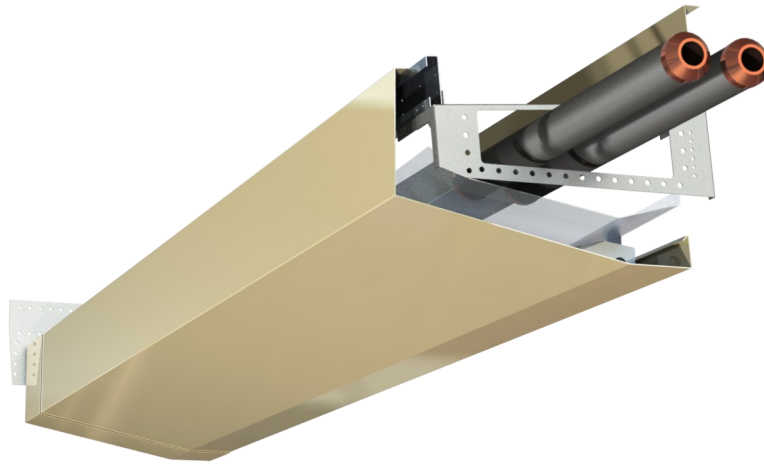


VALANCE UNIT



TECHNICAL CATALOG



MANUFACTURERS OF HYDRONIC HEATING AND COOLING
COMMERCIAL & INDUSTRIAL

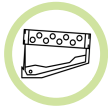
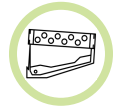
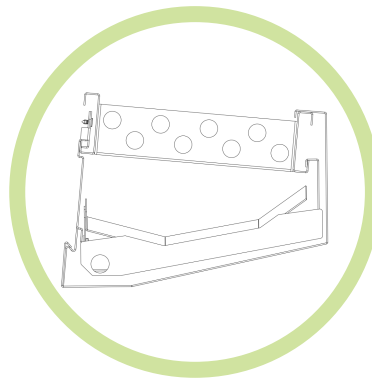


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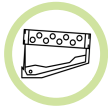
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VALANCE UNIT



1. PRODUCT OVERVIEW & DESIGN CONSIDERATIONS



1. PRODUCT OVERVIEW & DESIGN CONSIDERATIONS

1.1 Product Design

Valance heating and cooling units are simply hydronic coils mounted in an architectural enclosure. The units are mounted near the ceiling, usually along an outside wall, and provide draft-free, energy-efficient heating and cooling using natural convection.

This elegant, motorless design means valance units offer many advantages:

- **Quiet** – No motors, no fans, no noise—these units are virtually silent.
- **Efficient** - No fan is required to circulate air, saving up to 30% of the energy used in other air conditioning systems. Plus, since the air velocity is low, the coils can operate at a very efficient point.
- **No draft** – Large volume, low velocity convection air movement provides consistent, gentle air circulation.
- **Easy maintenance** – With no moving parts or filters, the only maintenance required is the occasional cleaning of the surfaces.
- **Easy install** – With no electrical hookups, they are easy to add in retrofit applications. Just hook into heating and cooling piping in an existing building.

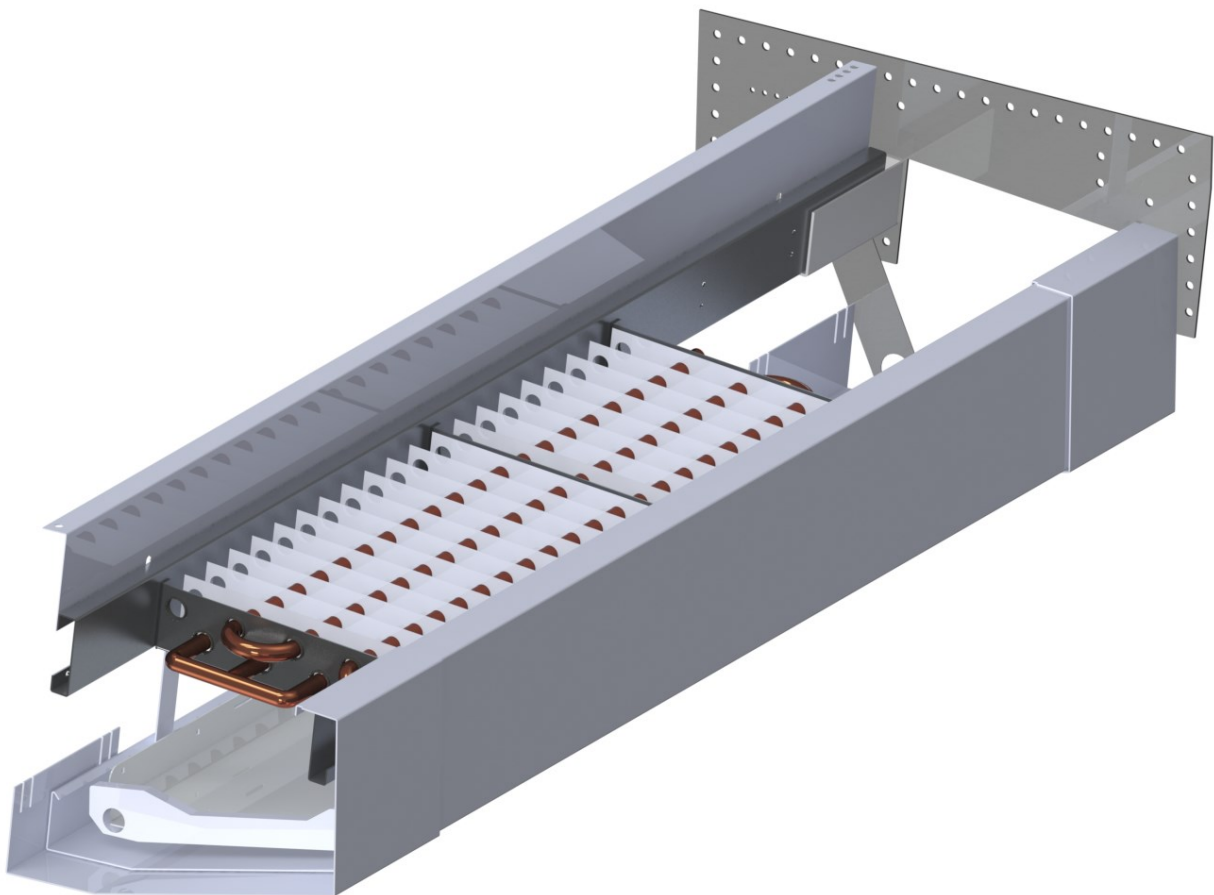
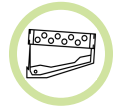


Figure 1.1.1 - Conceptual rendering of standard slope style valance unit.



1. PRODUCT OVERVIEW & DESIGN CONSIDERATIONS

1.2 How It Works

In heating mode

During the heating cycle, hot water circulates through the coil. Air within the valance units is heated, causing the air to rise by way of natural convection. As the air

rises, it heats up both the ceiling and the outer aluminum enclosure of the unit which, in turn, radiates heat down into the room.

