SECTION 23 82 19 - FAN COIL UNITS (IEC)

PART 1 - GENERAL

1.01 REFERENCE

A. Refer to section 23 05 00 for requirements which are applicable to this section.

1.02 WORK INCLUDED

A. Provide all labor, material, equipment, and supervision necessary to install and place into operation the fan/coil units shown on the drawings and specified herein.

1.03 SUBMITTALS

A. Submit shop drawings of fan/coil units.
B. Submit manufacturers' data sheets of performance characteristics.
C. Submit wiring diagrams of controls.

1.04 QUALITY ASSURANCE

A. Verify that all equipment is installed in accordance with the manufacturer's warranty requirements.
B. Provide adequate supervision of labor force to see that installations are correct.
C. Coils shall be tested in accordance with ARI Standard 410-2001. Each coil shall be factory tested for leakage at 300 psig air pressure with coil submerged in water. Insulation and adhesive shall meet NFPA-90A requirements for flame spread and smoke generation. Base or “standard” units shall be UL listed.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Basis of design shall be fan coils by International Environment Corporation. Equivalents by Trane, Carrier, York or prior approved equal.

2.02 CONFIGURATION

A. General:
B. Factory assembled vertical fan coil units complete with water coil, fan, motor, drain pan, and all required wiring, piping and controls.
C. FHY, LHA, LHW Floor Hideaway Units:
    1. Cabinet shall be made of heavy gauge galvanized steel.
    2. Interior surfaces shall be lined with ½? thick fiberglass Tuf-Skin® II (½? Tuf-Skin Exact-OKote, ½? foil face, or ¼? closed cell) insulation.
    3. Units shall be supplied with a 1? collar for duct connection.
    4. Units shall have a combination condensate drain pan and fan deck constructed of 16-gauge

galvanized (stainless) steel and extending the entire length of the unit.
5. Galvanized drain pans shall be coated with a 2-part closed cell foam insulation.
6. Units shall have 1? throwaway (permanent or pleated) filters.

D. FXY, FSY, LXA, LHW Floor Exposed Units:
1. Units shall be constructed of heavy gauge galvanized steel.
2. The interior surfaces shall be lined with ½? thick fiberglass Tuf-Skin® II (½? Tuf-Skin Exact-O-Kote, ½? foil face, or ¼? closed cell) insulation.
3. Cabinet shall have an Arctic White (or the color specified on the equipment schedule) powder-coat finish.
4. Cabinet shall be free standing with two access doors (or no access doors).
5. Top panel shall be supplied with a stamped (double deflection, steel or aluminum FXY, FSY only) supply grille.
6. Top panel on the FSY unit shall slope down from back to front at an angle of 25 degrees.
7. Standard stamped (or reverse-stamped grille) on the FSY unit shall provide discharge into the room at a nominal 60 (or 30) degrees from the vertical.
8. Galvanized drain pans shall be coated with 2-part closed cell foam insulation.
9. Units shall have 1? throwaway (permanent or pleated) filters.
10. Optional tamper proof fasteners shall be installed on cabinet control doors.

2.03 CERTIFICATION

A. Safety: Units shall be listed by Underwriters Laboratories, Inc. with the C-UL-US listing indicating the units comply with the minimum requirements of the U.S. and Canadian national product safety standard, UL 1995/CSA C22.2 No. 236.

B. Capacities: Coil capacities are tested in accordance with ARI Standard 410-2001.

2.04 MATERIALS

A. Coils: All coils shall have ½? copper tubes, manual (or automatic) air vents, and aluminum fins, 10 fins per inch spacing. Coil fins shall be mechanically bonded to copper tubes. Copper tubes must comply with ASTM B-75. Fin thickness shall be 0.0045? and tube thickness shall be 0.016?. All coils shall be leak tested with air at 300 psig under water.
1. For installation in a 2-pipe system, unit shall be equipped with:
a. 3-row coil (or 4-row on FHY, FXY, FSY) as shown on equipment drawings.
b. 2 ball valves
c. 1 control valve
2. For installation in a 4-pipe system, unit shall be equipped with:
a. 2/1 (LHA, LXA), 3/1, 3/2 or 4/1 (FHY, FSY, FXY) row-split coil, as shown on equipment drawings.
b. 4 ball valves
c. 2 control valves

B. Motorized control valves:
1. Shall be rated at 300 psig.
2. Shall be rated to operate with fluid temperatures between 40ºF and 190ºF.

C. Fans:
1. Fans shall be direct-drive, double-width fan wheels with
2. forward-curved blades.
3. Blower wheels shall be statically and dynamically balanced.
4. Scrolls and fan wheels shall be constructed of galvanized steel.
5. Shall be easily removable.

