



Central Station Air Handler Specification

(Model CS³)

Mechanical Specification

PART 1: GENERAL

1.01 WORK INCLUDED

- A. Provide complete air-handling unit(s) suitable for indoor installation. Contractor shall furnish and install air handling unit(s) as shown and scheduled on the drawings. Unit(s) shall be installed in accordance with this specification.

1.02 DESIGN BASE

- A. The construction drawings indicate a system based on a selected manufacturer of equipment and the design data available to the Engineer during construction document preparation. Electrical services, size, configuration and space allocations are consistent with that manufacturer's recommendations and requirements.
- B. It shall be the Contractor and/or Supplier's responsibility to assure the equipment is consistent with the design base. No extra compensation will be approved for revisions required by the design base or other manufacturers' for any different services, space, clearances, etc.

1.03 SUBMITTALS

- A. Submit shop drawings on each piece of equipment specified in accordance with Specifications Section 15010, General Provisions.
- B. Furnish three (3) sets of Operations and Maintenance Data.
- C. Furnish one (1) copy of submittal for each air handling unit to the Temperature Control Contractor.

1.04 START UP

- A. The Contractor shall provide labor to accomplish the check, test and start up procedure as recommended by the unit manufacturer.

1.05 WARRANTY



- A. The equipment supplier shall provide a guarantee on equipment for a period of one (1) year from start up or 18 months from date of shipment, whichever occurs first.
- B. Date of successful startup shall be certified by the Mechanical Contractor to the Engineer and Owner.

PART 2: PRODUCTS

2.01 CS³ AIR HANDLING UNITS

- A. General
 - 1. Furnish and install as shown on the plans CS³ air handling units. Units shall be Dunham-Bush Model CS³ Central Station Air Handler or equal.
 - 2. The units are to be completely factory assembled and blower run tested and shipped as one complete unit or in sections as shown to facilitate handling.
 - 3. The units shall be built in accordance with all applicable national codes including the National Electrical Code and UL1995.
- B. The units shall be furnished as shown on capacity schedules and drawings.
- C. Construction: Units will be designed for maximum strength being rigidly constructed in modules each section of extruded aluminium structural profile with strong nylon corners complete with external isolator and rigging supports. The entire assembly shall be fabricated from galvanized steel or coated with manufacturer's standard paint finish meeting ASTM-B-117, 500 hour (minimum) salt spray. Galvanized steel shall be UL-090U approved.
- D. Unit casing and frame
 - 1. Unit framework shall be of extruded aluminium structural section construction, joined with nylon corner to form rigid structure. Unit shall be (1" single-wall) (1" double-wall) or (2" double-wall) construction. Each panel shall be formed as an individually removable, rigid member. Base angles shall be structurally formed and to be of extruded aluminium structural section construction. Galvanized steel or manufacturers standard paint acceptable.
 - 2. All wall, floor and roof panels shall be a minimum of 18 gauge (galvanized) (painted) steel.
 - 3. Unit base to be designed for floor mounting or ceiling suspensions. Minimum ¼" x 2 ½" x 2 ½" structural steel shall extend beyond unit casing for isolation mounting or ceiling suspension.
 - 4. Unit to be of (1" thick single-wall) (1" thick double wall) (2" double-wall) design with 20 gauge (perforated)(solid)(galvanized) inner casing.
 - 5. Panels shall be fastened in such a way to minimize loosening due to vibration or stripping of fastener threads.
- E. Insulation: Casing to be completely insulated with (1" - 1 ½ LB) (2" -2 LB) density fiberglass or polyurethane foam with neoprene facing. Insulation shall be NFPA 90A approved.



F. Access door and/or panel

1. Access door/panel is to be provided on fan and angle filter sections as well as any other sections shown on the drawings. Access panel shall come with screwed type panel block to facilitate accessibility to internal parts and ease of servicing. Fan and angle filter section doors shall be a minimum of 18 inches in width.
2. Access doors shall be full size, of (1" single-wall) (1" double-wall) (2" double-wall) construction with 20 gauge galvanized (painted) steel construction with (solid)(perforated) inner liner. Access door panels shall be easily removable by air tight screwed compression latch. (Doors shall incorporate tempered, wire reinforced glass view port.) Gasketing shall be rigid PVC strip and PE foam to provide air-tight casing and minimize cold bridging or equivalent.

