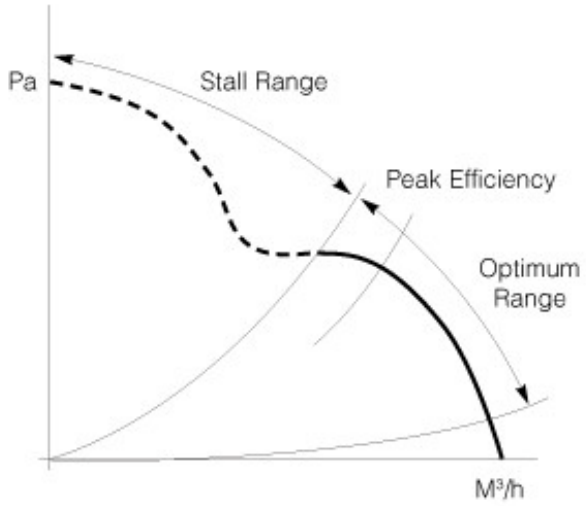
Fan Selection

When selecting a fan the duty point should ideally be at or close to peak efficiency. The point of peak efficiency varies between fan types. Refer to ‘How does a fan works?’ to understand each fan type. Operation at this point not only provides the most efficient operation, but also the optimum acoustic performance and motor temperature rise. The following graph is an example of an axial fan showing the optimum operating range and the area of peak efficiency, the ideal operating point for the fan.

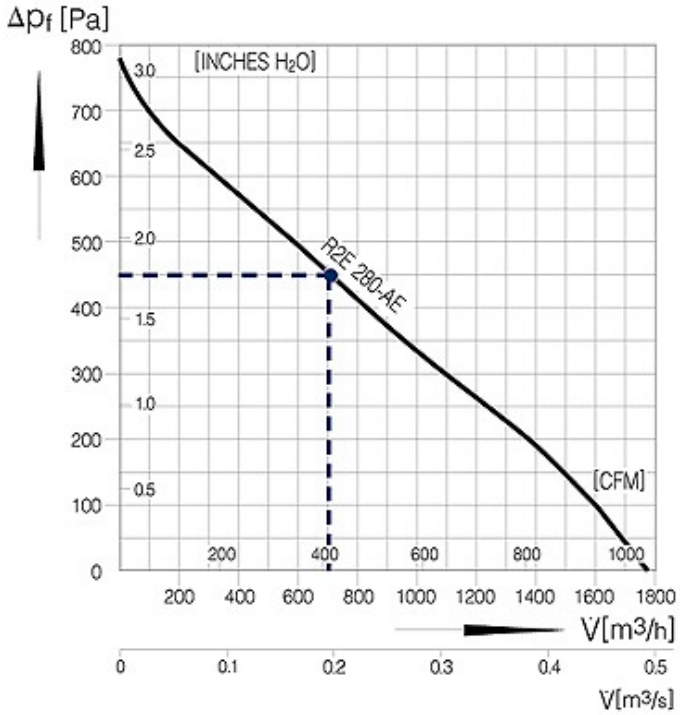


An example of an axial fan performance

Defining the volume flow required and calculating or estimating the system resistance determines the duty point. Reference to documents titled Airflow, Pressure Development and System Resistance in the technical library will help explain how a duty point can be determined. When a duty point is determined then a fan type needs to be selected. Reference to document titled Selecting a Fan Type will assist in the choice. The following should also be considered when a fan is to be chosen;