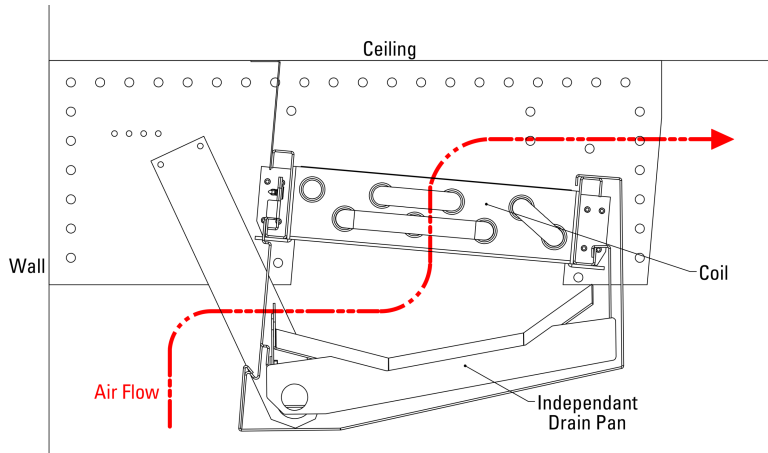


Figure 1.2.1 - Air flow diagram of a unit in heating mode.

In cooling mode

During the cooling cycle, cold water circulates through the coil. As air within the valance units is cooled, natural convection moves this cooled air towards the floor, while drawing warmer air towards the ceiling to then be in-

duced into the valance coil, creating a steady cycle of air circulation. As warm air moves across the cool coil, the moisture in the air condenses on the fins and drops into the pan to be drained away.

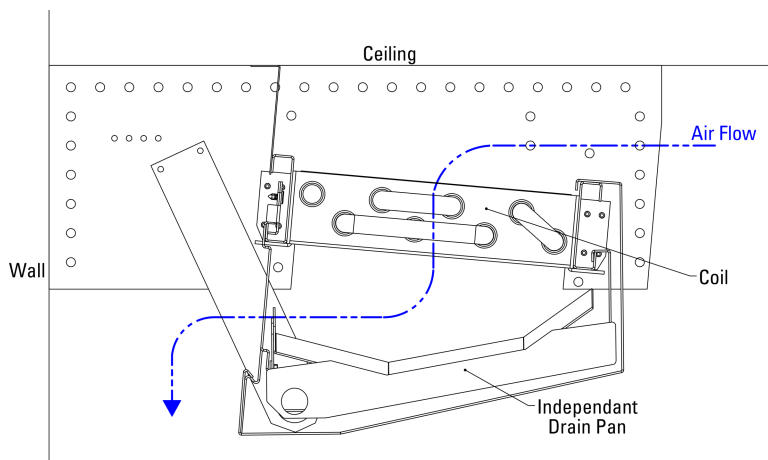
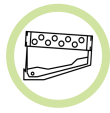


Figure 1.2.2 - Air flow diagram of a unit in cooling mode.

A valance unit can be applied to either a two pipe or four pipe system. Water is supplied by either the system's boilers or chillers. In both the heating and cooling modes, air is moved slowly through the coil. The volume

of air in motion is large, but the velocity of the air is slow, resulting in a draft free environment. Thermostat control the flow of water to control room temperature.



1. PRODUCT OVERVIEW & DESIGN CONSIDERATIONS

1.3 Design and Aesthetics

Sigma valance units are setting the industry standard, allowing for innovative enclosure designs for the architect, while still accommodating popular options like independent drain pans for easy maintenance.

An important feature is the independent drain pan design, which allows for condensate to properly drain without utilizing the outer cover. Multiple drain pans can be cascaded in series, and the slope is factory-set—so the contractor just hangs the drain pan using a simple, fool-proof slot system. This design allows for a level

installation, resulting in a better-fitting enclosure, while still allowing for custom shapes and profiles.

The covers are removable and lockable (if required), with a lever design that eliminates the concern of the cover inadvertently coming off the rail, while still being easy for maintenance workers to remove.

The coils are designed with rails that support the enclosure covers. Insulation barriers ensure that the rail of the coil does not conduct cold temperatures to the

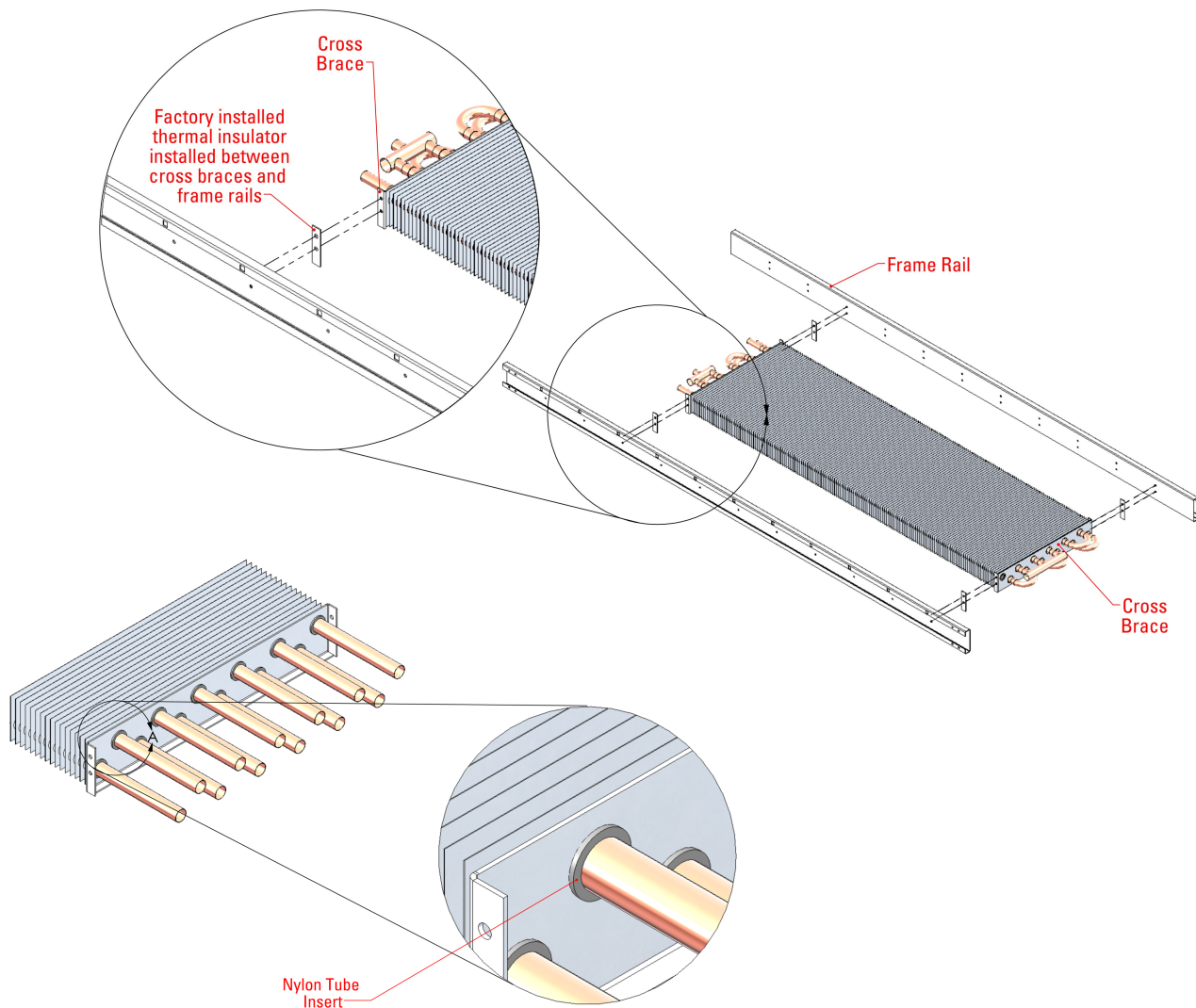
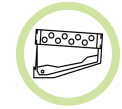


Figure 1.3.1 - Details of thermal and vibrational insulation in coil assembly.



