



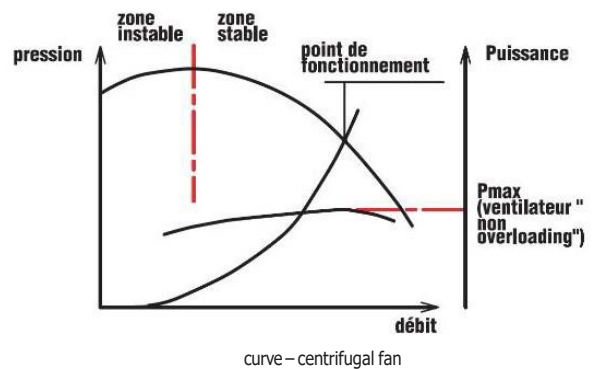
# Air Vision,

## Fan use and energy savings

Energy is also a main concern in the industry. Here under we define some solutions in order not to waste energy.

### 1. EXPECTED PERFORMANCES

It starts with a good definition of the expected performances of a fan. If the reality of your installation does not match the theoretical approach, the efficiency of the selected fan can be disastrous. The operating point of a fan on a circuit is the meeting point between the fan curve and the circuit pressure drop parable.



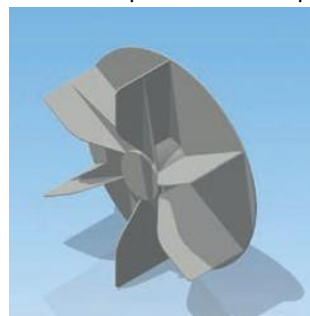
### 2. RIGHT CHOICE – Size and execution

The temptation to select a small machine, cheaper to buy with a bad efficiency is high, but will be expensive in the long run. So, it is better to avoid the choice of a fan which will work at the extreme right of the curve. For a centrifugal fan, a forward-angled blade produces more pressure but operates at a lower efficiency than a backward-angled blade.

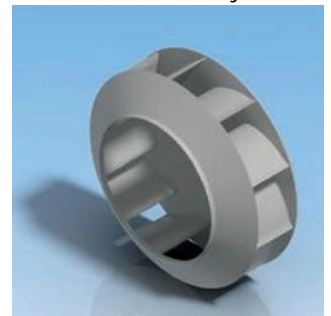
For many reasons of manufacturing cost, this blade is most often flat, or curved in a single plane.

Sometimes, it is designed like an airplane wing profile to optimize the performance.

However, the additional costs considered expensive in the past, may now be justified.



Impeller CTT for dust transport



Impeller NFLA, with high efficiency for clean air

### 3. RIGHT CHOICE – Axial or centrifugal

Theoretically, any fan, if running at the right speed, can deliver any pressure at any flow rate. The material strength limitations and the efficiency criteria mean that large flow rates at low pressures are reserved for axial fans and moderate flow rates at higher pressure are reserved for centrifugal fans.





#### *4.AIR VELOCITY*

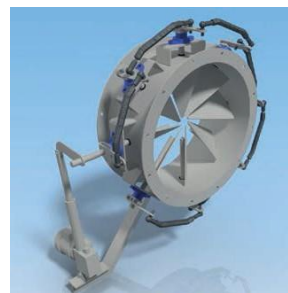
Excessive air velocities in the ducts, together with a poorly designed duct network, will greatly increase the pressure drops and, as a consequence, the absorbed power. Depending on the application and qualification of your air, there are ideal airspeeds to use. A dust removal or pneumatic transport fan will follow a completely different logic if you compare it to an application such as smoke extraction of a carpark or suction on a chemical laboratory hood.

#### *5.REGULATION FREQUENCY VARIABLE SPEED DRIVE*

If your process has variable performance requirements, the prices of frequency drivers allow in many cases a very rapid return on investment. By adapting the rotation speed to your process requirements, you do not waste energy. Without regulation, a ventilation system shall operate continuously at the maximum design rate required by a standard rate process phase. If the fan performance can be adjusted as needed, this saves significant energy.

#### *6.REGULATION INLET VANE CONTROL AND REGISTER*

Choose, whenever possible, an inlet vane control rather than a simple register. The Inlet Van Control on the fan's suction side changes the fan's curve, but a register only adds a pressure drop to your system to reduce the flow rate.



Inlet Van Control



Regulation register

#### *7.REGULATION – SENSORS*

Proper monitoring of your process by a careful selection of your sensors allows effective control of the fan, either by frequency variation, a register, or other adjustable variables. Different sensors are possible and allow the flow rates regulation:

- In an industrial process, the pressure sensors or flow measurement sensors adjust the fan's characteristics.
- Infrared sensors allow flow rate to be regulated according to the occupancy in a room
- CO2 probes are used to report on human activity.
- VOC probes report air pollution.
- Humidity sensors are particularly suitable in humid environments where too much moisture must be removed.
- The temperature sensor can also be used and regulates the flow rates according to the indoor temperature of the room or the temperature of the extracted air, this can be the case in collective kitchen for example.



### 8.NETWORK CONNECTION

You can kill the fan's performances by connecting it to the network without considering our recommendations. Good sizing of the accessories and the fan connection to the network is essential for its efficiency and its perfect operation.

It is a pity to note that sometimes all the effort to gain a few efficiency points in a design's motor or fan are reduce to zero by a bad design of connecting parts to the fans. What looks good to the eye looks good to the air, which means that it is important to select elbows with sufficient curve radius, and avoid any abrupt change of section or air direction, which generate turbulences and therefore pressure drops.



### 9.MOTORS

In industry, 60% of the electricity consumed is used for the motors' operation!

Motor replacement is often considered first, for improving passive energy efficiency, for two reasons:

- In order to take advantages offered by the new high-performances motors
- In order to avoid oversizing

Motors that run for a long time are good candidates for replacement by high- performance motors, especially when existing motors are old and require rewinding.

High performances motors, depending on their power, operate with up to 10% higher efficiency than standard motors.

Rewinded motors are 3 to 4% less efficient than the original motor.

However, if motor use is low or moderate (e.g. less than 3000 hours per year), replacing standard efficiency motors (especially those not yet rewind) with high performance engines may not be economical. It is also important to ensure that the critical performance characteristics (such as speed) of the new motors are equivalent to those of the existing motors.





## 10.AUDIT

We do perform installation audits and often see the use of fans that no longer match with the parameters set on purchase. Either because this fan comes from another facility and has been recovered, or because the process has greatly evolved. This can lead to significant overconsumption.

With a few simple measurements and an analysis of your facility, you can make significant savings by adjusting the characteristics of your fans.



*These 10 points may seem elementary, but we are too frequently confronted with many situations of clear non-compliance with one or more of these 10 points. Worse, a disturbing trend has emerged in recent years with the space's decrease available for installing of fans and their accessories. This lack of space drives our customers to make technical choices at the expense of good efficient operation.*

***Our team can provide you many tips!***