D. Fan Speed and Temperature Control: 3 (high, medium, low) or 2 (high, low) speed control, (off, on, auto), (wall or unit) (auto or manual) thermostat.

E. Motors:
   1. Motors shall be 3 speed, single phase, 60 Hz permanent split capacitor type for 115 (208, 230, or 277) volts, permanently lubricated, with sleeve bearings.
   2. Motors shall be equipped with quick connect electrical plugs.
   3. Motors shall have thermal overload protection with automatic reset.

F. Controls and Safeties:
   1. Controls: Unit shall be furnished with a 3-speed, 4-position fan
   2. switch (on a wall plate for field installation).
   3. Safeties: Unit fan motor shall be equipped with integral thermal protection.

G. Operating Characteristics:
   1. A 2-pipe system shall be capable of providing heating or cooling as determined by the operating mode of the central water supply system.
   2. A 4-pipe system shall be capable of providing heating and cooling on demand.

H. Electrical Requirements:
   1. Standard unit shall operate on 115V (208, 230, or 277V), single phase, 60Hz electrical power, and all exposed wiring shall be in flexible conduit.

I. Option and Accessories:
   1. Unit shall be equipped with sheath electric heaters for total or auxiliary electric heat as specified on the equipment schedule.
      a. Heaters shall be protected by an automatic reset safety cutout switch and a fusible link.
      b. Heater capacity shall be as specified on the equipment schedule.
      c. Heaters shall be single phase, 120, 208, 240 or 277 volts as specified on the equipment schedule.
      d. For total electric heat, unit controls shall include a sequenced heating/cooling thermostat in lieu of the heating/ cooling thermostat and automatic changeover device.
      e. A junction box and fuse shall be factory furnished and installed to protect the motor and control circuit when electric heaters are installed in a unit with a single power source.
   2. Service switch shall be factory installed.
   3. Units shall be equipped with 24V controls.
   4. Units shall be equipped with high level condensate switch.
   5. Factory installed outside air damper shall be motorized (FHY, FXY, FSY only) or controlled manually.
   6. Wall panels, painted with specified color, shall be furnished for top discharge or front discharge recessed unit (FHY).
   7. Outside air wall boxes shall be furnished for field installation.

PART 3 - EXECUTION

3.01 GENERAL

A. Install with galvanized steel drain pan with condensate drain to suitable discharge point.
B. Provide ball valves on water connections.
C. Provide 2 or 3-way control valves as indicated.
D. Install with flexible duct connections.
E. Provide clearance for filter removal.
F. Suspend horizontal units on vibration isolating hangers.

END OF SECTION

SECTION 23 82 30 - CONVECTORS, EXTENDED FIN RADIATION, UNIT HEATERS

PART 1 - GENERAL

1.01 REFERENCE

A. Refer to section 23 05 00 for requirements which are applicable to this section.

1.02 WORK INCLUDED

A. Provide all labor, material, equipment, and supervision necessary to install and place into service the convectors, radiators, and unit heaters described in these specifications.

1.03 SUBMITTALS

A. Submit shop drawings of all equipment.
B. Submit manufacturers' data sheets of equipment capacity.

1.04 QUALITY ASSURANCE

A. Verify that all equipment is installed in accordance with the manufacturer's warranty requirements.
B. Install systems and equipment in accordance with the IBC 2003 Code and the National Electrical Code.

PART 2 - PRODUCTS

2.01 BASEBOARD EXTENDED FIN RADIATION

A. Size and capacity as indicated on drawings.
B. 3/4" copper tube 2 1/8" X 2 5/16 .007" aluminum elements, 51 FPF.
C. Enclosure with baked enamel finish, damper assembly, front panel, element guide.
D. Complete with inside and outside corners, front splices, end caps and end pieces.
E. 600 BTU per foot at 180 deg. 4 GPM.
F. Weil McLain Model 75WLT-3 ThermaTrim Baseboard.

2.02 CONVECTORS

A. Furnish and install convectors of the size and capacity indicated on the drawings. Convectors shall be recessed, semi-recessed, wall, or floor mounted as indicated. Cabinets shall be 16 gauge steel front and top with 20 gauge steel enclosures. Cabinets shall be phosphatized and painted inside and out with one coat of combination light beige prime finish baked on. A baked enamel finish in a color selected by the Architect from manufacturer's color chart shall be provided.
B. Recessed and semi-recessed models shall be provided with a matching steel wall frame which shall overlap the opening edges and remain permanently in place. The cabinet front shall fit into a

gasketed recess to form a flush front cabinet line on recessed models. Front panels shall be fastened with tamper proof Allen head machine screws.