1. PRODUCT OVERVIEW & DESIGN CONSIDERATIONS

1.4 Independent Drain Pan Details

Sigma uses independent, double-sloping drain pans in accordance with ASHRAE 62-89 and revisions. The drain pans are fully cleanable, and insulation is on the exterior, so no water comes in contact with the insulation. Condensate drains are sloped at 1" per 10

feet and are set by the manufacturer to ensure thorough drainage. When drain pans extend greater than 20 feet, multiple drain pans can be utilized (below) to ensure drainage is effective.

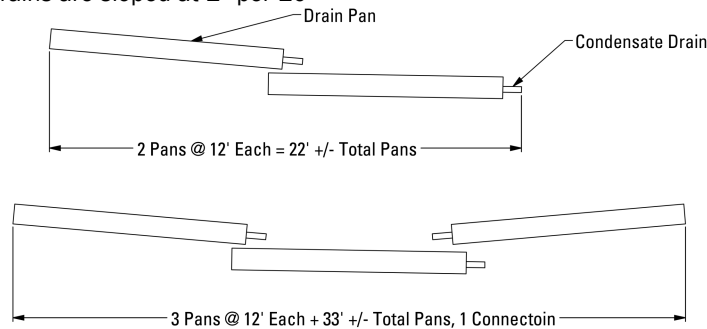


Figure 1.4.1 - Valance system using multiple drain

Another important advantage of independent drain pans is that the exterior enclosure is not required to be sloped. This not only allows a better-fitting enclosure, but also allows for aesthetic options like recessed reveals and complicated shapes.

Finally, the independent drain pan design allows for the drain connection at the wall to be 1/2" higher than the enclosure, so the hole in the drywall is covered.

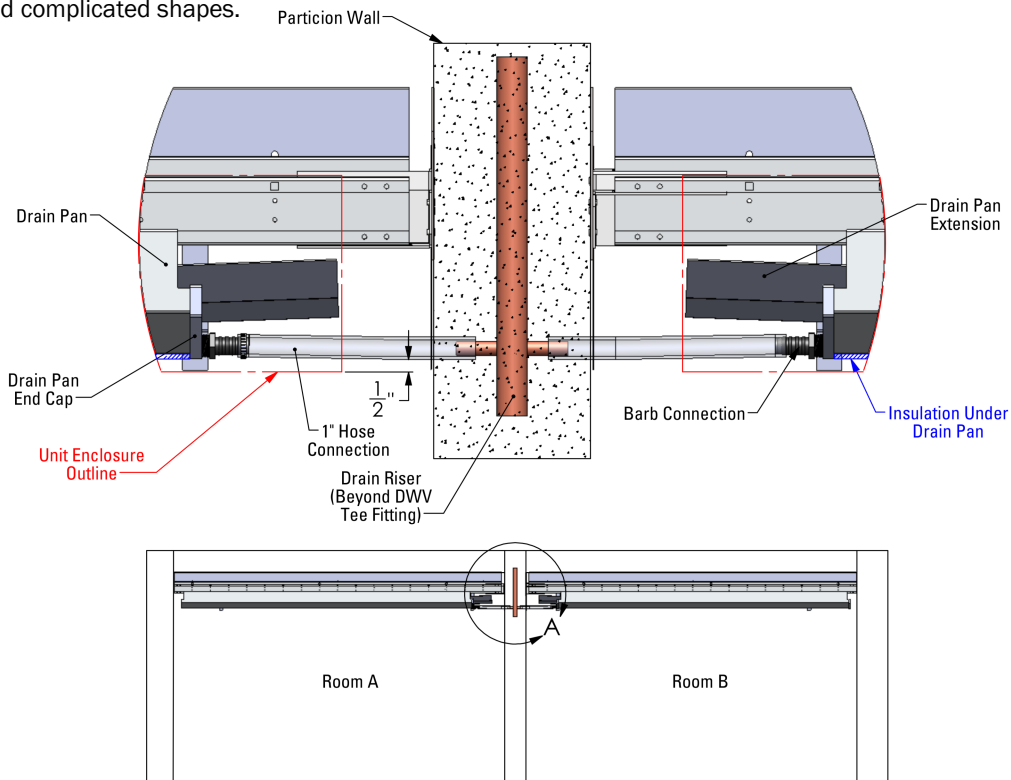
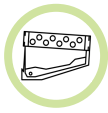


Figure 1.4.2 - Condensate drainage system in adjacent rooms.



1. PRODUCT OVERVIEW & DESIGN CONSIDERATIONS

1.5 Design Considerations

The application of the Sigma valance system is similar to that of any hydronic system. First, the designer must establish how much room is available for the Sigma valance unit based on the wall-to-wall dimensions of the room. The valance unit should be applied against the outer wall of the room, high in the corner where the outer wall meets the ceiling. Sigma recommends flat ceiling surface in entire room in front of valance unit so

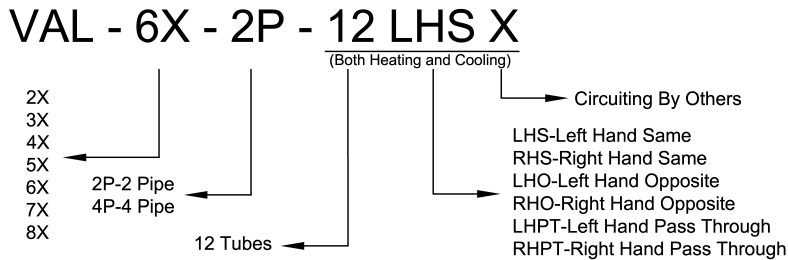
supply air can travel in the room without any interference.

The enclosure should run wall-to-wall. The coil should be shorter than the overall wall length. Sigma recommends the coil be 24" smaller than the overall wall length to allow room for valves, flow balancing devices, and traps if required. Although the coil could be larger, the designer must ensure room for the piping and

TWO PIPE SYSTEMS

In a two pipe system EITHER hot water or chilled water is provided to the valance coil. The coils are selected to run in both heating and cooling mode. The cooling capacity is typically the dominant requirement. The cooling capacity is determined using a 6°F ΔT on the water side (ex EWT=44°F and LWT=50°F). Since there is

no fan in the valance system the ΔT is limited to 6°F due to the physics of the coil. Some designers have included heat exchangers from the main campus systems, or utilize the return water to supply another cooling device such as other fan coils or outside air systems.

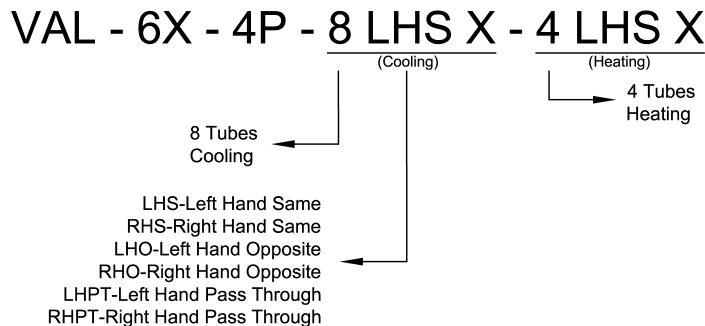


2-Pipe system nomenclature breakdown

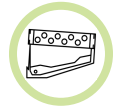
FOUR PIPE SYSTEMS

In a 4 pipe system BOTH hot water and chilled water are provide to the Valance coil through separate loops. Sigma circuits the coil to accept an independent supply and return from both the cooling and heating and cooling loop. This allows for the system to be run with cooling in one room and heating in the another room. In

this example the designer can use the charts to pick out the number of cooling tubes and the number of heating tubes. The number of heating tubes and cooling tubes is decided by matching the capacity required for a given application.