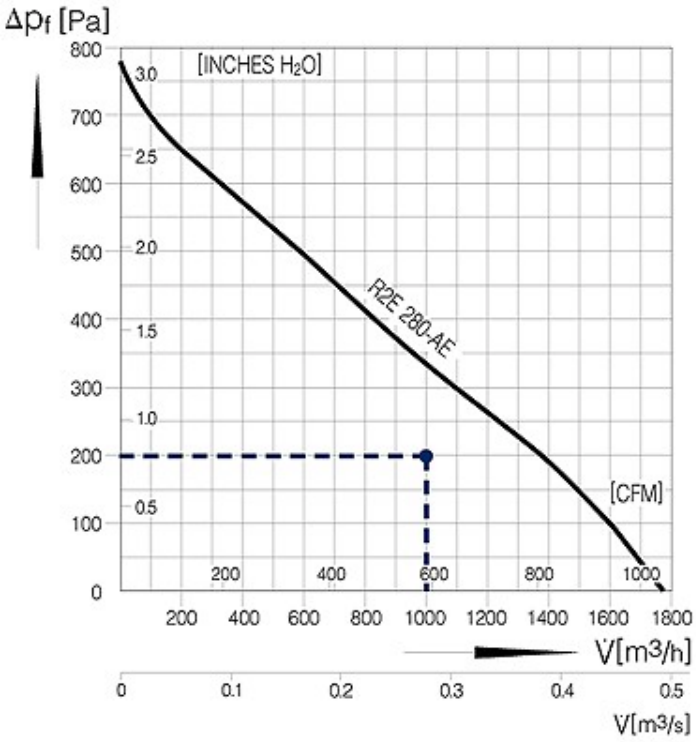
- The operating conditions such as temperature, humidity, dust etc
- The supply voltage, AC single or three phase or DC
- The space available
- Noise criteria
- Efficiency criteria

The following is given as an example of a simple selection from a fan curve. For example a requirement for 700m3/hr @ 450 Pa. This duty would fit the following fan graph perfectly.



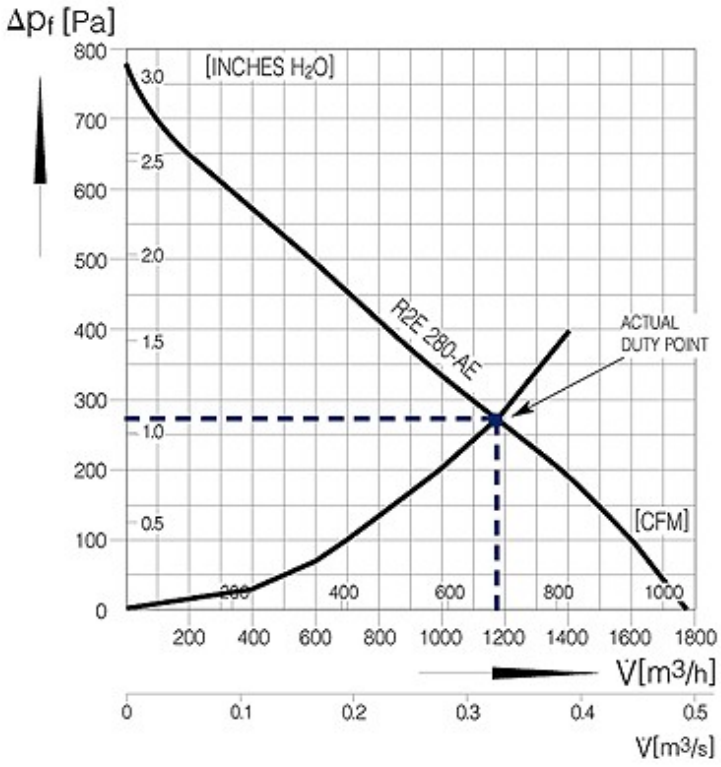
Example of a duty point matching a fan curve

It is rare that a required duty fits a fan perfectly. What if the required duty was 1000m3/hr @ 200 Pa, what would the fan actually give?



Example of duty point not matching a fan curve

The system the fan is applied to has a system resistance that can be approximated to a square law. With the given duty of 1000m3/hr @ 200 Pa a system resistance line can be drawn onto the graft to estimate the actual duty, as shown below.



Example of system resistance curve being applied to fan curve

The actual duty of this fan in the application would be in the region of 1,200 m^3/h at 300 Pa.