

Air Curtain  
Performance  
Optimized  
by Ability  
to Sense  
Wind Speed



## Purpose and Performance

A key function of an air curtain above a door opening is to deflect oncoming wind. It does this by discharging a downward barrier of air each time the door opens. A traditional air curtain is built to produce a specific velocity of downward air that is up to **90% effective** in accomplishing this wind-stopping goal.

Air curtain unit energy effectiveness is defined by the amount of energy saved (i.e., the energy loss prevented through an opening with an air curtain), divided by the amount of energy that would have been lost without an air curtain. It is represented as a percentage, and the amount of energy saved is reduced by the energy consumed by the unit. Research [e.g., Pappas and Tassou (2003)] shows that air curtains have a range of effectiveness from 60 to 90%, depending on the type and application.

2015 ASHRAE Handbook - HVAC Applications 57.28

While this percentage is impressive, there now exists an opportunity to optimize air curtain performance even further, and that is by ***allowing the air curtain to collaborate with the environment around it.***

## Intuitive Response

Can an air curtain react intuitively to wind pushing at the door opening?

***The answer is YES it can!***

*'Powered Aire's WindSENSOR air curtain incorporates intelligent technology that senses wind speed coming at the door, signaling the air curtain to discharge a velocity (fpm) of air as needed., and thus operating at its most effective level at any given time.'*

● ON WITH THE WIND

● CONSERVES ENERGY

● VARIABLE AIR OUTPUT

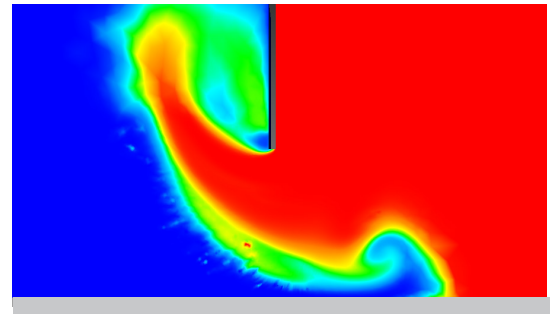
● EASY TO INSTALL

## Why This Matters

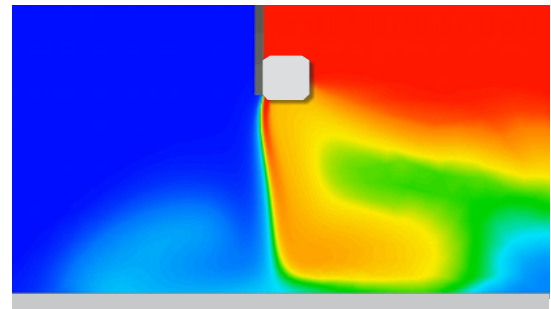
*During standard use, an air curtain operates at the same speed - and uses the same power, regardless of whether there is a breeze, a gust, a gale, or no air movement at all. But wind pressure at the door isn't always the same. One second you can have 5 mph wind pushing at an opening and the next you can have 12 mph. The result with a single speed air curtain operating at 5 mph is much different than at 12 mph.*

*In either case, it is better to have an air curtain than no air curtain at all, but efficiency can still be increased. The only way to maximize efficiency at the opening is for the air curtain to automatically adjust airflow based on the wind pressure to provide the desired seal.*

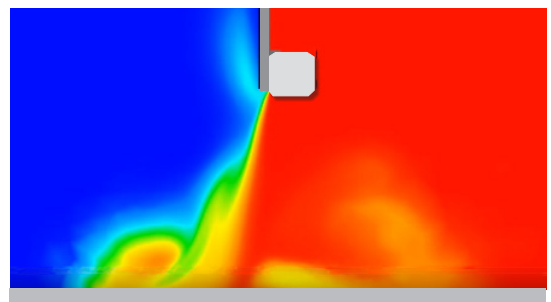
**An opening without an air curtain will experience air infiltration at the bottom of the opening, while inside air escapes out the top of the opening.**