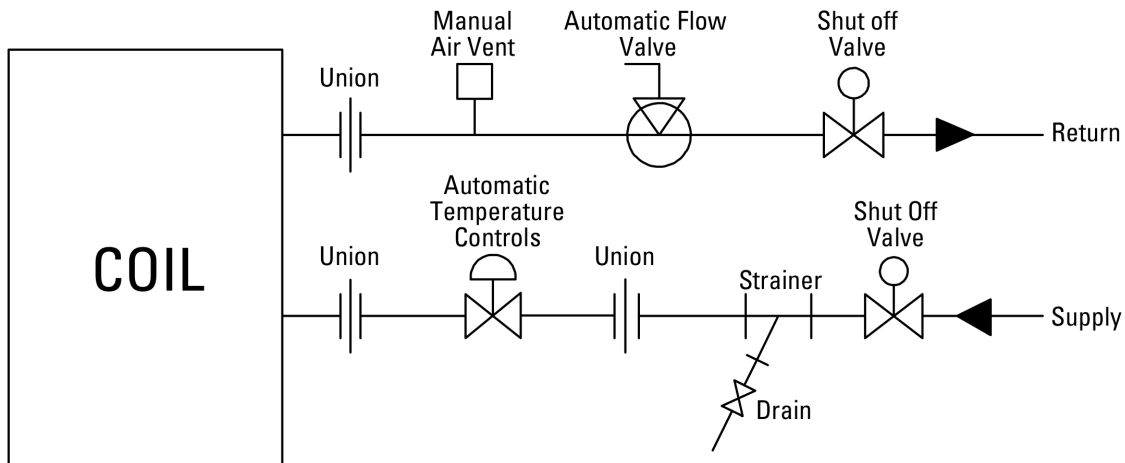
4-Pipe system nomenclature breakdown



1. PRODUCT OVERVIEW & DESIGN CONSIDERATIONS

1.6 Auto-Flow Valve

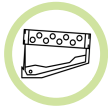
Sigma can provide factory mounted valve packages, pre-engineered to ensure room for the valves to fit with the coils. Contact Sigma for other configuration options.



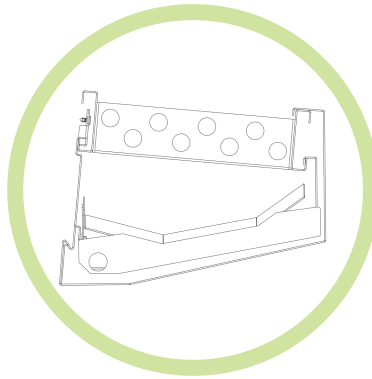
Return— union, automatic flow valve, shut off valve.

Supply— union, automatic temperature control valve, shut off valve with drain and strainer.

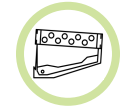
Figure 1.6.1 - Auto-flow coil valve package circuit diagram.



VALANCE UNIT



2. KEY FEATURES & BENEFITS



2. KEY FEATURES AND BENEFITS

ENCLOSURE

The Sigma valance unit enclosure shall be made of aluminum and come complete with trim strips, inside corners and end caps. The enclosure will hang straight and level to the wall and ceiling. Trim strips will be installed so that no fasteners are visible from the inside of the room. The enclosure will hang from the support channels of the coil, and the finish will be white-baked enamel.

Table 2.1 - Sheet Metal Gauges		
Gauge	Aluminum	Steel
22	0.025	0.030
20	0.032	0.036
18	0.040	0.048
16	0.050	0.060
14	0.063	0.075
12	0.080	0.105

Nominal aluminum and steel thicknesses. Sigma recommends 0.064 Aluminum for outer covers and drain pans

MULLION-STYLE ENCLOSURE

Sigma offers both a curved and flat broken mullion style of enclosure. The mullion style of enclosure allows for underlapping accessories. The mullion style is shown with a return edge of 3/4" and a 1 1/2" reveal at each end of the surface. For units that are longer than 10 feet, we break the enclosure with a middle mullion surface as

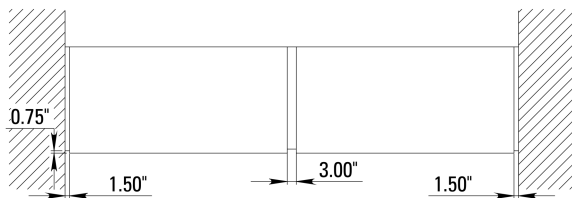


Figure 2.1 - Mullion style cover overlap dimension shown below.

INDEPENDENT DRAIN PANS

Sigma offers an independent drain pan. This ensures that condensate is reliably removed from the room once cooling is started. The drain pan is hung from the coil using the provided slots which are set at the factory to ensure a proper slope is maintained in the field. The contractor simply hooks using the lower hanger position on the side which the drain is located and the higher position is at the high end. The drain pan is supplied with a closed cell-foam insulation to ensure that no dripping will occur due to condensate. The insulation is mounted UNDER the drain pan, so as to avoid mold accumulation.

The drain is made of 0.064" aluminum with insulation on the underside of the drain pan. Plastic end caps are

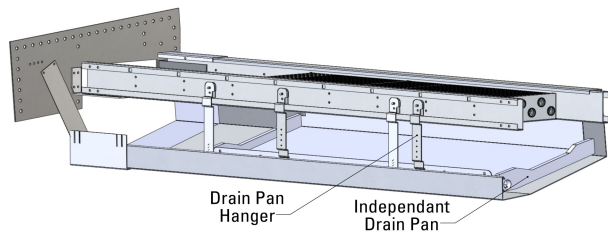


Figure 2.2 - Unit cover and drain pan hangers. Rear view shown. The drain pan is fused to the pan to accept a barb connector or cap. The contractor can choose to slope the drain pan in either direction at the jobsite.

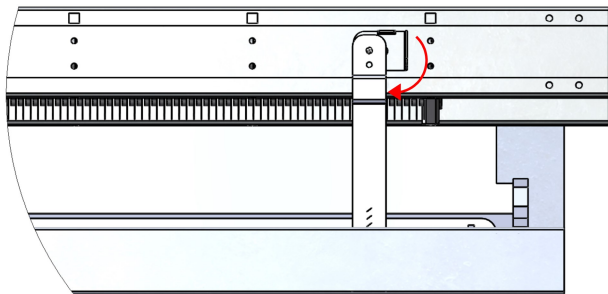
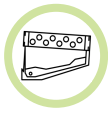


Figure 2.3 - Cover hanger locking mechanism detail. Rear view shown



2. KEY FEATURES AND BENEFITS

COIL

The Sigma coil is mounted on a rail that forms an integral part of the valance assembly. The rail is designed to act as the mounting system to the wall and are used to suspend the drain pan, mount the baffle and hang the enclosure. The rail system is made up of a one piece rail. In general, extension rails are supplied on rail systems greater than 144" (in some cases extension rails will be supplied on smaller coils, this is dependent on site conditions). The coil is supplied with insulation barriers to ensure that the rail of the coil does not conduct cold temperatures to the outer rail. This will prevent the outer rail from having condensate on it. The coil is provided with nylon inserts the fit around the tubes. This allows for quiet operation during expansion of the coil during the heating season and the contraction of the coil in the cooling season.

