

## BLOWER AIRFLOW SEPARATION: WHERE ARE BYPASS BLOWERS (AND THEIR SEPARATE AIRFLOW PATHS) USEFUL?

**Bypass blowers are electric-motor-driven blowers that segregate two paths of air:**

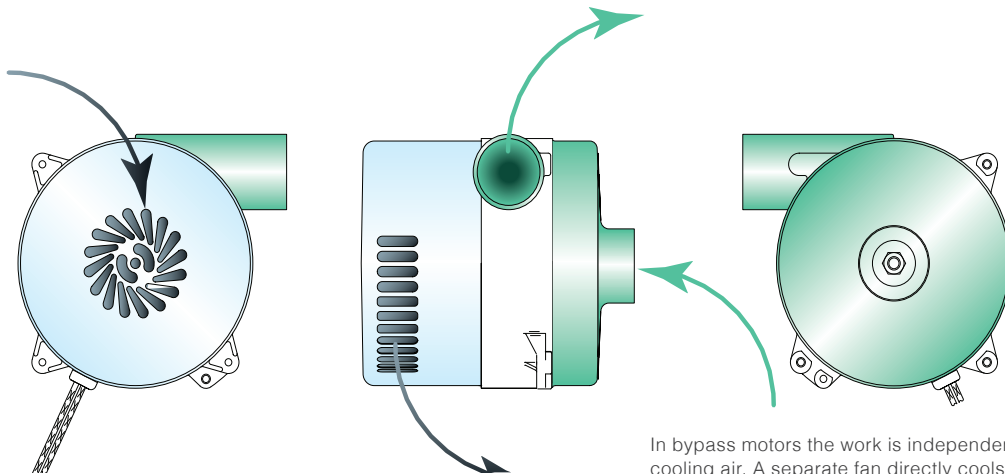
- the path of air for performing the application's blowing or vacuum function and
- the path of air to cool the blower's motor during operation.

In contrast, through-flow blowers make double use of a single stream of blower airflow by channeling that flow over the motor and electronics for cooling.

Through-flow blower benefits include simplicity and a compact design.

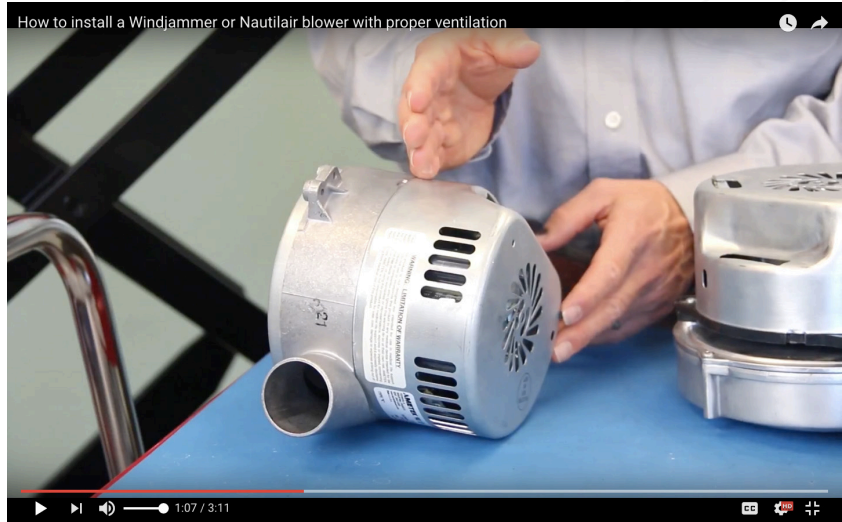
Bypass blower benefits include higher performance and cooler working-air temperature as well as cleaner air through the motor space. Dedicated airflow to the motor and drive also improves thermal management so the blowers can output higher torque-speed values. Running at cooler temperatures also extends life.

### **TWO SEPARATE AIRFLOW PATHS IN BYPASS BLOWERS**



In bypass motors the work is independent from the cooling air. A separate fan directly cools the motor armature and field. Usually the cooling air enters and exits through slots in the equipment housing.

This video shows how to install a Windjammer or Nautilair blower with proper ventilation. Click it to watch on YouTube.



More specifically, bypass blowers may be the only choice where industrial, HVAC, and appliance applications need cool working air. In applications with demanding duty cycles, bypass blowers can generate significant heat. If this heat is insufficiently shed, temperatures can quickly rise and cause premature blower shutdown. Here, through-flow blowers mix the working air and cooling air which recirculates heat so it's ineffectively exhausted from the blower.

Bypass blowers are also indispensable wherever working air has contaminants that otherwise threaten to accumulate on the motor-controller electronics within the blower. Such contamination can cause electrical short circuits and failure by overheating. Consider the extreme case of blowers in floor-cleaning equipment. Here, bypass blowers allow for scrubber and carpet-extraction functions that involve the vacuuming of water and debris.

## WHAT'S THE DIFFERENCE BETWEEN A BYPASS BLOWER AND A BYPASS MOTOR?

Bypass blowers and bypass motors are the same thing. The latter term is common in industries where it's understood that the overall motor-driven design serves a blower function. In fact, bypass blowers come in brushed and brushless-motor designs, as the need for air separation (if not its specific form) is independent

of other design variations. AMETEK Windjammer, Lamb, and Nautilair products all come in bypass-blower designs to serve various applications requiring the prevention of air mixing.