G. Supply fan section

1. Centrifugal fans shall be double width, double inlet, (forward curved) (airfoil) type, complete with housing and tested in accordance with AMCA standard 210-85. The sound rating shall conform to AMCA standard 300-96. Fans are to be statically and dynamically balanced as a complete assembly to ISO 1940 and minimum AMCA 204/3-G2.5 after assembly. Fan shafts shall be solid steel, turned, ground, and polished. Fan and shafts to operate at 25% less than critical speed.
2. Fan bearings shall be self-aligning, pillow block, re-lubricable, ball type selected for 200,000 hour average life.
3. Fan and motor shall be internally mounted as a rigid assembly on a common base. Grease lines shall be extended to a common fitting on the cabinet exterior.
4. The entire fan and motor assembly shall be isolated from the unit base on rubber-in-shear (units size 48 and below, only) or (1")(2") deflection open-spring isolators and incorporate a flexible connection between fan assembly and discharge panel. Tie down brackets for shipping purposes shall be provided which are released after the unit is in place.
5. Fan may be furnished (optional) with variable inlet vanes interconnected to a common jackshaft.

H. Motors and Drives

1. Motors shall be of minimum horsepower scheduled, 1800 RPM ball bearing, rigid base, T-frame (TEFC)(High Efficiency) design. Motors shall be factory mounted to an adjustable motor base having heavy duty adjusting bolt(s) for alignment and belt tension.
2. V-belt drives shall be rated at (120%) (150%) of motor name plate horsepower. Motors 15 horsepower and less shall be supplied with adjustable drives. Motors 20 horsepower and greater shall be supplied with fixed drives, which are to be replaced by the installer, after balancing of the system to meet scheduled capacities.

I. Cooling coil section:

1. Cooling coil section shall have a full size insulated primary drain pan extending under header connections and downstream of cooling coil.



2. Primary drain pan shall have a drain connection extended through unit base.
3. Drain pan shall be of (galvanized) (stainless steel), double wall construction and fully insulated. Drain pan shall be pitched to provide a positive drain of condensation to minimize standing water and include (LH)(RH) connection.
4. When stacked coils are required, an intermediate drain pan is to be furnishing with drains extending to the primary drain pan. Coils must be removable through the access panels.
5. All connection, including supply, return, vent and drain shall terminate outside the air handler cabinet. Cabinet penetrations shall be gasket.

J. Chilled water Coils

1. Coil face velocity shall not exceed 550 feet per minute and shall have capacities as shown on unit schedule. Coils shall be of the extended surface type, constructed of 5/8" O.D. (copper) tubing and plate fins of (aluminum) (polycoat aluminum) (copper) and shall be certified as complying with ARI Standard 410. Coils shall be of drainable (cleanable) construction. Tubes shall be pressure-bonded into fin collars by expanding the tubes. Plate fins shall be die-formed with integral spacing collars that cover the tube surface.
2. Headers shall be seamless copper with (steel)(red brass) MPT pipe connections. Coils casing shall be a minimum of 16 gauge (G90 galvanized) (304 stainless) steel.
3. Each coil shall be tested at 400 psig air pressure under water.
4. Vent and drain connections shall be factory installed in the return and supply connections respectively.

K. Direct expansion coils

1. Coil face velocity shall not exceed 550 feet per minute and shall have capacities as shown on the equipment schedule. Coils shall be of the extended surface type, constructed of 5/8" O.D. (copper) tubing and plate type fins of (aluminum) (polycoat aluminum) (copper) and shall be ARI Standard 410 certified. Distributors shall be as required for capacity control and number of refrigerant circuits required. Tubes shall be pressure-bonded into fin collars by expansion of the tubes. Plate fins shall be die-formed with integral spacing collars that cover the tube surface.
2. Headers shall be seamless copper with copper sweat connections. Coil casings shall be a minimum of 16 gauge (G90 galvanized) (304 stainless) steel.
3. Each coil shall be tested at 400 psig air pressure under warm water.

L. Hot water coils

1. Coil face velocity shall not exceed 700 feet per minute and shall have capacities as shown on the equipment schedule. Coils shall be of the extended surface type, constructed of 5/8" O.D. copper tubing and plate type fins of (aluminum) (polycoat aluminum) (copper) and shall be ARI Standard 410 certified. Coils shall be of drainable (cleanable) construction. Tubes shall be pressure-bonded into fin collars by expansion of the tubes. Plate fins shall be die-formed with integral spacing collars that cover the tube surface.