The coil should be sized to accommodate the valve train on the appropriate side (left or right). The installer should determine the required amount of space to install the valves. When the Sigma factory supplied valve train is used Sigma recommends a minimum of 18" between the coil and the coil end plate and the rail on one side (valve pocket space), 6" between the coil end plate and the rail on the opposite side (see page 9). Note: The space available is 2 1/2" less than the pocket space. This reduction in available space is due to the U-bends on the coil.

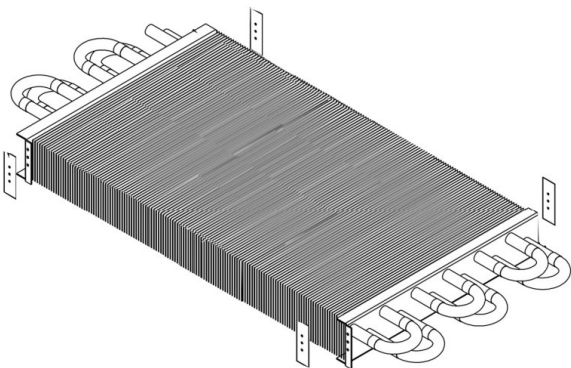


Figure 2.4 - Coil thermal insulators.

MOUNTING BRACKETS

Sigma offers 3 different kinds of mounting brackets. The brackets are used for mounting the Valance system to the building. Each bracket is designed to mount the coil to the building under different site conditions.

STUD MOUNTED BRACKETS

The stud mounted brackets are designed to be mounted on the stud work before the drywall is installed. The installer mounts the left or right hand bracket to the appropriate side. The brackets are designed to locate by mounting the bracket flush to the top of the finished ceiling and the edge of the finished wall. This bracket must be installed BEFORE the drywall is installed to ensure that the bracket is hidden. If the bracket is used after the drywall is installed, the bracket plate WILL NOT be covered by the enclosure.

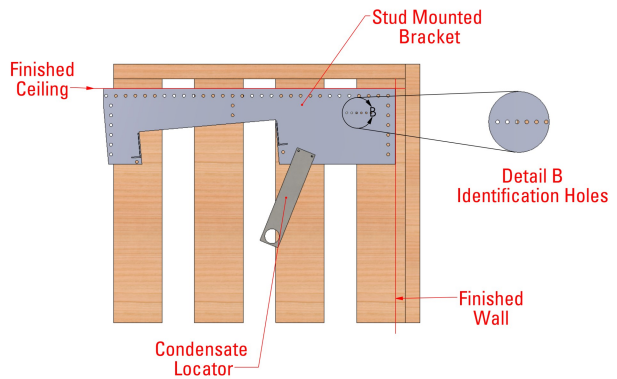
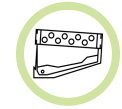


Figure 2.5 - Stud mounted wall bracket detail.



2. KEY FEATURES AND BENEFITS

SURFACE MOUNTED BRACKETS

The surface mounted bracket is used to mount on the surface. It can be mounted on concrete or drywall. This bracket will not extend past the enclosure. When using the surface mounted bracket on the drywall, Sigma recommends that the contractor places a back plate behind the wall surface. For concrete walls appropriate fasteners (supplied by the installer) must be used to

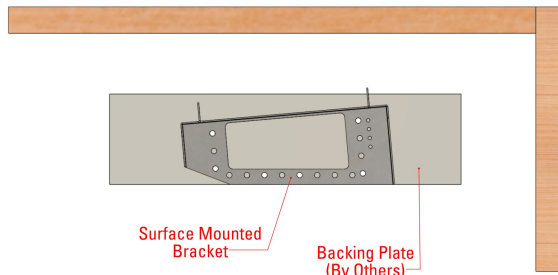


Figure 2.6 - Surface mounted wall bracket detail.

ensure that the bracket is securely mounted.

CEILING MOUNTED BRACKETS

The ceiling mounted brackets are used in four situations.

1. The coil rails that are 12ft or longer for 2X to 6X
2. The coil rails that are 8ft or longer for 7X and 8X
3. Coil has an end that does not reach a wall
4. Coils have an inside or outside corner

The first situation is of coils that are greater than 12 feet in length. This support is used to take out any sag in the middle of the coil that may occur. The installer must supply a support structure to bear the weight of the coil and water in the system. Sigma recommends either a threaded rod or a wire that is secured to the building

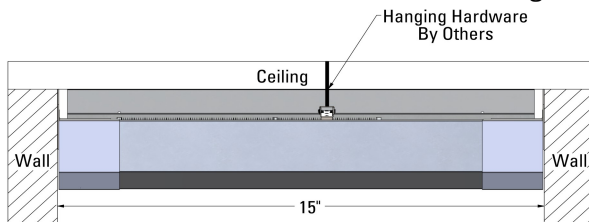


Figure 2.7 - Ceiling mounted bracket detail.

structure. The installer must consult local codes for mounting instructions to the structure of the building.

BAFFLE

A ceiling baffle is mounted by the contractor to ensure that the air flow does not bypass the back of the coil.

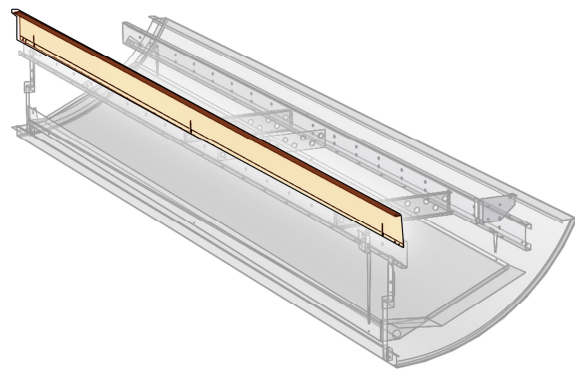
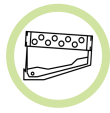
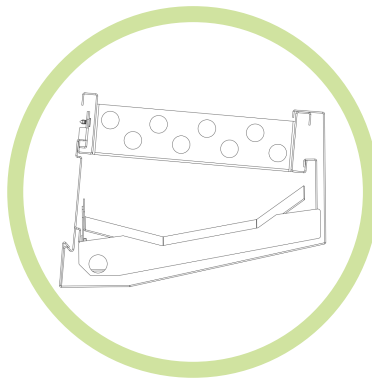


Figure 2.8 - Airflow baffle detail.

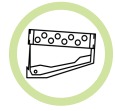
The baffle is factory-painted the same color as the enclosure and is mounted with a thumb screw. A slot in the baffle is provided to allow for site adjustment.



