Selecting Fans

Optimum Operation Range

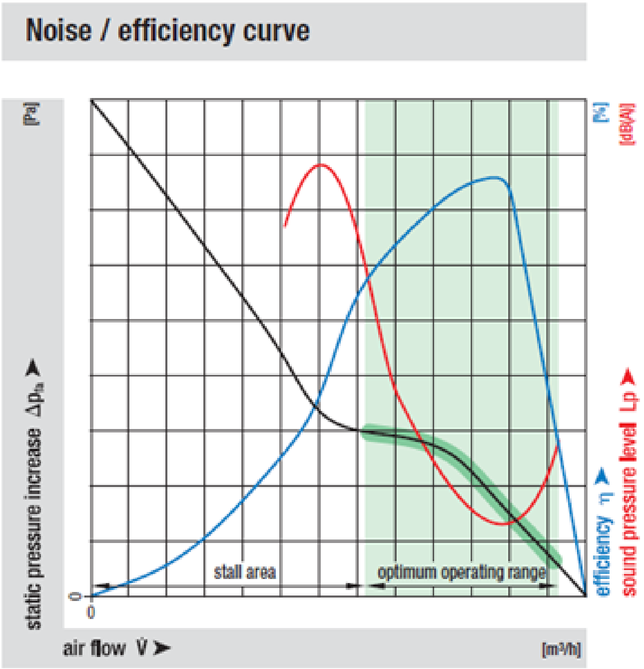
JOHNSON ELECTRIC

Optimum Operation Range

- **The optimum operating range of the fan is shaded in green in the curve given here (aka the “Saddle”)**

- **Right of the “Saddle”**
  - Maximum Efficiency
  - Minimal Noise

- **Left of the “Saddle”**
  - Stall Area
  - Reduction in Efficiency
  - Increase in Noise



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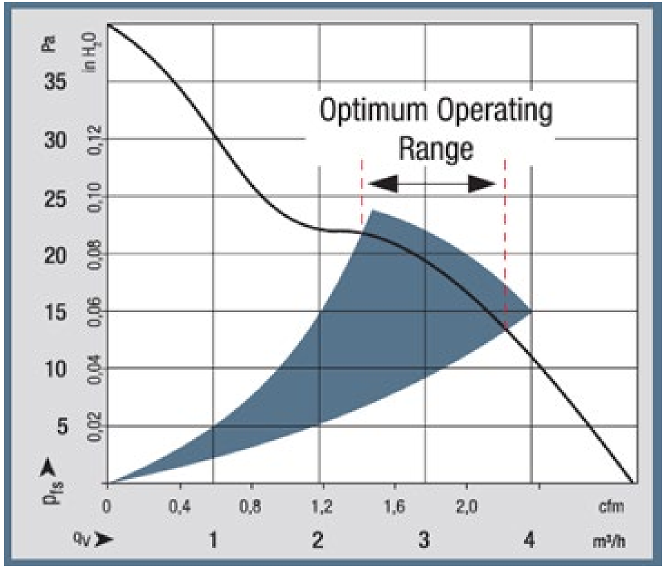
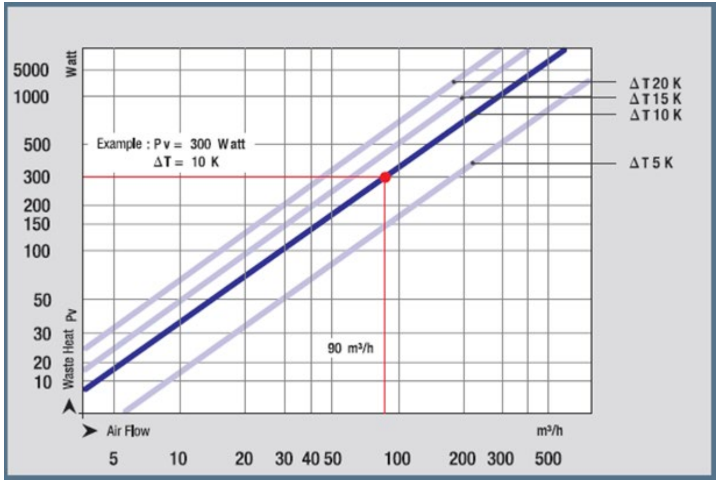
Optimum Operation Range



