

SECTION 23 82 00
CONVECTION HEATING AND COOLING UNITS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Valance Units and accessories.

1.2 RELATED WORK

- A. Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION:
General mechanical requirements and items, which are common to more than one section of Division 23.
- B. Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT: Noise requirements.
- C. Section 23 21 13, HYDRONIC PIPING: Heating hot water and chilled water piping.
- D. Section 23 31 00, HVAC DUCTS AND CASINGS: Ducts and flexible connectors.
- E. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Valve operators.
- F. Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC: Flow rates adjusting and balancing.

1.3 QUALITY ASSURANCE

Refer to Paragraph, QUALITY ASSURANCE, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
1. Valance Units.
- C. Certificates:
1. Compliance with paragraph, QUALITY ASSURANCE.
 2. Compliance with specified standards.
- D. Operation and Maintenance Manuals: Submit in accordance with paragraph, INSTRUCTIONS, in Section 01 00 00, GENERAL REQUIREMENTS.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. National Fire Protection Association (NFPA):
 - 90A-02.....Standard for the Installation of Air Conditioning and Ventilating Systems
 - 70-05.....National Electrical Code
- C. Underwriters Laboratories, Inc. (UL):
 - 1995-05.....Heating and Cooling Equipment

1.6 GUARANTY

In accordance with FAR clause 52.246-21.

PART 2 - PRODUCTS

2.1 VALANCE UNIT

- A. The valance units shall include the heat transfer elements, element support structure, support brackets, ceiling baffles, streamline enclosure, wall mounting brackets, any necessary wall trim, integral insulated condensate pans, PVC drain fittings (internal type unless otherwise noted), control valves, shut-off valves, balance valves, controls, and all necessary circuiting and terminal adapters.
- B. Heat Transfer Elements:
 - 1. Plastic slides shall be attached to the heat transfer element fins at 3'0" spacing and be held in place by the element support channel. The plastic slides shall isolate the coil fins from direct contact with other metallic surfaces including the support channel to prevent any noise during expansion and contraction of the coil. Fins shall not be in direct contact with the supporting elements such that coil movement resulting from expansion and contraction will result in any creaking noises.
 - 2. The heat transfer element circuiting shall be such that the total water side pressure drop will not exceed ten (10) feet of water pressure drop at flow rates specified on the valance schedule.
 - 3. The heat transfer element shall have supply and return connections in accordance with valance connection details. All units shall be the 2-pipe design for chilled water only.
 - 4. The heat transfer element (coils) shall be constructed of aluminum flat plate fins with 1/2" seamless copper tubing. Coil fin spacing

shall not exceed four (4) fins per inch. The flat plate aluminum fins shall have full tube collars. The coil's copper tubing shall pass through the fin collar and the tubes shall be mechanically expanded to provide an efficient, permanent bond between the tube and fins for positive tube-to-fin contact and assurance of predictable heat transfer. The coil 1/2" copper tubes shall be manufactured from tempered drawn copper (per ASTM SB75) to form tubing of 0.603" O.D. with a tube wall of 0.020". Fins shall be aluminum alloy 1100H12 (0.010" fin thickness x 2.375" wide).

5. The coil shall be pitched in the support channels so that the condensate drains silently into the insulated condensate disposal pan, and aids in coil and condensate pan self-cleaning during the cooling mode by the washing action of the condensate flowing over the fins and room side enclosure when draining towards the drain connection.

C. Supports:

1. The longitudinal support for the Valance unit shall be provided by the element (coil) support channel. All components, including drain pan, ceiling baffle and heat transfer element, shall be supported from this channel. The support channel shall consist of two extruded aluminum channels facing inward and providing support for the heat transfer element. The unit lateral supports shall be constructed of 1/4" thick extruded aluminum channels of alloy 6105T5. Cross bracing shall be provided as required to offer lateral support. The support channel shall run the length of the room and rest on the wall brackets as shown on the plans. The support channel shall run the full wall-to-wall length or width of the room to support the Valance room side enclosure. Adjustable, slotted "J" hooks shall provide support to the rear side of the Valance enclosure and allow enclosure adjustment to establish proper pitch for condensate disposal.

2. Provide an intermediate ceiling suspension hanger(s) for any Valance unit whose overall length is 13'-0" or greater. (Spacing between intermediate supports shall not exceed 10'-0".) The intermediate ceiling support hangers shall be positioned of equal distance from each other and the walls for symmetry to form a neat finished appearance. The intermediate ceiling support hangers shall be located along the centerline of the element support structure and shall be securely fastened to the building structure overhead. The intermediate ceiling

support hangers shall provide support directly to the element support channels. The support rods and surface mounting plates where used shall be field painted to match the Valance enclosure or ceiling finish as directed by the architect.

