



ASCENDANT™

ACTIVE DESICCANT -
HIGH EFFICIENCY COOLING HYBRID

WHERE AND HOW TO SELL



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WHY ASCENDANT?

Ascendant is a conventional cooling and active desiccant hybrid system, performance optimized to deliver and control low dew point air, while minimizing regeneration energy input.

Ascendant can produce supply air humidity levels as low as 15 grains which can be delivered at any traditional supply air temperature (in some cases the optional post cooling may be required).

Ascendant achieves a high operating efficiency by utilizing conventional cooling where it is most efficient (cooling air to moderate temperatures) and active desiccant dehumidification where they are most beneficial and operates most efficiently (processing saturated air).

Ascendant is configurable as a dedicated outdoor air system (DOAS) or a total conditioning air system, employing chilled water or DX cooling and using almost any regeneration energy source.

Ascendant comes with factory installed optimized DDC controls and algorithms, while total energy recovery integration is optional.

HOW ASCENDANT WORKS

Ascendant processes outdoor/return air streams to a moderate leaving coil temperature condition (when needed), delivering saturated air to the active desiccant wheel which promotes very efficient operation and further depresses the supply air humidity content to very low dew points.

By employing moderate pre-cooling temperatures the efficiency of the cooling system employed is high since it operates with moderate refrigerant suction temperatures.

A modulating bypass damper allows the cool, moderately dry air leaving the cooling coil to be mixed with the appropriate quantity of warm, very dry air leaving the dehumidification wheel to deliver the required supply air dew point. If tight temperature control is also required, a small sensible-only post cooling coil is provided.

The desiccant wheel operates effectively using a regeneration airflow with is typically 20% - 40% of the supply airflow volume. A moderate regeneration temperature (140°F to a maximum of 200°F) is required, allowing the use of hot water, steam, direct or indirect fired gas, electric, or waste heat (i.e., by-product of a power generation (CHP)).

Preconditioning the outdoor air with total energy recovery, when there is a return air path available, substantially increases overall system energy efficiency.

SELLING ASCENDANT

It is important for SEMCO® to be the basis of design for the system that the customer is designing to achieve the sale of any system. SEMCO can assist the engineer in the development of the schedule and the specification of the equipment.

With our years of experience working directly with engineers, we understand the project requirements better than an outsider. By working closely with the engineer, we won't become victims of "insider knowledge" if the specification or schedule is not comprehensive.

By working directly with the engineer, we can provide features that are impossible or difficult for our competitors to match, for instance:

1. Flexible Unit layouts
2. Comprehensive controls
3. Low regeneration temperatures
4. Excellent unit access
5. Low wheel pressure drops
6. Automatic bypass dampers
7. Winter mode solutions

By working directly with the engineer, we can give exactly what is needed, not a shortcut or "close enough" performance. The engineer may want a unit for critical application designed with extra capacity which might be left out by a low cost competitor.

If a competitor wins a project, they may have issues resulting in a change of order basis. This could come in dimensional issues, potential control coordination changes, etc.

When competing against a company, like Munters, that uses a condenser heat for regeneration, we have a huge advantage in controllability and part load operation. The advantage comes from the fact that condenser heat is directly tied to evaporator load, so as the load goes down the condenser heat follows. The evaporator load cannot be forced or it will freeze. Higher quality condenser heat comes at the expense of high compressor head pressure which shortens the compressor's life.

By working directly with the engineer, we can give **exactly what is needed**, not a shortcut or "close enough" performance.

THINGS TO CONSIDER DURING THE SALE

1. Active dehumidifiers are often expensive and applied on critical applications. Every unit requires shutdowns for maintenance, and anything mechanical will eventually break.
2. Is redundancy of the system necessary?
3. If the load in the space is greater than expected and there is not additional capacity, then the desired space conditions will not be maintained.
 - What will the response be to this issue?
 - What problems does this create?
4. Is airflow turndown required?
 - Electric heaters have air velocity and Watt density requirements that can cause issues.
 - Direct-fired burners need a minimum pressure drop through the air wing to correctly mix combustion air with the gas.
5. DX control can be quite coarse, such as a 2 stage unit without digital scroll. You will always cycle unless the load cannot be met and stay at 100% demand. If we're providing dry makeup air this is fine. If straight to a small space, then DX can be a problem.
6. If the application is 100% recirculation then precooling might not be needed.
 - The selection software is going to add precooling in every case so the selection may need to be done in-house.
7. The dehumidifier wheel has a fixed slope for a given set of conditions. The slope is roughly one degree of reheat per degree of dew point depression. For a specific temperature/humidity point on the psychrometric chart, there is only one saturated cooling coil discharge temperature, where the slope of the active wheel discharge mixing line will hit the desired output. The bypass damper controls mixing – but you remain on the sloping line based on wheel performance and mixing. If a cool or accurate discharge condition is needed, then post cooling is required.
8. If a source of dry air is available for regeneration, this will improve performance.
9. For sizing the regeneration heat source, you need to accommodate the coolest outdoor temperature when dehumidification is required but also the maximum outdoor grain level. These are definitely not coincident. You will need less regeneration temperature when it is in the 60's and 70's outdoors due to the outdoor dew point being lower, but it is not a 1:1 ratio. If the outdoor temp drops 30 degrees, maybe you need 15 degrees less regen temperature rise. The easiest way to have extra dehumidification capacity is extra heat available. The controls will not call for it if not needed. This is simple with direct-fired gas. Not simple with electric heat, HW, steam. With electric heat you will not get 1 Watt more than the heater design.
10. High regeneration heat is potentially problematic and the higher the temperature the greater the potential. The unit cannot be shut off at the disconnect because the heat needs to dissipate. If a high regeneration temperature unit is suddenly stopped the cabinet interior could rise above 200° and cause damage.
11. Direct-fired gas heat requires 100% outdoor air for combustion and no recirculated air through the burner.
12. The indirect-fired burner SEMCO provides has a welded 304SS heat exchanger that is suitable for draw-through or blow-through fan locations, and can, of course, accept recirculation. If this is an indoor unit the outdoor air for combustion (the exhaust air) will have to be ducted. See Heatco specific installation instructions for correctly sizing and installing the ducts.