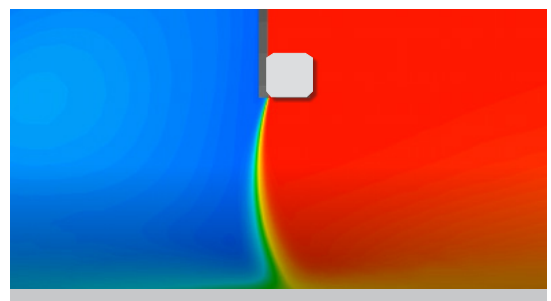
**An underpowered air curtain will allow inflow breakthrough. The air curtain flow is curved inwards and does not reach the floor.**



**With an overpowered air curtain, the air flow is too strong at the floor, resulting in exfiltration of conditioned air and turbulence at the floor.**



**The optimum condition for air curtain operation is when the air curtain flow reaches the floor and seals the opening with a distinct and uniform barrier of air.**

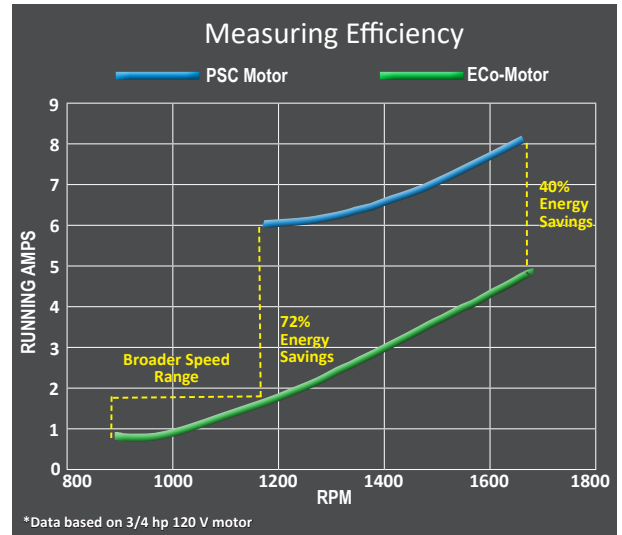


To further optimize performance, air curtains with WindSENSOR technology utilize Powered Aire's own energy-efficient ECo-Motor™ to provide extremely quick activation times as well as an expansive range of speeds (Models ECE & ECC).

# ECoMotor™

Efficient | Dependable | Variable

POWERED AIRE harnessed the power of electrically commutated (EC) motor technology by creating the ECo-Motor. Designed specifically for air curtain applications, the ECo-Motor produces lightning fast startup time, significant energy savings, and expansive variable speed control. By combining green technology with an energy saving product, Powered Aire is changing the way the air movement industry designs, specifies, and perceives open doors.



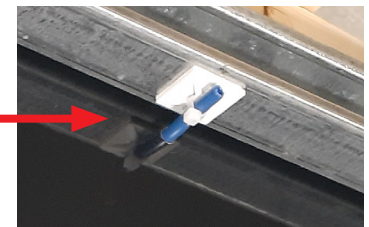
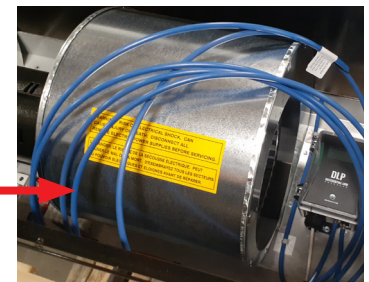
- **Effectively activates 5-7 times faster than a traditional ECM and twice as fast as a comparable PSC motor.**
- **Wide-ranging Variable Speed Control (RPM turndown ratio of 2:1).**
- **Motors are at least 80% efficient at all speeds.**
- **40-72% energy savings.**



## How It Works

The outside pressure tube will be coiled up inside the air curtain when it is shipped. The installer will run this out of the air curtain and through the wall to the outside of the building.

The reference tube to measure the building pressure is run to the outside of the air curtain, typically at the top of the unit.



The difference in pressure between the inside and outside is then compared digitally and the air curtain velocity is adjusted accordingly for optimum efficiency.