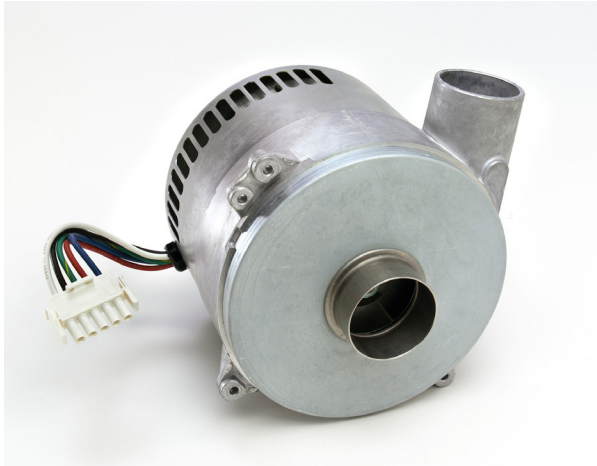
## WHAT'S THE DIFFERENCE BETWEEN A PERIPHERAL BLOWER AND A TANGENTIAL BLOWER?

Peripheral blowers and tangential blowers are the two different subtypes of bypass motors. Both blower subtypes have a round-cylinder morphology to accommodate the rotating circular fan, but other design features differ.

Peripheral bypass blowers deliver diffuse air discharge — uncontrolled into the environment or chamber being treated. So on a typical peripheral-bypass blower, instead of a horn for air discharge, there are small louvres on the side of the cylinder itself. Air exits as if it's leaking out of the cylinder instead of being directed out.

Peripheral-bypass blowers excel where focused output-air direction is unimportant. One advantage is that the design is relatively compact — especially useful in designs or tight enclosures having geometry that can't accommodate tubes or other air-routing components.

Another common peripheral-bypass blower



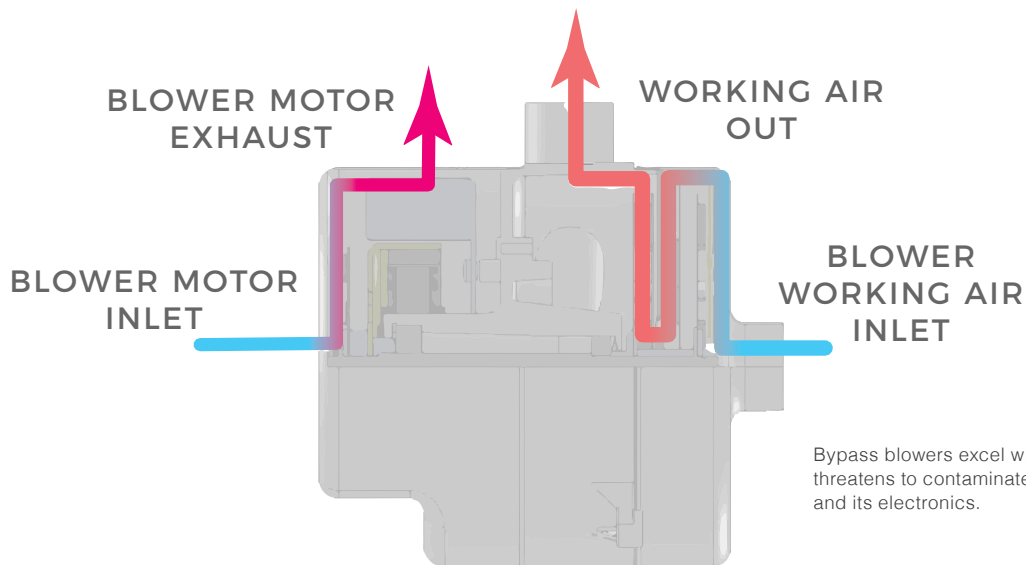
This Windjammer blower incorporates a brushless dc motor for a compact design that delivers long life. Low-voltage variations for vacuum or pressure applications deliver variable output pressure to 98 in. H<sub>2</sub>O and flow to 190 CFM; high-voltage versions output up to 169 in. H<sub>2</sub>O and CFM to 275. Notice how this bypass-blower variation has a circuit for working air and slots for a circuit of motor-cooling air.

application is on redesigns — where a machine builder must replace a peripheral-bypass blower because that's what the machine was originally designed to accommodate. Here, it's increasingly common to replace brush-motor variations (still the dominant peripheral-bypass motor

option) with brushless motor variations to get longer design life.

In contrast, tangential-bypass blowers include a horn to force air to exit the blower at direction that's at a right angle to the air-inlet direction.

In fact, most blower applications use tangential-bypass blowers. That's because tangential blowers have the advantage of letting designers route blower output to specific directions or even out through a tube. For the latter, designs often include a round output tube onto which hose can mount; this allows routing of discharge air to very specific volumes within a machine or environment. For more information, visit [ametekdfs.com/learningzone](http://ametekdfs.com/learningzone).



Bypass blowers excel where the working air threatens to contaminate or wet the motor and its electronics.