WHAT WE NEED TO KNOW TO HELP SPECIFY ASCENDANT

1. Will system be indoors or outdoors?
2. Curb, pad or rails mounting? Is SEMCO providing the curb (SPL required)?
3. Voltage?
4. Air flow?
5. Control supply or space temp?
6. Control supply or space humidity?
7. Set points?
8. Chilled glycol (%), CW or DX? If CW is there freeze protection by an upstream heat source?
9. Natural gas or propane?
10. Gas pressures about 6 in minimum required.
11. Is there an agreed upon sequence of operation including off peak and winter operation?

KEY MARKETS FOR ASCENDANT AND WHY THEY NEED ASCENDANT

HOSPITAL OPERATING ROOMS	HOTELS	CHILLED BEAM PROJECTS	MUSEUMS	ARCHIVAL STORAGE	DRY AIR STORAGE
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HOSPITAL OPERATION ROOMS (OR)

To minimize reinfection, codes require hospital operating rooms to be controlled at 50% relative humidity down to 62°F. This equates to a dew point of 42°F in the space.

Most hospitals operate with chilled water systems and these codified conditions cannot be achieved using chilled water alone.

Hospitals operate chillers inefficiently, at great operating expense, to produce the coldest possible chilled water while still not achieving the required humidity levels.

Ascendant can deliver the low dew point air necessary to achieve 45% RH at 62°F delivering 55°F water while allowing the chiller to operate at its optimum efficiency level.

HOTELS / CONDOMINIUMS

There is a very high latent load associated with ventilation air and infiltration in hotels and condominiums located in humid climates.

The conventional heat pumps and fan coil units employed cannot properly process this latent load, especially when unoccupied, and are therefore often oversized.

Ascendant can deliver outdoor air dehumidified to very low dew points allowing the ventilation air to control space humidity regardless of the internal sensible load.

By deep drying the ventilation air, the packaged cooling units can be downsized, reducing the size of ductwork, noise produced and energy consumption.

CHILLED BEAM PROJECTS

Active or passive chilled beam designs are most energy efficient when system fans are sized to deliver only outdoor ventilation air.

Handling the latent load associated with people and infiltration with the outdoor air volume alone often requires dew points lower than achievable with conventional systems.

Space humidity needs to be controlled well below the dew point of the water temperature delivered to the beams to avoid condensation.

Ascendant can process three times the latent load of a custom refrigeration based DOAS allowing it to prohibit beam condensation using the minimum possible outdoor air quantity.

MUSEUMS

Archives, museums and libraries exist to preserve documents and artifacts for as long as possible and to avoid any “preventable” premature damage.

HVAC systems can significantly impact the life of these objects by consistently maintaining the relative humidity at approximately 50% and avoiding swings over time.

Humidity spikes can accelerate damaging chemical reactions and biological attack.

Ascendant systems with post cooling can carefully track space conditions and control them to consistent levels due to the high dehumidification capacity and advanced DDC controls.

ARCHIVAL STORAGE / DRY AIR STORAGE

The desire to handle dehumidification loads with the smallest airflow possible (lower the dew point the better) – Ascendant achieves with fewer systems.

To preserve the products, avoid rust and prevent condensation, the need for cooling and heating of these spaces can be avoided if effective active dehumidification is employed.

Relative humidity is a function of both moisture and temperature. Unheated warehouses, cave storage, etc. result in high RH conditions and potential condensation.

Warm, very dry air delivered by Ascendant is highly beneficial and can substantially reduce the cost of operating these facilities.

COMMISSIONING

It is always required that we sell a commissioning trip, but if possible it is highly beneficial to sell a start-up as well. Start-up involves unit checkout: Do all sensors report correctly? Have shipped loose sensors been installed correctly? Can the controller correctly modulate all peripheral equipment (valves, duct pressure, etc.)? Often, at the time of start-up the building or physical plant is not quite ready so it is impossible to test the unit. Normally the owner and commissioning agent are not present so a return trip is needed.

The commissioning trip is a good time to meet the owner and facility manager, explain how Ascendant works and provide information about maintenance. Sales presence along with our service tech can be beneficial for all. Salesmen or sales representatives cannot perform this task alone.

Be sure that before commissioning trip takes place, the customer should submit in writing a report to SEMCO indicating that everything is ready for commissioning.

AFTER SALE SUPPORT

To ensure that the client is satisfied it is crucial to provide after sale support. By doing so, we increase the likelihood of having a satisfied customer who will do business with us time and time again.

Contact the customer within 45 days of commissioning to address any questions or concerns and to elicit feedback from the customer.

Confirm that the customer has the Ascendant Owner’s Manual, understands the maintenance requirements, and knows how to contact the SEMCO service team should the need arise.

SEMCO SERVICE DEPARTMENT:

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FläktGroup® SEMCO® delivers smart and energy efficient Air Distribution and Air Quality solutions to support every application area. We offer our customers innovative technologies, high quality and outstanding performance supported by more than fifty years of accumulated industry experience. The widest product range in the market, and strong market presence in 65 countries worldwide, guarantee that we are always by your side, ready to deliver Excellence in Solutions.

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