

WHY SELECTING THE RIGHT SIZED FAN MOTOR IS IMPORTANT

THIS WHITE PAPER WILL ADDRESS:

- ·Fan Motor Purpose and Function
- Issues from Incorrect Sizing
- Selecting the Right Direct Drive Fan Motor Based on Ventilation Needs

FAN MOTOR FUNCTIONALITY

Fans are an essential component of any kitchen ventilation system. In order to provide enough flexibility to adjust to the installation and changes in cooking that often occur, it is critical that motors are sized appropriately. This will ensure that the hood will capture and contain effluent as intended. Many variables affect the type and size of the motor required such as belt drive versus direct drive, the amount of airflow needed, and static pressure of the system for the specific applications. Furthermore, if the motor is sized too small, it doesn't allow for any flexibility in changes and/or assumptions from the initial design, meaning if static pressure increased from the original proposal, you may be required to install a different motor. However, oversizing can lead to an increase in the cost of the fan to begin with. Sizing it just right is crucial and provides value in both cost and flexibility.



FAN SELECTION

Fan selection is made simple using our computer aided product selection (CAPS®) paired with the advanced knowledge of our sales representatives. You can have full confidence in the Accurex team of experts who will assist you in choosing the right fan for your unique needs. The example below shows a direct drive fan option that can move 2,200 cfm against a system pressure of 0.27 in wg. The motor recommended in this situation by our CAPS program is a ¾ hp motor with a break horsepower of 0.40 hp.



Figure 1 - Fan curve for ¾ hp motor.

FIGURE 1

Figure 1 illustrates the fan curve that is recommended for this situation. This fan curve shows the selected performance point, as noted by the intersection of the system resistance curve (dotted blue line) and the fan performance curve (solid red line). Notice that the fan selected requires the impeller to spin at 1,320 rpm to achieve 2,200 cfm, and necessitates a 0.40 brake horsepower (shown as a triangle on the hp curve or dotted black line).

Note that with this direct drive fan option, it will move too much air if the motor is allowed to run at full speed and must be reduced to hit the correct performance. Direct drive exhaust fans with an electronically commutated motor (ECM) are an ideal solution for applications where ventilation flexibility is needed by having a fan that can quickly increase or decrease exhaust with the push of a button or turn of a dial. As the fan speeds up, it moves more air, requiring more horsepower along with the motor's rpm.

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FIGURE 2

Figure 2 demonstrates a motor's developed hp at various speeds. Here the selected motor does not provide the full nameplate hp specifications until the motor reaches approximately 1,800 rpm. The motor needs to spin at 1,320 rpm to achieve the desired performance for this fan.

The vertical red line shows the point where 1,320 rpm hits the hp/rpm curve. Following this intersection, use the scale on the left axis to determine that at 1,320 rpm, the motor will provide 0.56 hp. Since the rpm of the fan motor was lowered, the available hp and torque must also decrease.

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Figure 3

FIGURE 3

In comparison, Figure 3 shows a hp curve for a ½ hp motor illustrating that only 0.38 hp is available at the same motor rpm. This motor will not produce the hp needed at the designated rpm as shown in figure 2. Evaluating both motor hp graphs verifies that the ¾ hp motor was the correct size for this fan since it provides enough hp at the specified rpm.

Correct fan motor sizing is crucial to ensure that hoods function properly, capturing contaminants efficiently through the duct system and exhausting to the outdoors. While many variables affect the size and type of motor required for an individual kitchen space, our experienced team of experts along with our CAPS program can recommend the right fan for your specific needs.

ABOUT ACCUREX

ACCUREX



At Accurex, we believe there is a better way to help simplify the most challenging kitchen ventilation system environments, from engineering to aftermarket support. As a Greenheck Group Company, we have more than 70 years of manufacturing and engineering experience in air movement and control products and offer a breadth of configurable products and services tailored to meet your needs.

Engineering Simplicity into Kitchen Ventilation Systems

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For additional information or questions, please reach out to us at **SALES@ACCUREX.COM**.

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