SPECIFICATION GUIDANCE

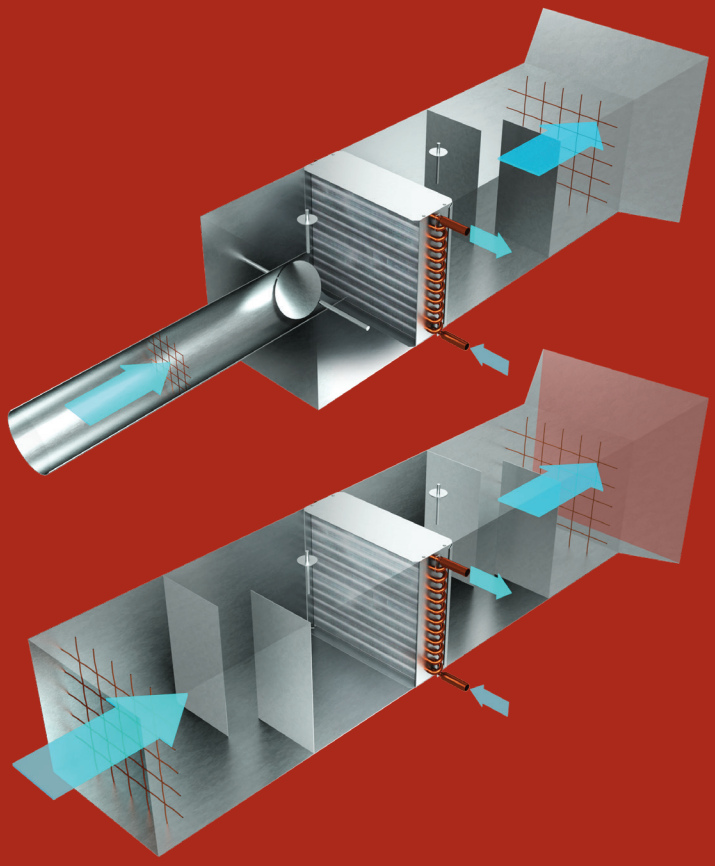
Why to Specify & Schedule the Price Vantage Single Duct VAV Box

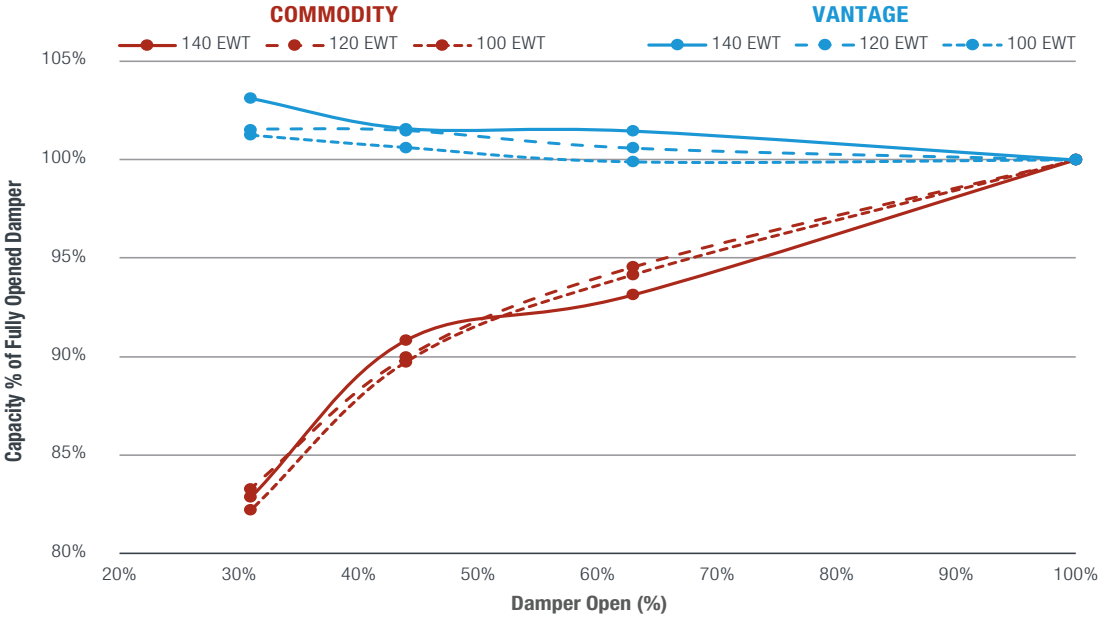
The Price Vantage Single Duct unit repositions the damper on the downstream side of the water coil heat exchanger. This repositioning of the damper is critical to maximize single duct heating performance.