- The fan you are looking for must also be able to deliver a suitable static pressure increase Δpf, in order to force the air through the device. Therefore, a fan must be selected that provides the required air flow performance within its optimum operating range (see the left air performance curves under technical data).
- If more than one fan meets your requirements, the sound level, space requirements, economy, and ambient conditions will assist in making the final choice.
- Motor torque curve is not important for a ventilation application but PQ curve with the right operation point of the design.
- *Please Note* Range hood applications are special. Due to a mechanical flap, the operation point will move to the left side of saddle when the fan turns on.

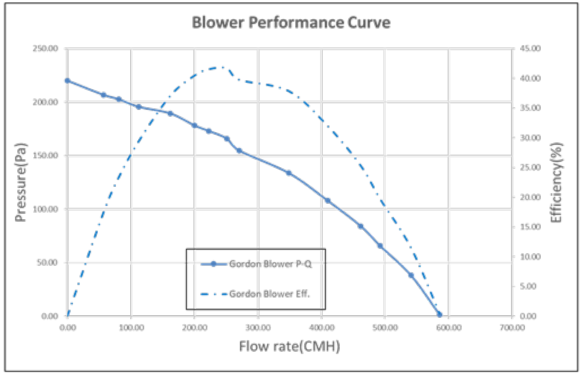
Dissipate Energy



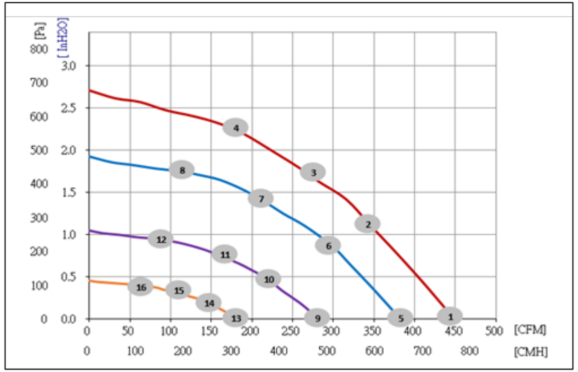
Definitions
PV = amount of heat to be dissipated in [W]
CPL = = specific heat capacity of air in [J/kg/K]
CPL = 1010 [J/kg/K]
ρL = air density in [kg/m]
ρL = 1,2 kg/m3
ΔT = T1 –T2 temperature difference in [K] between inlet and outlet

- **A large amount of the energy consumed by electrical and electronic devices is converted to heat. Therefore, when selecting the correct fan, it is important to determine the dissipated energy that must be removed. The electrical power consumption of the unit to be cooled often represents a suitable value for this purpose.**
- **The air flow that the selected fan is required to generate is determined by the dissipated energy and the admissible heating (ΔT) of the cooling airflow (from entry to exit of the device to be cooled). The maximum admissible ΔT depends greatly on the temperature sensitivity of the individual parts of the device.**
- **For example, ΔT = 5K means that the average cooling airflow leaving the device to be cooled may be only 5° C warmer than the ambient temperature. This requires a lot of air. A lower air flow rate is sufficient if a higher temperature difference (e.g. ΔT = 20K), can be tolerated.**

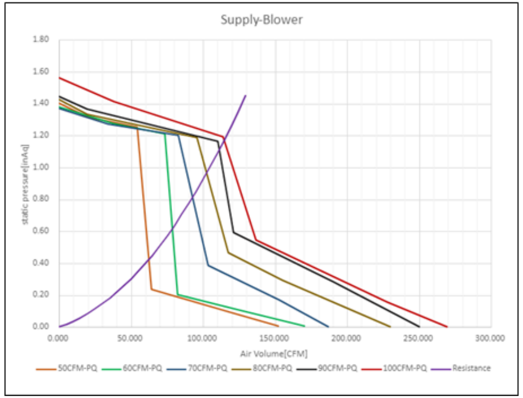
Example PQ Curve per Application



Curve & its operation point for an air purifier



Curve & its operation point for a FFU



Curve & its operation point for constant air setting for an ERV

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Thank You

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