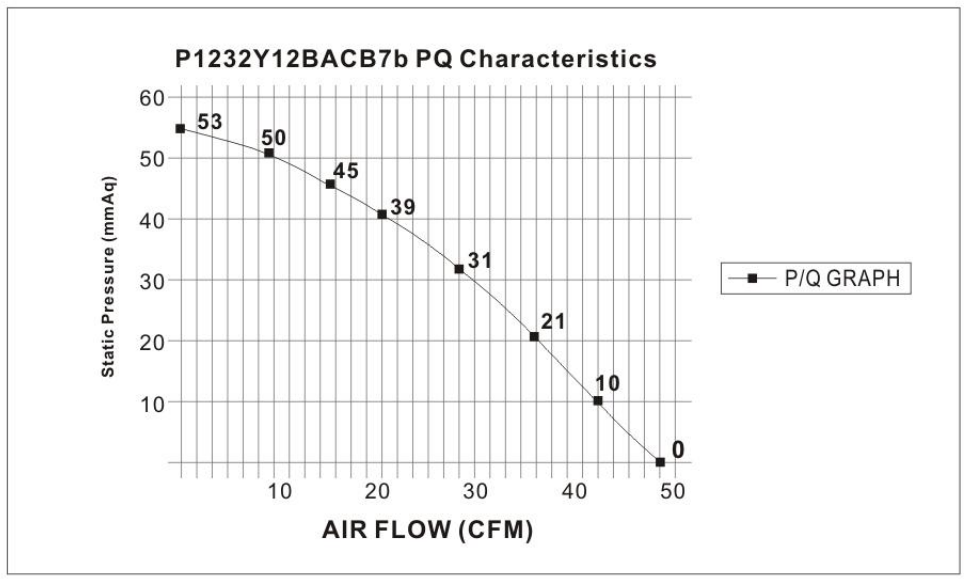
HOW TO MEASURE THE IMPEDANCE OF YOUR SYSTEM

The measurement of the system's impedance and the selection of the appropriate fan motor can be illustrated by the following example:

Let us use PELKO's 1232 blower with the following PQ characteristic:



A. Calculate airflow through your system by applying the blower in your system and by measuring the incoming and outgoing airflow temperatures as follows:

$$\text{Airflow in CFM} = \frac{1.76 \times P}{T_2 - T_1}$$

Where: P = Input power into your system (e.g.1000 W)

T_2 = Outgoing airflow temperature in ℃ (e.g. 59.1℃)

T_1 = Incoming airflow temperature in ℃ (e.g. 20℃)

Then, calculate the test result: Air Flow = 45 CFM

B. Refer to the PQ characteristic of the blower to determine the static pressure of your system at the measured airflow. The pressure can be determined from the PQ graph above to be 6 mmAq, for the calculated airflow in A of 45 CFM.

C. From the temperature specifications of your equipment calculate the temperature difference T2−T1 where: T1 is the typical room temperature (e.g. 25℃) and T2 is the maximum allowable operating temperature of equipment (e.g. 60℃). The T2−T1 = 35℃. Assuming that your are powering your system with 1000W, necessary airflow can be calculated using the formula shown in A as follows:

$$\text{Air Flow in CFM} = \frac{1.76 \times 1000}{35} = 50.3 \text{ CFM}$$

D. For the purposes of the example used here the appropriate fan motor to be selected for this application should be able to deliver minimum of 50.3 CFM at minimum static pressure of 6 mmAq. For safety reasons and to allow for higher room temperature, from PELKO Motors DC fan catalog, we can choose model P1232Y that can deliver 64 CFM at 6 mmAq with 4200RPM or model P1238X that can deliver 63 CFM at 6 mmAq with 3650RPM. We can further consider the noise level and product life.

In this case P1238X model will be the optimum solution for the system outlined in the above example (see also SELECTION OF A COOLING FAN and AIR FLOW EFFICIENCY OF A MOTOR).