D. Wall Brackets:

1. Each Valance unit shall be supported by wall brackets located at each end of the unit. The brackets shall be self-positioning, fitting directly into the junction of the outside wall and the ceiling. The wall brackets shall be manufactured of 14 gauge galvanized steel. Rooms which have window treatments, soffits, or wall obstructions will require the installer to coordinate with the manufacturer's installation instructions to adjust for such field conditions.

- a. Wall mounting brackets for new construction or where wall studs are accessible during construction of renovation projects, shall be secured to the wall studs and concealed by the gypsum dry-wall material as detailed on the plans. This contractor shall coordinate the wall mounting bracket installation with the dry wall contractor responsible for erecting and finishing the wall to ensure that the brackets are installed in accordance with the manufacturer's recommended installation instructions.
- b. Where wall brackets are surface mounted to existing wall construction, the contractor shall fasten the wall brackets to the wall with approved fasteners (mollies, expandoes or other approved fasteners) that will assure adequate support of the Valance channel and coil. Surface-type wall mounting brackets shall only be used in applications where there are masonry walls or the dry wall is existing and the wall mounting brackets cannot be mounted on the studs under the sheet rock. The surface mounted wall brackets shall be furnished with an off -white primer finish coat allowing for the brackets to be field painted with a finish coat same as the walls. This contractor shall coordinate with the painting contractor to be sure all exposed (surface mounted) brackets get painted to match the wall finish.
- c. Ceiling intermediate support hangers and integral piping trapeze hangers where water piping mains pass through the

Valance within the enclosure shall be fabricated of heavy gauge aluminum.

- E. To prevent the di-electric action, pipe hangers shall **be** coated with shrink-fit tubing (field or factory applied) or a rubber sleeve shall be installed on the pipe at the hanger support point. Alternative di-electric separation means as approved by the manufacturer of the valance unit can be substituted upon engineers review and acceptance.
- F. All enclosures and pan liners shall be continuous in length without splices. Splicing of coils and Valance enclosures shall only be allowed where rooms are too wide and standard unit dimensions will not fit. Splice sections in accordance with the manufacturer's recommended installation instructions. Spliced sections are required where enclosure lengths exceed 16 ft. or coils and enclosures must be shipped in shorter lengths to allow the installer material access into the rooms.
- G. The Valance room side decorative enclosure shall be streamline type constructed of 0.032" heavy gauge aluminum type alloy 303H14. The room side decorative enclosure/drain pan shall be lined with closed cell insulation having a solid waterproof surface and shall face the heat transfer element. Liner shall be of cross linked polyolefin foam.
 - a. The Valance streamline-style enclosure shall be factory finished with a thermal setting white primer/finish coat of paint. The installer must use care in handling, storing, and installing the Valance enclosures to protect them from scratches and abuse during installation.
 - b. The ceiling baffle shall be adjustable and include a gasket to allow for a tight fit against the ceiling. Ceiling baffle shall be constructed of the same material and finish to match the Valance room side enclosure.
- H. Valance units shall be provided with interior drain fitting connection, or exterior drain fittings, as indicated on the plans (Exterior drain fittings shall be used only where interior drain fittings will not fit or suit the application). The internal drain connection shall be of molded PVC and shall be affixed to the drain pan with a mechanical seal. Drain connection from pan to riser (including riser) shall be continuously insulated.

- I. Capacities shall be as outlined in the Valance Unit schedule on the plans.

PART 3 - EXECUTION

3.1 GENERAL

- A. Work shall be installed as shown and according to the manufacturer's diagrams and recommendations.
- B. Handle and install units in accordance with manufacturer's written instructions.
- C. Where the room wall-to-wall dimension exceeds 16'-0", field splice the coil, channel pieces and the Valance enclosure as outlined in the manufacturer's installation instruction manual or as so instructed verbally to achieve the proper installation of the product. The maximum channel length to be shipped in one piece is 20' -0". Field verify and coordinate to be sure that the longest channel length ordered can be fit into the room as one piece, and if not, shall order materials, and field apply splices as required to allow the product access to the rooms where it is to be installed while maintaining good symmetry and appearance after installation is complete.
- a. Where the coil length exceeds 16'-0", field splice the coil, sections together with slip couplings (e.g. a 5/4 coil will required 9 couplings, and a 6/5 coil will require 11 couplings, etc.).
- D. Where walls do not allow for square corner fit-up, field cut any mitered trim or enclosure pieces to match the field diagonal conditions.
- E. Provide required lengths of threaded rod to match manufacturer's intermediate ceiling support hangers where intermediate ceiling support hangers are required.
- F. Coordinate installation of the Valance unit so the Valance does not interfere with window dressings (I.E. drapes, blinds, or columns) as well as any other room finishes, such as television sets, etc. The contractor must coordinate the location of the wall brackets to assure the Valance minimum dimensions are maintained. (While manufacturer's installation instructions and dimensional sheet reference a minimum dimension off the wall gain the approval of the engineer for the minimum dimension desired to all for serviceable access of the drain pan and valve piping package where applicable).