VALANCE UNIT



3. CAPACITY DATA



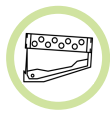
3. CAPACITY DATA

3.1 Capacity Data

		Table 3.1.1 - 2-Pipe System Capacity Data													
Model	Tubes	Cooling						Heating							
		Entering Water Temperature (°F)						Entering Water Temperature (°F)							
		40	41	42	43	44	45	120	130	140	150	160	170	180	
4X-2P	8	356	344	326	311	290	274	332	425	536	629	734	846	951	
5X-2P	10	516	498	473	450	420	397	390	500	630	740	863	995	1119	
6X-2P	12	689	660	626	594	564	523	440	595	732	875	1013	1160	1304	
7X-2P	14	846	810	769	729	693	642	484	655	805	963	1114	1276	1434	
8X-2P	16	975	915	855	803	766	716	523	707	870	1040	1203	1378	1549	

Notes: - Capacities are total capacity and measured in Btu/ft.

- Cooling capacities are based on nominal 6°F ΔT, 75°F D.B., 63°F W.B., and a 0.7 SHR.
- Heating capacities based on a 70°F D.B.
- GPM for heating identical to that of cooling.
- Contact factory for non-tabulated selection and capacity for 4-Pipe system.

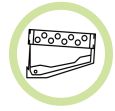


3. CAPACITY DATA

3.2 Pressure Drop Data

Table 3.2.1 - 2-Pipe System Pressure Drop Data			
Model	Tubes	Flow Rate (GPM)	Pressure Drop H ₂ O (ft.)
4X-2P	8	1	2.19
4X-2P	8	1.5	4.49
4X-2P	8	2	7.48
4X-2P	8	2.5	11.04
4X-2P	8	3	15.30
5X-2P	10	1	2.65
5X-2P	10	1.5	5.52
5X-2P	10	2	9.20
5X-2P	10	2.5	13.69
5X-2P	10	3	18.86
6X-2P	12	1	3.22
6X-2P	12	1.5	6.56
6X-2P	12	2	10.93
6X-2P	12	2.5	16.22
6X-2P	12	3	22.43
7X-2P	14	1	3.68
7X-2P	14	1.5	7.48
7X-2P	14	2	12.65
7X-2P	14	2.5	18.86
7X-2P	14	3	25.99
8X-2P	16	1	4.26
8X-2P	16	1.5	8.63
8X-2P	16	2	14.49
8X-2P	16	2.5	21.39
8X-2P	16	3	29.56

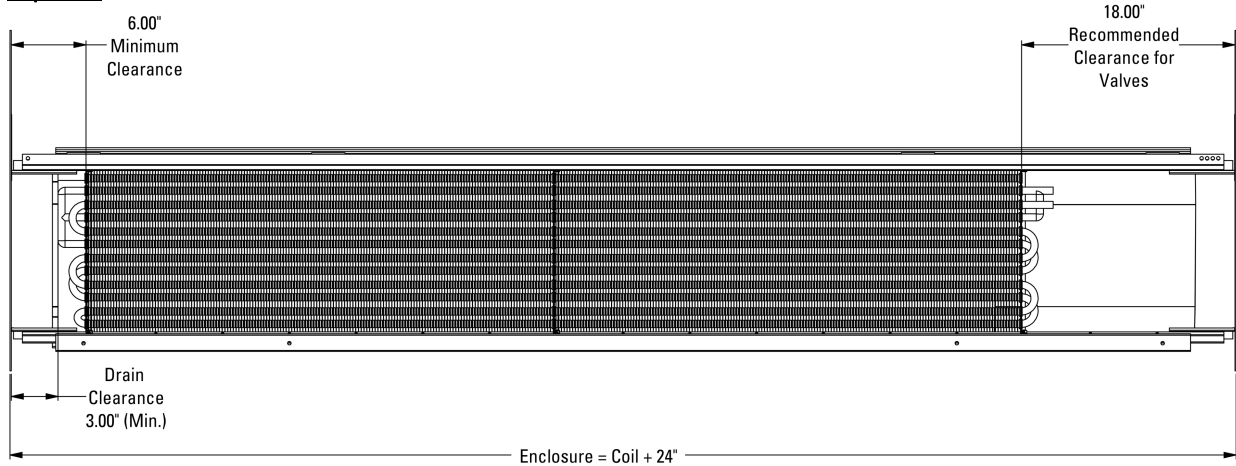
- Notes:**
- Pressure drop based on a 10ft coil with single circuit coil. Coil circuit can be changed to reduce pressure drop; however, it will negatively affect the capacity. Sigma recommends limiting the pressure drop to 15 ft of H₂O.
 - Above listed pressure drop does not include any piping accessories.
 - Pressure drop can vary slightly due to temperature viscosity of fluid..



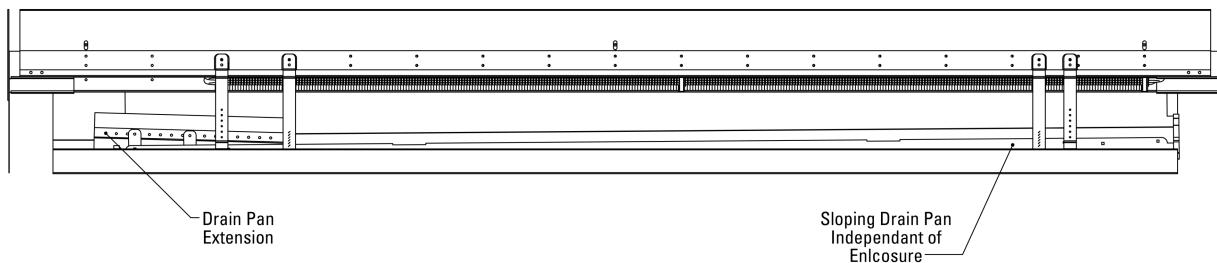
3. CAPACITY DATA

3.3 Design Example

Top View



Back View



Note: The space available is $2\frac{1}{2}$ " less than the pocket space. This reduction in available space is due to the u-bends of the coil

Figure 3.3.1—Unit length and clearance data.

Coil Selection Example:

Room Length = 10 ft wall to wall

Cooling Design Temp. = 75° F EDB, 63° F EWB, 45° F EWT, and 6° F ΔT

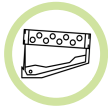
Heating Design Temp. = 70° F EAT, 140° F EWT, and 120° F LWT

Cooling Load = 5000 Btu

Heating Load = 5500 Btu

2 Pipe System

Max. Active Coil Length = Room Length – 2 ft = 10 ft – 2 ft = 8 ft (need to round down this length to nearest 6 inch increment)



3. CAPACITY DATA

3.3 Design Example

Typically, cooling takes precedence over heating so let`s start with cooling selection.

Cooling:

Target Cooling Capacity = 5000 Btu / 8 ft (active coil length) = 625 Btu/ft

As per Table 3.1.1, 7X-2P provide 642 Btu/ft at specified cooling design condition so let`s pick 7X-2P as preliminary selection.

Total cooling capacity = 8 ft x 642 Btu/ft = 5136 Btu

Flow rate = 5136 Btu / (500 x 6°F ΔT) = 1.71 GPM

Heating:

Target Heating Capacity = 5500 Btu / 8 ft (active coil length) = 687.5 Btu/ft

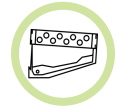
As per Table 3.1.1, 7X-2P provide 805 Btu/ft at specified heating design condition so 7X-2P is the ideal unit as it fulfills both, cooling and heating, capacity requirements.

