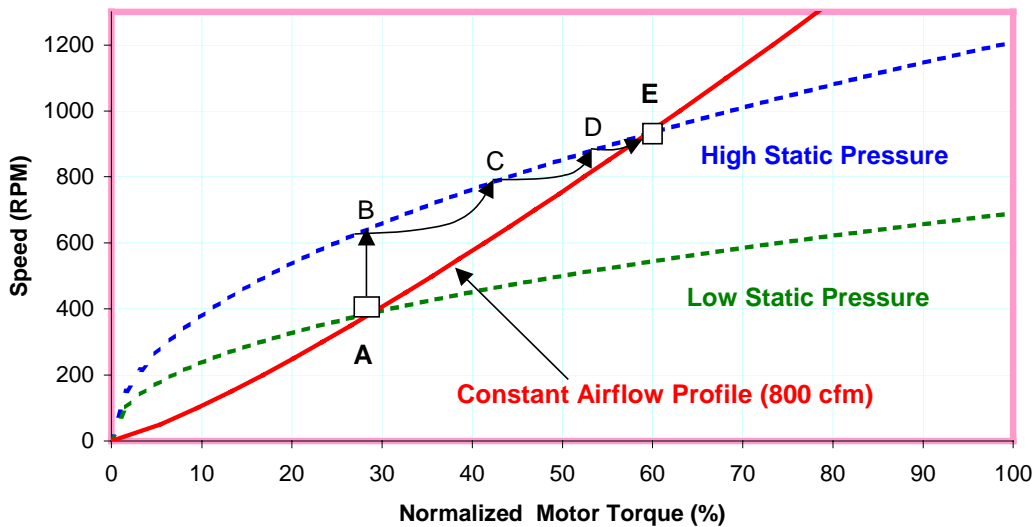


How the **GE ECM™** achieves constant airflow

Unlike a conventional induction motor, GE's ECM motor regulates itself by automatically changing torque and speed to maintain a programmed level of constant airflow over a wide range of external static pressures. This is accomplished through several steps.

If static pressure changes (for example, a clogged air filter, or different installation), then the blower speed will increase to Point B (see High Static Pressure Curve, blue line). This increase in speed occurs when any blower, whether equipped with an ECM or AC induction motor encounters an increase in static pressure. The reason is that the clogged filter restricts



First, the air-moving system is characterized in an airflow chamber for its torque and static pressure operating range. That characteristic is then programmed into the motor. Then the motor's control is programmed with a set of desired airflows (e.g. 800 cfm). That constant airflow is defined by the ECM's speed and torque, which is expressed in the graph nearby as the red line. Point A on the red line, for instance, represents an airflow of 800 CFM at the initial level of static pressure in the system, here called Low Static Pressure (see the green line).

As long as the pressure remains constant, the ECM motor will continue to deliver 800 cfm to the system. This is referred to as a stable operating point which is defined as any point where the system profiles intercept the ECM constant airflow profile. Points A and E in this example are the only stable points for constant airflow in the graph.

airflow in the system meaning there is less air for the blower to propel through the system. (This is akin to a car's wheels losing traction on ice and spinning freely).

The airflow at Point B, however, is lower than required to remain on the desired Constant Airflow Profile as expressed by the red line. The motor will not operate at Point B because its programming does not allow this combination of torque and speed for this particular system. As a result, the GE ECM patented algorithm will increase torque and speed to find a new stable operating point on the High Static Pressure Curve. Increases in torque will continue until the speed and torque converge with the next stable operating point, which in this case is Point E on High Static Pressure Curve. When operating a point E, the blower is delivering higher torque, higher speed, but the same airflow as in point A.