Water coil heat exchangers are tested in accordance with ASHRAE Standard 33, and certified to AHRI Standard 410, while single duct VAV units are tested in accordance with ASHRAE Standard 130 and AHRI 880.

Critically, water coil heat exchanger testing occurs within an open duct configuration. This test configuration results in uniform airflow across the face of the water coil, leading to optimized heat transfer efficiency, minimized generated noise, and minimized pressure drop.

When these water coils are placed on the discharge of a VAV box, the velocity profile is influenced by the shape and position of the upstream damper and inlet assembly. As the damper closes, the velocity becomes less uniform leading to decreased heat transfer efficiency, higher fluid flow requirements, greater air and fluid pressure drops, or reduced heat exchanger capacity. These negative impacts are not captured by the current industry test methods.





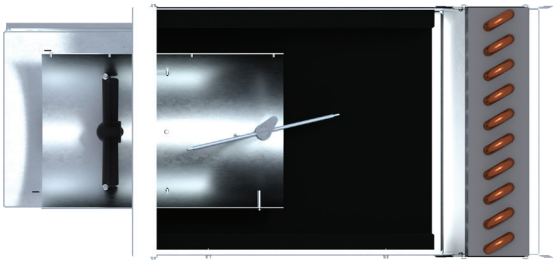
Relocating the damper downstream reduces these impacts, and results in a consistent airflow across the coil face independent of the dampers position. Outcomes include improved zone comfort due to more uniform supply air temperatures, improved hydronic distribution efficiency due to lower fluid flows needing smaller pumps and pipes, and increased heating system efficiency because of optimized return water temperatures to condensing boilers or commercial heat pumps.

Why Do Single Duct VAVs Not Exist in Different Configurations?

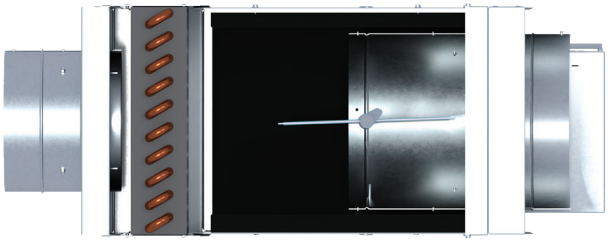
Single duct units are utilized by the HVAC industry in large volumes, are highly commoditized, and are offered in general the same configuration independent of the manufacturer. Original single duct units were airflow regulation units only, utilizing butterfly dampers due to their relatively low cost. As heating elements were introduced to single duct systems, the rectangular shape for the casing and coil was a natural choice to produce heat exchangers in an economical manner. The availability of sufficient heat capacity has not historically been a design constraint; steam heating systems or 180-degree Fahrenheit water from a conventional boiler has had no limit to capacity to offset building loads.

As energy code has progressed, the airside requirements for VAV systems have become more stringent (lower volumes), and the hot water temperatures have reduced because of more efficient equipment being required to be code compliant.

Today, many climate zones and applications find sufficient heat from a VAV reheat system is a design challenge. This has led to industry research and product development optimizing system operation. The Vantage VAV box is a byproduct of this reality.



Typical single duct



Vantage single duct

How to Specify & Schedule the Price Vantage VAV Box

Specification Requirements:

- Water coils must be AHRI 410 certified and tested while installed in the single duct unit.
- Water coil data must be accurate independent of the dampers' angular position.

Schedule Requirements:

- Water coil capacity, fluid pressure drops, fluid flow rate, and return water temperature must be based on testing with:
  - The water coil installed in the single duct unit.
  - The single duct damper set to a 50% position.

Why This Approach Works Best

Simplifies design workflow – Minimal changes needed for consulting engineers.

Ensures accurate reheat performance – Reflects real-world dynamic operation, aligning with ASHRAE 90.1's 50% max reheat airflow rule.

Eliminates ambiguity – A 50% damper position is clear to manufacturers.

Promotes fair competition – Allows multiple design approaches to meet performance requirements, encouraging open bidding and cost savings.

PRODUCT PAGE

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