Ventilation Strategies:

Chilled Beams vs. Chilled Water Fan Powered Terminal Units

Nailor®

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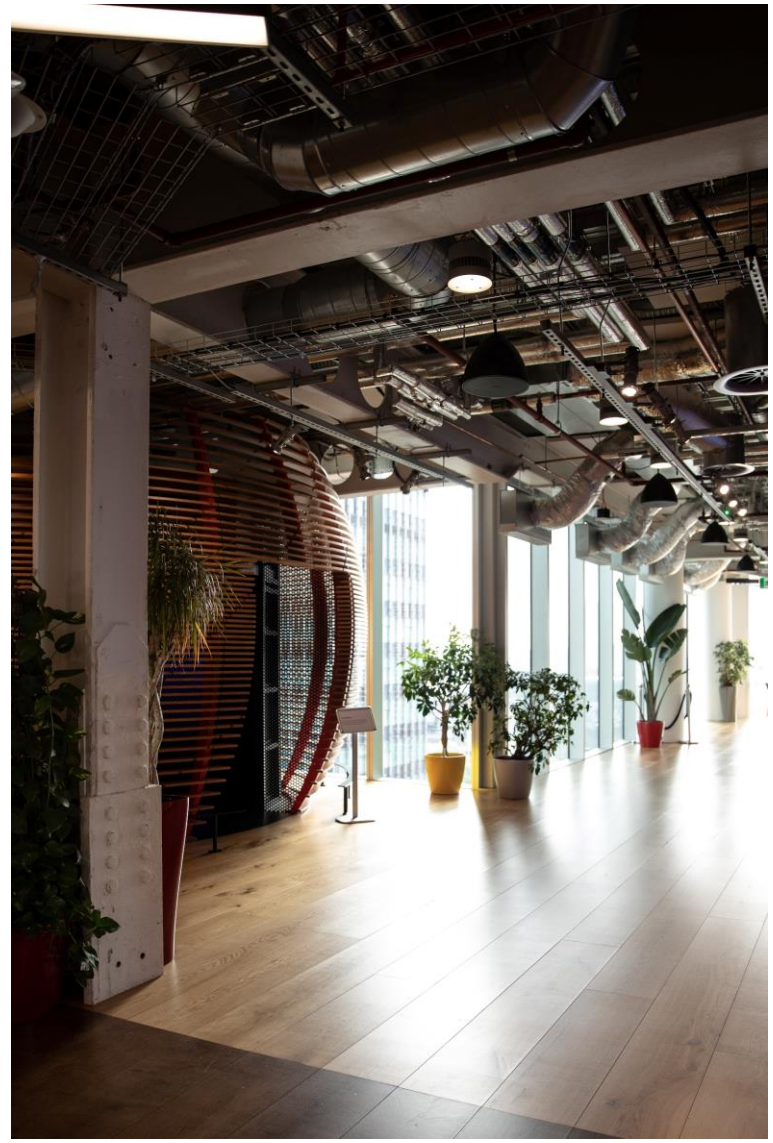
DOAS Air Distribution

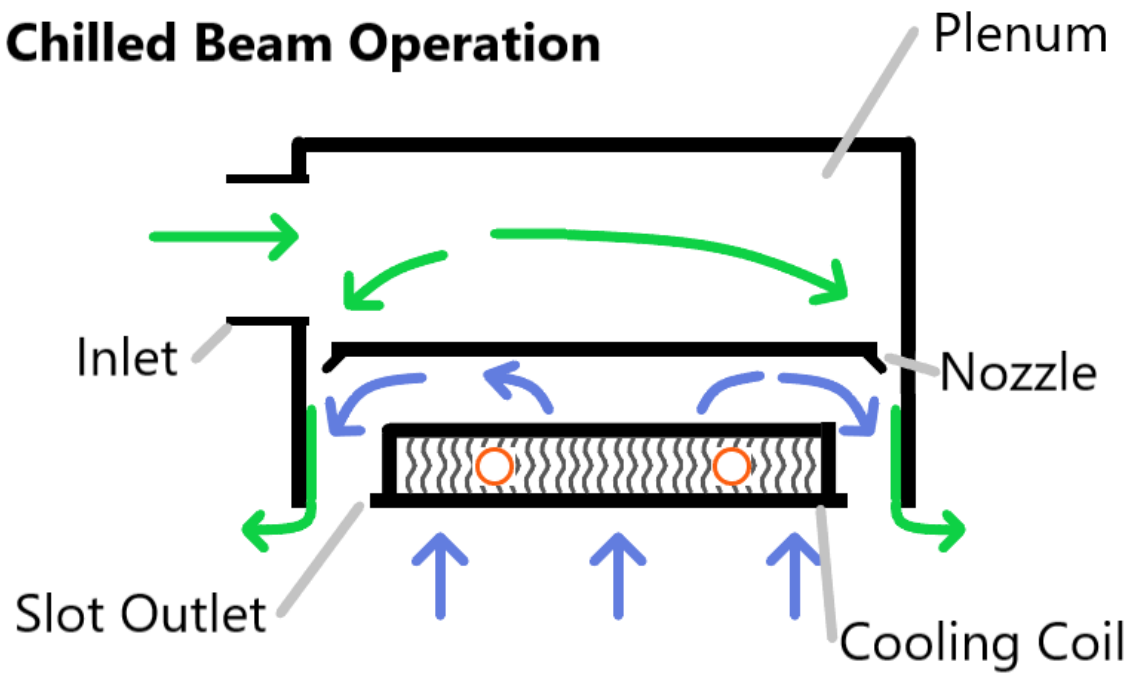
Two main pieces of HVAC equipment used to control and distribute ventilation air from a DOAS are:

