WHAT IS A FAN – Fan Laws

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A fan is a volume machine that shovels air. The bigger the shovel the greater the air flow. Fans are predictable and follow a strict set of laws.

The three basic fan laws are:-

- Air volume flow varies directly with speed, therefore **Double** the speed then the air volume flow increases **2 times**
- Pressure varies as the square of speed, therefore **Double** the speed then the pressure increases **4 times**
- Power varies as the cube of speed, therefore **Double** the speed then the power required increases **8 times**

Fans are used to blow or suck through duct work and other equipment – this air flow path is called "The System". The system has its own law called the systems curve which is the relationship between volume flow and the resistance to the flow.

Pressure varies as the square of air volume flow, therefore **Double** the air volume flow then the pressure required to blow the air through the system increases by **4 times**

Thus it is very important to select a fan that is suitable for the system requirement.

A few years ago a customer rang to say that our fan, installed in their system, was no good because the pressure was okay but the volume flow was about half what it should be. In analysing this issue, we considered carefully the system curve because to double the flow through the system, the pressure increases by 4 times.

The problem was resolved by removing the blockage in the system. The fan and the system are not independent of each other and in this particular case it was the system and not the fan, that had the issue.