SUGGESTED SPECIFICATIONS
SINGLE DUCT AIR TERMINAL UNITS

SECTION 1. GENERAL

1.1 Basic Unit. Furnish and install METALAIRE Single Duct Air Terminal Units. The units shall be the size and capacity as outlined in the plans and specifications. Casing dimensions shall be checked to ensure the terminals fit the available space.

1.2 Quality, Agency, Standards. Air terminals shall be certified under the Air Conditioning, Heating and Refrigeration Institute (AHRI) Standard 880-08 Certification Program and carry the AHRI seal. All NC values shall be calculated per AHRI Standard 885-08. Units with NC values calculated per AHRI-885-90 or 98 will not be accepted. Terminal units shall be either ETL® or UL® listed as a complete assembly. Terminal electrical components, including actuators and low voltage controls shall be UL® listed. All electrical components including both line voltage and low voltage shall be mounted in a metal control enclosure. Units shall have a single point field wiring connection. Units shall be manufactured and wired per UL-1995 and in accordance with the National Electric Code.

1.3 Shipping. All terminals shall be shipped as a single unit requiring no field assembly. Accessories including hot water coils and electric heaters shall be factory mounted.

SECTION 2. CONSTRUCTION

2.1 General. Single Duct Terminal Units shall be METALAIRE Air Terminal Units. The units shall be the size and capacity as outlined in the plans and specifications. Casing dimensions shall be checked to ensure the terminals fit the available space.

2.2 Casing. The air terminals shall be constructed of galvanized steel. The casing shall be a minimum of 22-gauge. The terminal primary air inlet valve shall have a round (oval or rectangular for larger sizes) inlet for field duct connection. The terminal unit discharge shall allow for a slip and drive duct connection. Units shall have a universal control-mounting panel constructed of minimum 22-gauge steel. Control panel shall include stand-offs to allow controls to be mounted without penetrating the terminal casing. Control panels without stand-offs are not acceptable.

2.2.1 Optional Sliding Door Control Panel Cover. Provide a sliding control panel cover that slides towards the primary inlet and prevents the cover from being removed.

SECTION 3. PRIMARY INLET AIR VALVE

3.1 Inlet Tube. Primary inlet air valve assembly shall have a seamless butt weld on round inlet tube to minimize leakage and prevent the damper from binding on overlapping seam welds. Inlet tubes with overlapping welds or non-continuous, skipped welds are not acceptable. Inlet air valve shall have three structural beads machine formed into the tube. One external bead shall be provided for the attachment of flexible duct. Inlet air valves without three structural beads are not acceptable.

3.2 Flow Sensor. Primary inlet air valve flow sensor shall be multi-quadrant averaging sensor with flow sampling of both velocity pressure and flow differential pressure from four quadrants, and shall
contain two control ports and two accessory ports. Flow sensors sampling only velocity pressure in all four quadrants are not acceptable. Sensors reading differential pressure with fewer than 8 measuring points are not acceptable. All piping connections to the flow sensor must be made with external ports that extend through damper tube. Units with piping connections made in the primary air stream are not acceptable. Flow sensors with plastic piping connections of any kind are not acceptable. At an inlet velocity of 2000 fpm, the differential static pressure required to operate any terminal size shall not exceed 0.14” wg. for the basic terminal.

3.2.1 **Damper Assembly.** Air terminals with inlet flow sensing devices shall be provided with a gasketed access door to permit removal, inspection and cleaning of the air flow sensor.

3.3 **Damper Assembly.** Damper shaft shall rotate in a self-lubricating, long life, low friction thermoplastic bearing. Damper shaft construction shall be one piece, continuous extruded aluminum. Damper shaft end shall include a permanent cast damper position indicator. Damper tube shall be free of obstructions including damper stops to allow the free rotation of the damper. Mechanical damper stops located in the inlet tube are not acceptable. A flexible gasket-mounted damper blade without adhesives shall provide damper seal. Damper gasket shall include slit partitioning around the perimeter to prevent damper noise at low flows near full close off. Damper gaskets without perimeter slit partitioning are not acceptable. Mechanically fastened damper assembly shall be double layer, 18 gauge equivalent, galvanized steel with integral blade seal. Leakage through the damper assembly shall be less than 1% of maximum CFM at 3” static pressure.

SECTION 4. INSULATION

4.1 **Standard Fiberglass Insulation.** Air Terminals shall be internally insulated with (½” or 1”) thick, 1.5 lb. /ft³, dual density fiberglass. Insulation and edges shall be coated to prevent air erosion to 6000FPM surface velocity. Insulation shall comply with UL 181 and NFPA 90A.

4.2 **Optional Foil-Faced Fiberglass Insulation.** Air Terminals shall be internally insulated with (½”, ¾”, 1”) thick, 1.5 lb. /ft³ dual density or 1” 4 lb. /ft³ dual density, fiberglass covered with scrim backed foil facing. All surfaces and edges of the insulation shall be sealed with scrim backed foil facing so that there is no exposed fiberglass in the airstream. Insulation shall comply with UL 181 and NFPA 90A.