- Chilled Beams
  - *Located in the space*
  - *Utilize the DOAS air to induce room air through a sensible cooling coil*
- Chilled Water Fan Powered Terminal Units
  - *Located in the ceiling*
  - *Fan in the unit combines the DOAS air with room air that is conditioned by a sensible cooling coil*



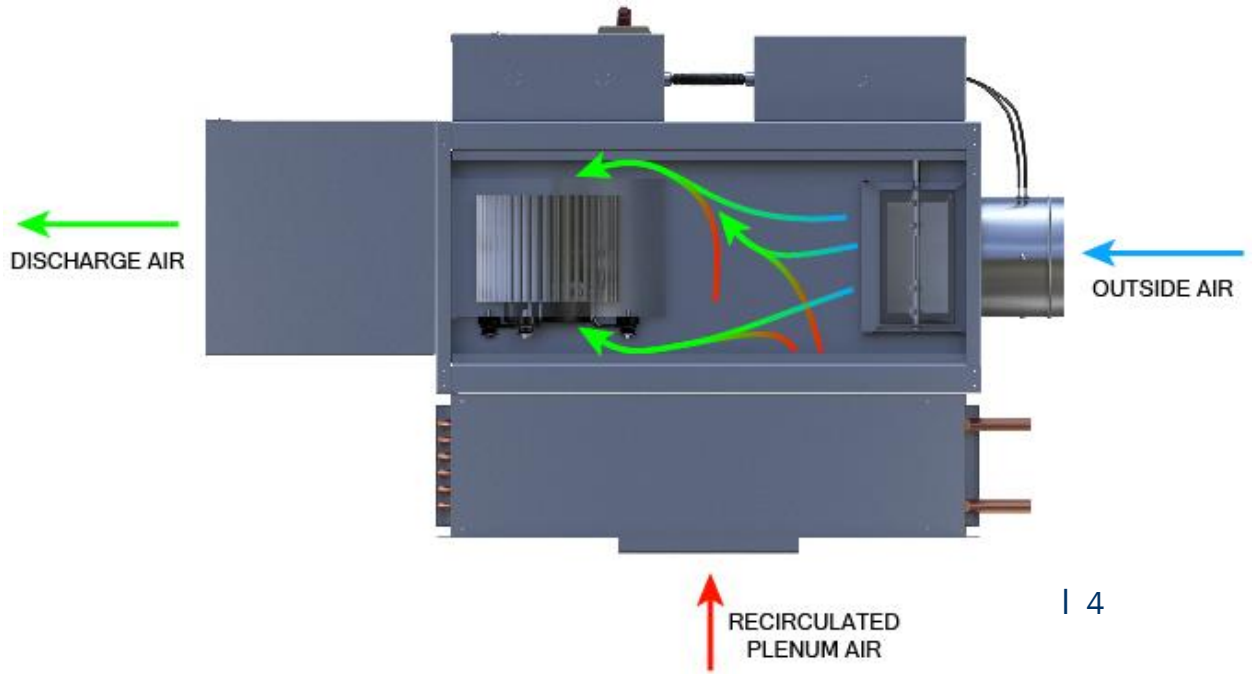
Active Chilled Beams:
How they work

- DOAS primary supply enters the chilled beam through the inlet and into the plenum.
- The primary air is directed towards the slot outlets through nozzles in the plenum.
- The accelerated primary air creates a low-pressure zone that induces the room air through the sensible cooling coil.
- Room air is:
  - *Conditioned as it passes through the sensible cooling coil*
  - *Mixes with the primary air*
  - *Directed out into the room*