2. Headers shall be seamless copper with (steel MPT) (Red brass MPT) connections. Coil casing shall be a minimum of 16 gauge (G90 galvanized) (304 stainless) steel.
3. Each coil shall be tested at 400 psig air pressure under warm water.
4. Vent and drain connections shall be factory installed in the return and supply connections respectively.

M. Steam coils

1. Coil face velocity shall not exceed 700 feet per minute and shall have capacities as shown on the equipment schedule. Coils shall be of the extended surface type, constructed of 5/8" O.D. copper tubing and plate type fins of (aluminum) (polycoat aluminum) (copper) and shall be ARI Standard 410 certified. Coils shall be of drainable (cleanable) construction. Tubes shall be pressure-bonded into fin collars by expansion of the tubes. Plate fins shall be die-formed with integral spacing collars that cover the tube surface. Tubes shall be pitched 0.125" per foot toward return connection.
2. Headers shall be seamless copper with (steel MPT) (Red brass MPT) connections. Coil casing shall be a minimum of 16 gauge (G90 galvanized) (304 stainless) steel.
3. Each coil shall be tested at 400 psig air pressure under warm water.
4. Steam coils shall be of non-freeze type with internal steam distributing tubes with directional kinetic orifices spaced at suitable intervals to provide positive condensate removal and uniform steam distribution over the entire face of the coil.

N. Filter section

1. Filters shall be (throwaway fiberglass) (35% efficient pleated fiberglass) (permanent aluminum) type. Filter face velocities shall not exceed 500 feet per minute. Filter tracks shall be of die formed galvanized steel. Filters shall be of side loading type with access door/panel on (LH)(RH)(both) side of unit.
2. Final filters shall be of the (bag) (rigid cartridge) type. Filters shall be (65%) (85%) (95%) efficient by NBS dust spot test. Filters shall be mounted in an extruded aluminum filter track with 1/8" thick construction, incorporating a reinforced nylon pile gasket for positive air seal. Filters shall be of side loading type with access door/panel on (LH)(RH)(both) sides of unit.

O. Standard Dampers

1. Dampers shall be parallel type; frames shall be constructed from 14 gauge galvanized sheet steel. Damper blades shall be constructed of 16 gauge G90 galvanized steel. Maximum damper blade width shall not exceed 8 inches. Damper rods shall rotate in frictionless bearings. Damper-to-damper linkage shall be provided with (plain or combination filter/mixing section)(internal or external face and bypass). Dampers shall be designed for shut-off against a 2-inch pressure differential. Dampers shall not have leakage greater than 10 CFM/sq. ft. at 1 in. W.G. static pressure. Damper must be rated to operate over a temperature range of -4°F to 176°F (-20°C to 80°C).
2. Low leak-Airfoil: Dampers shall be opposed type; frames shall be constructed of formed 14 gauge galvanized sheet steel. Damper blade shall be airfoil type, constructed of 1/16 in. extruded aluminum. Maximum damper blade width shall not exceed 6 inches. Blade



and jamb seals are required on all dampers. Jamb seals shall be self-compensating stainless steel. Blade seal shall be thermoplastic rubber gasket, extend the full length of the blade and along the top and bottom blade stops of each damper. Damper rods shall rotate in frictionless bearings. Damper-to-damper linkage shall be provided with (plain or combination filter/mixing section)(internal or external face and bypass). Dampers shall be designed for shut-off against a 4-inch pressure differential. Dampers shall not have a leakage greater than 0.54 CFM/sq. ft at 1 in. W.G. static pressure. The damper must be rated to operate over a temperature range of -4°F to 176°F (-20°C to 80°C).

- P. (Mixing) (Combination filter-mixing box). Section shall have parallel dampers to efficiently mix outdoor and return air. Dampers to have interconnecting linkage. (Filters shall be as described above.) (Mixing box shall include insulation as described above.)
- Q. Access section(s) shall be provided as shown on plans between each component to permit complete upstream and downstream access to all internal components. Access sections shall be provided with access door/panel as described in Section 2.01 F.)