C. Access panels shall be provided for access to control and shut off valves.
D. Convectors fed from below shall be provided with a brass air chamber vent assembly.
E. Heating elements shall be 1/2 inch round seamless copper tubes with aluminum fins and 1 inch seamless copper headers. Tubes shall be mechanically expanded into fin spacing collars and silver solder brazed to the headers. Header tapping's shall be 3/4 inch FPT. Heating elements shall be tested at 320 PSI hydrostatic pressure.
F. Convectors shall have inlet and outlet grilles die formed with directional louvers.

2.03 EXTENDED FIN RADIATION

A. Furnish and install extended fin radiation of the size and capacity indicated on the drawings.
B. Units shall be wall mounted with 20 gauge steel back plate extending the full height of the enclosure.
C. Elements shall be copper tube mechanically expanded into .018" thick aluminum fins.
D. Enclosures shall be 16 gauge steel.
E. Provide end caps, outside corners, inside corners, and end enclosure with access door.
F. Slope top units shall have expanded steel discharge grille.
G. Units shall have extruded aluminum top grilles.
H. Manufacturers; Airtherm, Vulcan, Slant-Fin, Trane, Standard Fin Pipe.

2.04 UNIT HEATERS - CABINET TYPE

A. Wall mounted, recessed, or semi-recessed as indicated on the drawings.
B. Seamless copper tube elements, filters and filter rack, direct drive fans, double extended shaft. Fan and motor mounted on a single motor board, die formed fan housing.
C. Front panels removable, acoustically insulated, access door to motor, end piping compartment, 16 gauge cabinets, inlet grille in base, and 2 way adjustable discharge grille.
D. Manufacturers; Airtherm, Vulcan, Slant-Fin, Trane.

2.05 UNIT HEATERS - PROPELLER TYPE

A. Wall mounted or ceiling mounted propeller type as indicated on the drawings.
B. Seamless copper tube elements with plate fins, direct drive fan, permanently lubricated split capacitor motor.
C. Manufacturers; Airtherm, Vulcan, Slant-Fin, Trane.
D. Casings phophatized and painted with baked enamel.
E. Horizontal and vertical adjustable louvers.

2.06 FLOOR RECESSED EXTENDED FIN.

A. Floor recess formed by others.
B. Install heating element, bracket, baffles and supports along with all necessary pipe, valves and fittings.
C. Continuous baffle 20 gauge steel.
D. 16" x 1 1/2" brackets at maximum 4'-0" on center.
E. Capacity as scheduled on the drawings.
F. Furnish and install top extended aluminum bar grille to span opening. Provide steel angle iron recessed frame.
G. Paint brackets, baffles, elements and piping flat black. Paint inside of trench flat black.
H. Manufacturer: Vulcan, Sterling, or approved equal.

2.07 PERIMETER RADIATION - FIELD BUILT ENCLOSURES

A. Furnish and install wall mounted extended fin radiation complete with valves, fittings, brackets and supports.
B. Element and tube size as indicated on the drawings.
C. Copper tube, aluminum fin elements tested at 300 psi.
D. Extruded aluminum discharge grille with .162" bars on 1/2" centers. 67% free area cross bars on 6" centers. Vulcan type VA or equal.
E. Enclosure fabricated as detailed on the architectural drawings.

2.08 PEDESTAL RADIATION

A. Single width units shall be 6 1/4" wide, double width shall be 11 3/16" wide by 5 1/4" high with 3 7/8" pedestals, 18 gauge front and back panels.
B. Units shall have extruded top grille.
C. Units shall have copper tube, aluminum fin coils of the size and capacity indicated on the drawing.
D. Units shall be available in a choice of 8 baked enamel colors.
E. Units shall be Trane Type E3A.

PART 3 - EXECUTION

3.01 CONVECTORS, RADIATION, AND UNIT HEATERS

A. Provide rough opening information to the General Contractor to allow for proper wall openings during construction.
B. Field measure each existing recessed opening for the actual dimension of the required convector. Provide a shop drawing indicating the room number of each space, the opening size, and the type of convector to be provided in the recess. Indicate as to whether the convector is to be recessed, semi-recessed, wall, or floor mounted, and the heating capacity and conditions of performance.
C. Provide a color chart for selection of color by the Architect.
D. Install the convector or unit heater with 1 inch rigid fiberglass insulation behind and around the convector where placed in outside walls.
E. Piping to all elements shall be provided with unions, an automatic control valve on the return side, flow measuring device set to the GPM quantity indicated in the schedule, and shut off valves for servicing.
F. Provide a mockup of the first unit for review and acceptance by the A/E prior to installation of remaining units. This shall also be reviewed by the owner’s representatives prior to further installations.

END OF SECTION

CONTENTS

DIVISION 26 - ELECTRICAL
DIVISION 27 - COMMUNICATIONS