4.3 **Optional Closed-Cell Foam Insulation.** Air Terminals shall be internally insulated with (½”, 1”) thick, 1.5lb. /ft³ density, closed-cell foam insulation and shall be Thermopure for fiber free application. Exposed fiberglass is not acceptable. Insulation shall comply with UL 181 and NFPA 255 (25/50). Material shall be chemically resistant to most hydrocarbon based solvents. Material shall not support mold growth or demonstrated degradation while subject to air erosion when tested in accordance to UL 181 and UMC 10.1.2.

4.4 **Optional Solid Double - Wall/Metal Lined Insulation.** Air Terminals shall be internally insulated and thoroughly sealed with solid metal/double walled liner to completely isolate the internal (½”, 1”) fiber glass insulation from the airstream. The insulation shall provide a virtually non-destructible, non-porous duct surface and shall inhibit bacteria growth. Internal insulation shall comply with UL 181 and NFPA 90A.
SECTION 5. HOT WATER COIL

5.1 Construction. Hot Water Coils are to be factory mounted to the discharge outlet of the terminal. The number of rows and circuits shall meet the capacities as shown in the schedule. Hot water coils shall be enclosed in a minimum 20-gauge coated steel casing allowing attachment to metal ductwork with a slip and drive connection. Fins shall be rippled and sine wave type, constructed from heavy gauge aluminum, and mechanically bonded to the tubes. Tubes shall be copper with a minimum wall thickness is 0.016” with male sweat header connections.

5.2 Performance. Coils shall be leak tested to 300 psi with minimum burst of 2000 psi at ambient temperature. Coil performance data shall be rated and presented in accordance with AHRI standard 410. Coils must be ARI rated, certified and include an AHRI label. Coils that are not AHRI rated, certified or labeled AHRI are not acceptable.

SECTION 6. ELECTRIC HEAT

6.1 Construction. Electric Reheat Coils are to be factory mounted on the discharge of the Air Terminal with the sizes, kilowatts, steps, operating voltage, control voltage, and accessories as outlined in the plans and specifications. Heater casings shall be constructed of galvanized steel. Element wire shall be high grade nichrome alloy rated to 45 watts per square inch density. Element wire shall be supported by moisture resistant steatite ceramics. Ceramics to be enclosed in reinforcement brackets spaced across the heater element rack at 2” to 4” intervals. Controls shall be contained in NEMA 1 control cabinet with a hinged, latching door. A permanent wiring diagram shall be affixed to the inside of the control cabinet door for field reference. The heating element rack shall be recessed 1” into the duct to assure adequate air temperature readings for proper operation of safety switches. Each Electric Duct Heater shall be shipped with an ETL ® label certifying that it meets or exceeds the safety requirements of Standard 1996. Each heater will have an automatic primary high temperature limit switch, a manual reset high temperature limit switch, air static or fan relay type air proving switch and fusing if the heater exceeds 48 amps as required by UL®. A terminal block for line and control voltage shall be provided for simplified field wiring. A P. E. switch or contractor per step shall be provided for each stage of heat.

6.2 Performance. The heaters shall be ETL® listed for zero clearance, tested in accordance with UL® Standard 1995, CSA-C22.2 No. 236 and in accordance with the National Electric Code (NEC).

SECTION 7. ACCESS PANELS AND MOUNTING

7.1 Access Panels. An optional separate bottom primary inlet access panel is available.

7.2 Mounting. Terminal shall include 3” wide bottom-mouting surfaces on opposite ends designed to accept bottom-mouting hardware including trapeze type. Bottom-mouting surfaces shall allow mounting hardware to be installed without interfering with access or removal of the bottom access panels.

7.2.1 Optional Mounting. Field mounted hanger brackets designed to accept threaded rods up to 5/16” in. diameter are acceptable.
SECTION 8. SOUND

8.1 Sound Ratings. The terminal manufacturer shall provide AHRI certified sound power data for radiated and discharge sound. All NC values shall be calculated per AHRI standard 885-98. Verify sound ratings for the terminal do not exceed specified value at scheduled static pressure. Sound performance shall be AHRI certified. Each individual terminal unit shall bear an AHRI label.

8.2 Attenuators. Sound attenuator shall be provided where scheduled to meet acoustical performance requirements. The attenuator and terminal unit shall be single piece construction. Attenuator insulation shall be the same as the unit casing insulation.

SECTION 9. CONTROLS

9.1 Digital Controls. Factory mounting and wiring of DDC controls shall be as specified in the schedule. Mounting shall include manufacturer’s flow sensor, transformer (if required by DDC controls manufacturer), and an enclosure protecting DDC controls and wiring.

9.2 Analog Controls. Analog electronic controls with flow adjustments shall be as specified in the schedule and be provided by the terminal unit manufacturer.

9.3 Pneumatic Controls. Pneumatic controls shall be as specified in the schedule. Manufacturer shall provide terminal units with factory set flow adjustments as required per the Terminal Unit schedule.