Chilled Water Fan Powered Terminal Unit:
How they work

- DOAS primary air enters through the inlet that contains a flow sensor.
- The flow sensor measures the airflow, and the controller responds by changing the damper position to ensure the proper amount of ventilation
- The fan pulls the plenum/room air through the sensible cooling coil on the unit inlet
- Primary and recirculated air mix in the unit and are delivered by the fan to the supply ductwork



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Active Chilled Beams:
Benefits Vs. Challenges

Benefits

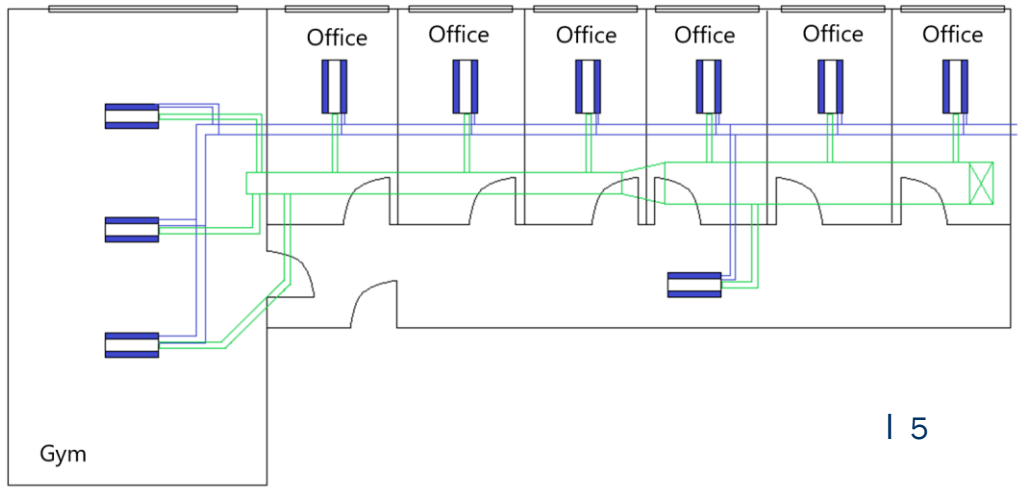
- No moving parts
  - *inherently higher reliability & low energy use*
- Low profile
  - *work well in applications where ceiling height is a concern*
- Beams required in every space
  - *controls to each room, rather than one control for multiple rooms*

Challenges

- Require higher static pressure, 3/4" at the inlet, to operate
  - *Fan energy from the DOAS is a cube function of Static Pressure*
- Coils are located directly above the space
  - *If space conditions change (someone opens a window) it could cause condensation to drip from the coils.*

Challenges cont'd

- Relies on primary air to induce room air through the coil
  - *Induction is a cube function of the static pressure at the inlet*
  - *A slight reduction in primary airflow results in an outsized reduction in induction*
  - ***Renders chilled beams constant volume.***
- Each room requires a separate chilled beam system with its own piping connection
  - *Greatly increasing the first cost of the HVAC system*
  - *Increase the costs of renovation, especially in a transient office environment*



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Chilled Water FPTU:
Benefits Vs. Challenges

Benefits

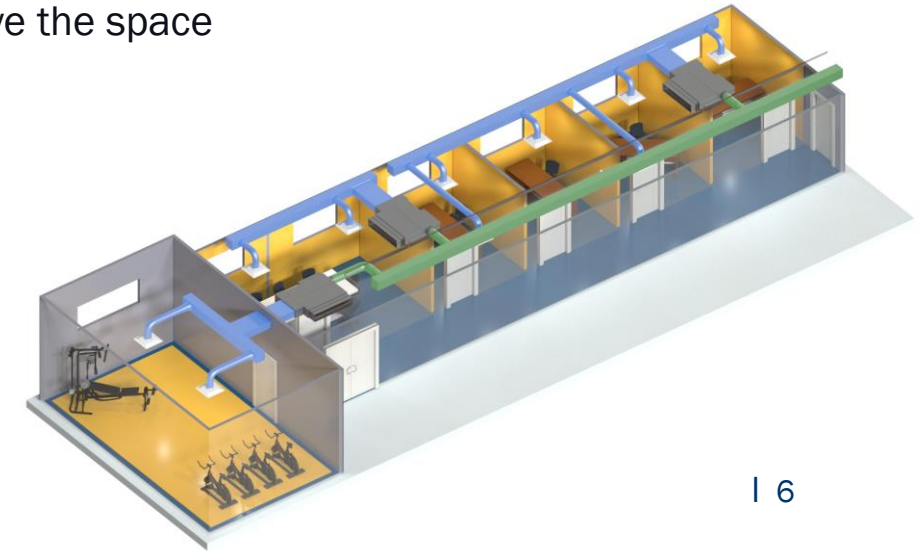
- Multiple sizes enable one piece of equipment, and one water connection, to serve multiple spaces
  - *Much lower first cost*
- The damper and flow sensor enable the control of ventilation air when paired with a VAV DOAS.
  - *Employing demand control ventilation allows the ventilation energy use to be optimized based on occupancy*
- The coil has a drip pan
  - *There is little chance that water will drip into the room*
- The fan can increase and decrease airflow based on demand in the space.
  - *Building loads cooling loads are at 50% of design or less for 85% of the occupied times.*
  - *Varying the supply is critical to occupant comfort*

