow erosion. Materials are to be in accordance with NFPA 90A and 90B and UL 181 standards.
- i. All air terminal units shall be tied back to the building automation system.
- j. Terminal Unit With Hot Water Heating Coils:
 1. Hot water heater coils shall be integral to the unit, not an add-on. All water coils to have not more than 6 feet/second water velocity and not more than 11 fins per inch.



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CONSTRUCTION REQUIREMENTS

- 3.1 Install air terminals level and with the manufacturer's recommended straight run of metal ductwork at inlet and outlet, flexible connectors may be installed on the outlet side of the box. Install so that damper operator, damper actuator, and hot water control valve actuator (where provided) can be readily serviced. Do not block access to DDC Controller.
- 3.2 Provide access doors in ductwork to both faces of reheat coils.
- 3.3 Support units individually from structure. Do not support from adjacent ductwork.

REFERENCE

- 4.1 The applicable CSI Specification Section is 23 36 00.