Total heating capacity = 8 ft x 805 Btu/ft = 6440 Btu

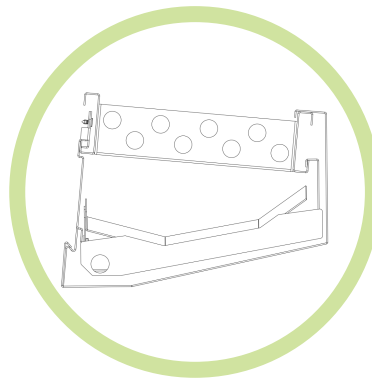
For 2 pipe system, flow rate for heating to be same as for cooling so heating flow rate = 1.71 GPM

Heating ΔT = 6440 Btu / (500 x 1.71 GPM) = 7.5 °F

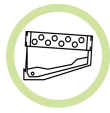
LWT = 140°F – 7.5°F = 132.5°F



VALANCE UNIT



4. DIMENSIONAL DATA & CONCEPTUAL COVERS



4. DIMENSIONAL DATA & CONCEPTUAL COVERS

4.1 Unit Dimensions

Table 4.1.1 - Unit Dimensional Data Based on Sloped/Square Outer Cover						
Model	Dimension	Dimension	Dimension	Dimension	Dry Weight	Wet Weight
	A (in.)	B (in.)	C (in.)	D (in.)	(lb/ft.)	(lb/ft.)
4X	12 11/16	6 5/8	4	19 13/16	6.95	7.74
5X	13 1/2	7 1/2	4 1/4	23 1/8	7.95	8.94
6X	14 13/16	9 11/16	4 7/16	28	9.05	10.24
7X	15 5/8	11 3/8	4 11/16	31 15/16	9.99	11.37
8X	19	12 3/4	4 7/8	36 3/16	11.39	12.97

NOTE: Weight is for a standard unit operating with and without water.

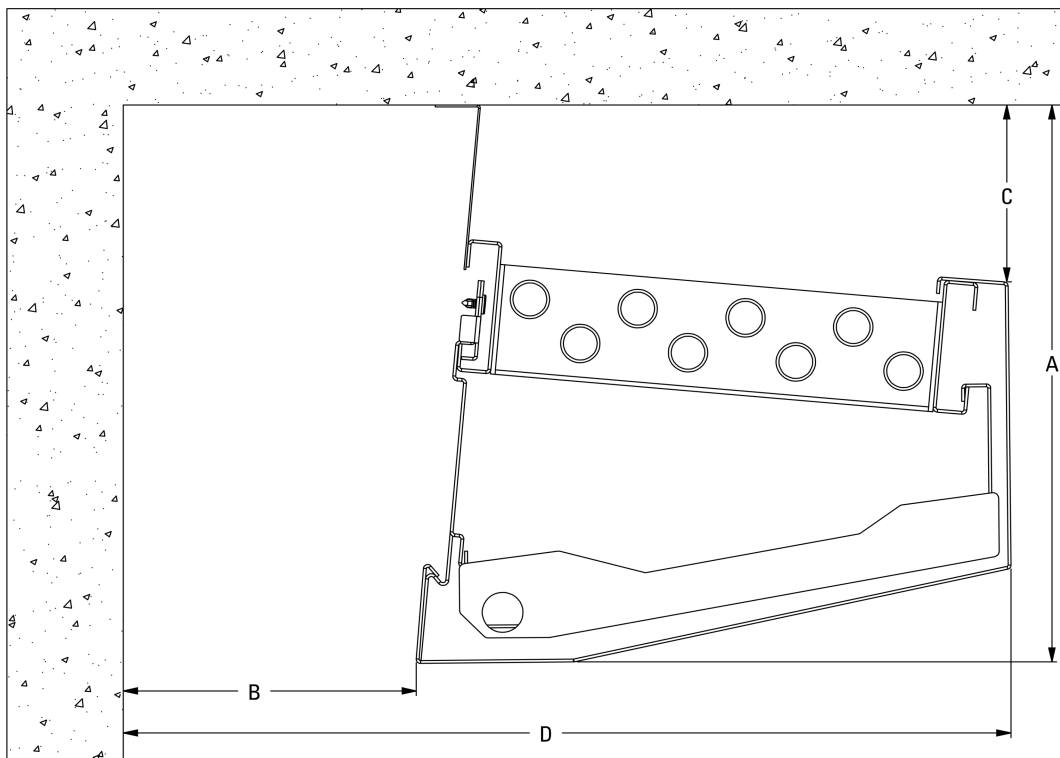
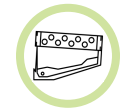


Figure 4.1.1 - Valance unit dimensional data (4x model shown, drawing not to scale).



4. DIMENSIONAL DATA & CONCEPTUAL COVERS

4.2.1 Valance Cover with Overlapping Trims



Figure 4.2.1.1 - Rendering of cover with overlapping trim.

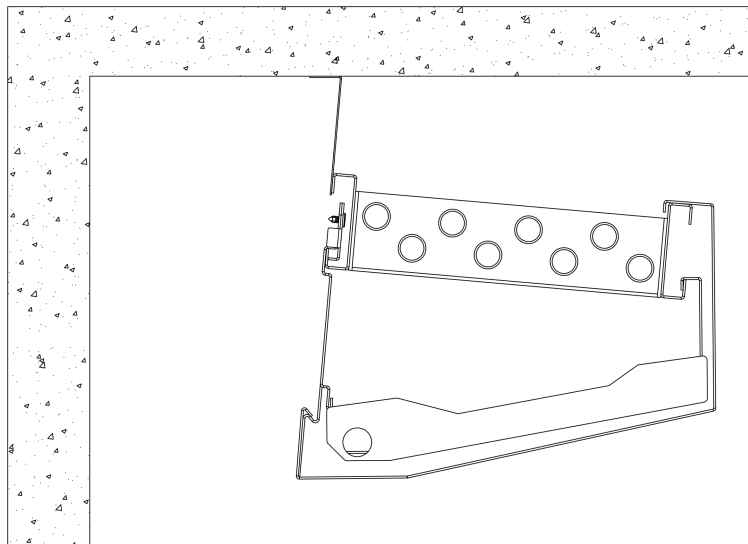
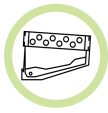


Figure 4.2.1.2 - Side profile of above cover design (4x model shown, drawing not to scale).



4. DIMENSIONAL DATA & CONCEPTUAL COVERS

4.2.2 Recessed Curved Valance Cover



Figure 4.2.2.1 - Rendering of recessed curved cover.

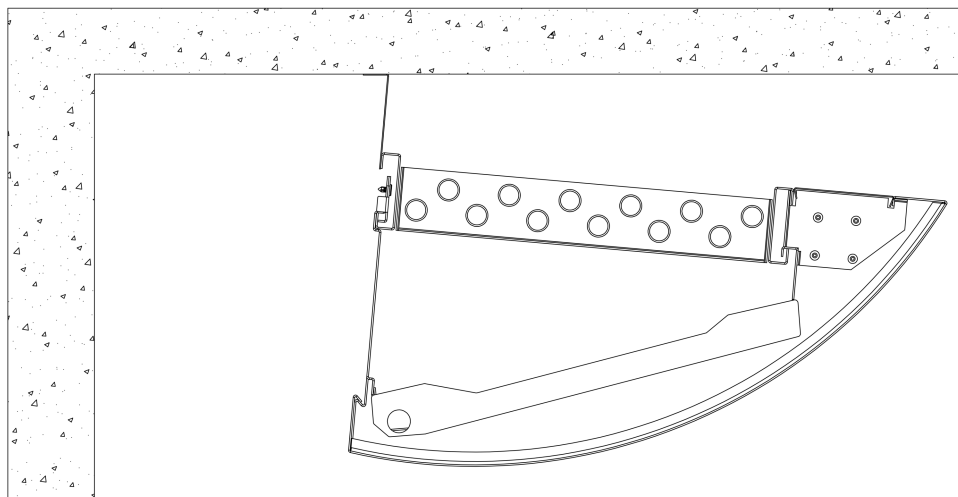
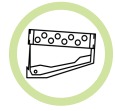


Figure 4.2.2.2 - Side profile of above cover design (4x model shown, drawing not to scale).