Benefits cont'd

- Air distribution is separate from the terminal unit, enabling accurate ADPI
  - *This also enables different air distribution designs, not just slots*
- The design is more flexible to renovation or changes to the space layout
  - *Air distribution can be modified without affecting the terminal unit location and piping*

Challenges

- The terminal unit is taller than a chilled beam so it does require additional ceiling height
- Noise does have to be considered due to the fan in the space
- Ductwork and air distribution equipment is required to serve the space



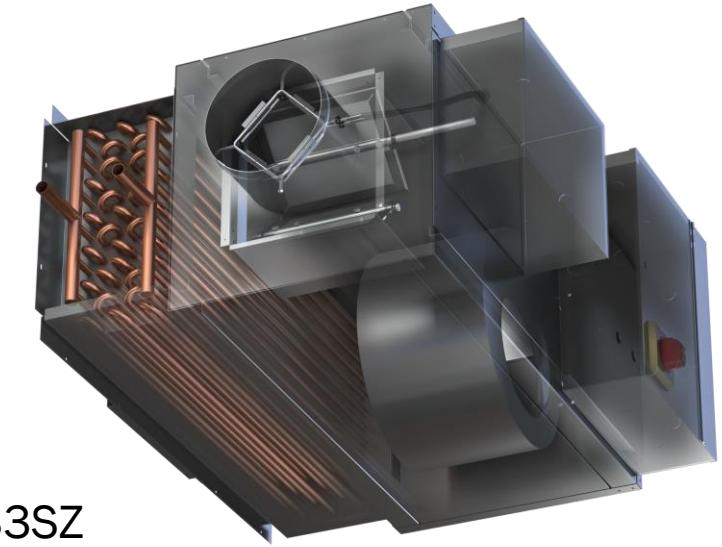
Chilled Water Fan Powered Terminal Unit:

The Clear Winner

For most applications, the Chilled Water Fan Powered Terminal unit outperforms the chilled beam on:

- Occupant Comfort
- System Flexibility
- Overall System Energy Efficiency

Nailor has a full portfolio of units for any application. If latent load is a concern the Nailor 35FH fan coil fits well with a DOAS system.



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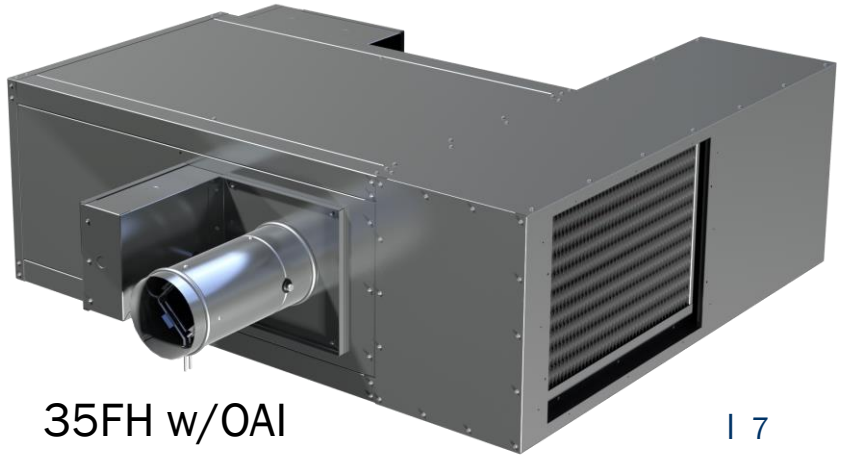

35FH w/OAI

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