3.2 INSPECTION

- A. Examine location where Valance equipment and accessories are to be installed and determine space conditions and notify architect in writing of any coordination issues or conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Install equipment where shown in accordance with manufacturer's written instructions and with recognized industry practices to ensure that equipment complies with requirements and serves intended purposes. The Valance manufacturer shall visit the job site on at least four (4) occasions during the Valance installation process. These visits are separate from that required to prepare the mock-up. The first and final visits shall be with the architect's or engineer's selected representatives present.

- B. Coordinate with other work and trades as necessary to interface installation of equipment with other components of systems.

Approximate Valance lengths maybe noted for reference. Contractor must field measure each room for final finish wall to wall dimensions prior to releasing product for manufacturing.

- C. Install a minimum of three (3) Valance units complete as mock-up rooms (as selected by the engineer) under the supervision of the Valance manufacturer's representative, for inspection and approval by the architect / engineer prior to commencing installation of the balance of the Valance units or system. The mock up units shall be installed and maintained as part of the project, so no extra materials will be required after completion of the mock-up installation. The installation shall be complete in all respects with all specified materials to include the piping, condensate drain piping to the riser drain connection, control valve(s), stop and balance valves, air vents, Valance coil and enclosure. Once the mock-up rooms are approved by the engineer, the sample installation shall serve as the model for installation practices throughout the balance of the project. Final installation of the mock-up rooms shall be a part of the finished project, and shall be protected by the contractor from any construction damage through-out the term of the project.

The mock-up rooms shall be completely finished by all trades so as the installation is ready for turn over to the owner. The finished mock-up rooms shall be inspected and approved before installation of any other Valance units are installed in the project.

- D. Do not to allow the mains or run-outs (drops, risers, etc.) to be visible when viewing the Valance installation from the front. If there are piping drops from the ceiling, they must be located behind the Valance baffle so as to be concealed from view while looking at the Valance unit from the front. Follow all installation recommendations of the Valance manufacturer, and install the mock-up rooms for approval, in order to have all questions involving project installation variables resolved, and to become familiar with the piping details.

- E. Wall brackets for supporting the Valance channel shall be installed as recommended by the Valance manufacturer's installation instructions. Wall brackets shall be mounted level one to the other in each room. Also see wall bracket installation details on the plans.

While mounting the wall brackets confirm the wall brackets in each room are level one to the other. Contractor shall not rely on measuring from the floor, ceiling or decking over head as they may not be level (from one side to the other) and this may affect the installation for proper pitch in the Valance unit. Consult the Valance manufacturer's representative for direction (if there are any questions) in proper positioning of wall brackets.

- F. Provide connections into the condensate drainage system drain piping as shown on the plans. Make connections to the drain riser piping as shown on the plans and/or as directed in the manufacturer's installation instructions. Provide and install a radiator-type hose clamp over the Valance hose terminal connection at the building drain riser run-out termination.

- G. Clean each unit of dust and any construction debris after installation in accordance with the manufacturer's recommended procedures prior to commissioning and turning the system over to the owner. Vacuum coil and drain pan until clean.

- H. Test each Valance unit's condensate disposal for proper pitch by pouring a significant amount of water into the unit enclosure / drain pan and

confirming it drains away properly. Adjust the pitch as required to ensure proper drainage toward the drain end, and ultimately into the condensate disposal drainage piping system as noted on the plans. While performing this test confirm that the room side enclosure and drain connections are free of leaks. Submit a completed room schedule confirming each room condensate disposal system and enclosure has been checked accordingly.

- I. Where piping passes through the wall partition, insulate the pipes as detailed on the plans. The piping insulation where passing thru the partition walls shall be approved Armaflex Type AP (1/2" thick) closed-cell type and extend a minimum of 13" into the Valance enclosure. The insulation shall be white in color. The ends and seams of this insulation shall be sealed watertight.
- J. After the Valance room side (decorative) enclosure is installed, adjust the "J" hooks to establish the proper pitch to drain condensate to the enclosure drain end. (See manufacturer's installation instructions). Locate all drain riser connections so that the condensate readily flows away from the Valance enclosure drain and pitch in direction of flow for positive condensate disposal.
- K. Pay special attention to the instructions noted on the Valance unit interior insulation. A special label is attached to this insulation advising contractor not to cut or discard the ends of this insulation material. Be aware and follow these directions. If the insulation is excessively long such that it extends above the top of the Valance enclosure such that it is visible, the contractor shall contact the architect / engineer and/or the Valance manufacturer representative for direction as to how this insulation is to be trimmed. When the installation is complete the insulation shall not be visible while viewing the Valance from the front.
- L. Use care in handling storing and installation the Valance enclosures to protect them from scratches and abuse during installation.

3.4 OPERATIONAL TEST

Refer to Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

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