4. DIMENSIONAL DATA & CONCEPTUAL COVERS

4.2.3 Recessed Curved Valance Cover



Figure 4.2.3.1 - Rendering of recessed mullion cover.

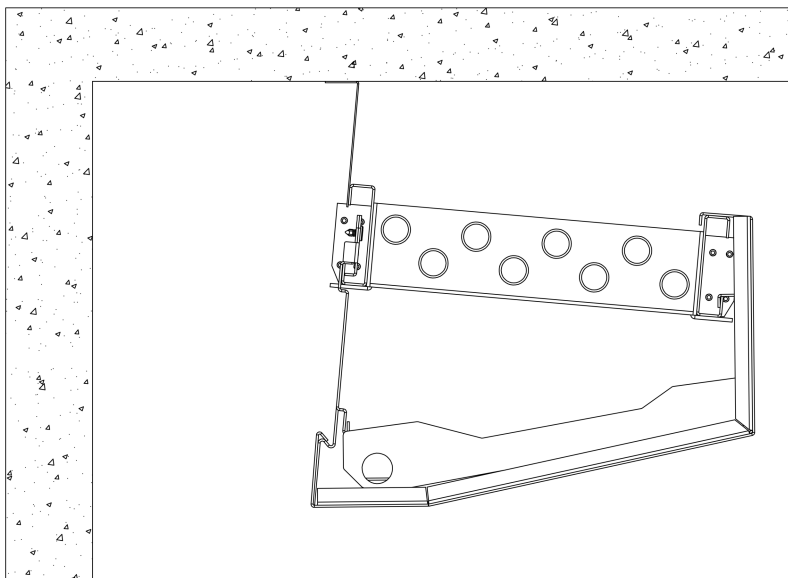
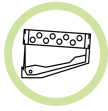
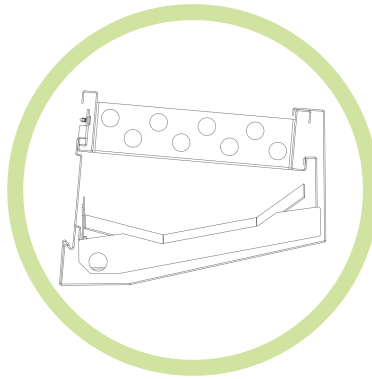


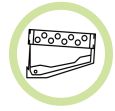
Figure 4.2.3.2 - Side profile of above cover design (4x model shown, drawing not to scale).



VALANCE UNIT



5. GUIDE SPECIFICATIONS



5. GUIDE SPECIFICATIONS

1.0 Scope

1.1 Valance Unit

1.1.1 Valance units shall be manufactured by a company regularly engaged in the manufacture of valance units. This manufacturer should have catalogued data that has been performance-tested.

1.1.2 Standard of Acceptance: Sigma.

1.2 Submittals

1.2.1 Manufacturer shall provide complete submittals of shop drawings of:

- A. scaled layouts showing valance type, capacity, coil and panel lengths,
- B. installation and construction details for all valance types,
- C. tabular data indicating coil and drain handling,
- D. capacity flow and pressure drops for all coils.

2.0 Product

2.1 General

2.1.1 Manufacturer shall refer to mechanical drawings to determine location, quantity and finish of valance units.

2.1.2 Refer to architectural and mechanical details for installation requirements and valance details

2.2 Valance Units

2.2.1 Standard valance covers shall be made of 0.064 aluminum. The covers shall go wall-to-wall unless otherwise indicated on the drawings. The valance covers shall be complete with overlapping trims and connectors for units greater than 10 feet.

2.2.2 The coils shall be made of copper tubes and aluminum plate fins. The aluminum fins' spacing shall be no denser than four (4) fins per inch. The coil shall be tested at 250 psig. The frame supports shall be manufactured from 14 Ga aluminum support channels. The coils shall be manufactured to ensure no sagging of the coil tube will occur. The coils shall be provided with a thermal break to ensure that the fins, or fin supports, do not conduct cooling to the rails.

2.2.3 The valance unit shall include an independent drain pan. The pan must be a separate part that is not connected to the valance surface. The pan shall be manufactured of 0.064" aluminum. The drain shall be sloped in two directions to ensure that condensate flows easily to the drain. The drain pan shall be insulated on the underside so that condensate does not drip into the enclosure. The drain pan shall hang from the coil rail and be connected with slots. These slots are factory set to ensure an appropriate slope is maintained in the field.

2.2.4 The valance enclosure shall be hung from the coil rail. The hanging mechanism shall include a locking lever that can rotate from the locked to the unlocked position. In the unlock position the cover shall be removable. In the lock position the hanger is prevented from lifting off the coil rail. This will ensure that the valance cover cannot be removed inadvertently.

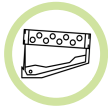
2.2.5 The wall brackets are manufactured out of 12 Ga galvanealed metal. The coil supports are welded to the wall bracket. Brackets must be strong enough to support the coil enclosure, independent drain pans, baffle and trim pieces. For 2X to 6X units, coil rail that is 12 ft or longer and for 7X and 8X units, coil rail that is 8 ft or longer, an intermediate bracket will be required to carry the extra load.

2.2.6 A ceiling baffle shall be supplied to ensure no bypass around the coils. The baffle shall be mounted by the contractor with a thumb screw so that the baffle can be adjusted to follow the ceiling.

2.2.7 The valance unit shall be a standard colour as supplied by Sigma. The colour shall be chosen by the architect. The valance cover and baffle shall be painted the same colour. The panels shall go through a 3 stage wash and degreasing section, followed by a dry-off oven. Powder paint shall be applied and baked on the panels to ensure a cohesive surface

2.2.8 All panels, and coils shall be individually tagged with a room number and valance tag that corresponds to the schedule supplied by the manufacturer.

Continued on next page



5. GUIDE SPECIFICATIONS

2.3 Execution & Installation

2.3.1 Contractor shall co-operate with other trades working to locate all piping and hangers clear of other work.

2.3.2 The contractor shall install all wall brackets at a level location before the drywall is installed. The wall bracket must be securely fastened with fasteners supplied by the contractor to ensure it is stable and can hold the wall bracket and the coil bed. The manufacturer shall supply location drawings for mounting heights.

2.3.3 The contractor shall install the coils on the wall brackets. The contractor shall use sheet metal screws to fasten the coil to the wall bracket.

2.3.4 The drain pan is located on the rails. It shall be installed so that the lower hanger position is at the drain and the higher position is at the high end. This will ensure proper slope.

2.3.5 The factory-supplied drains are then connected to the condensate system by means of hard piping or polytube that is supplied by the contractor.

2.3.6 The valance panels are then installed. We recommend that the installer use white gloves to ensure that the panels remain clean. The covers should be placed in position and then a locking lever should be rotated to ensure the Valance does not fall off the frame.

2.3.7 Trims and corners should be installed as required.