HW Ventilation

AXIAL IMPELLERS

HW Ventilation

Headquartered near Milan, Italy, HW ventilation is a leading manufacturer of axial impellers and ventilators for industrial applications. With our extensive experience in the market, we are an extremely dynamic company committed to continuously provide our customers with innovative products and services 100% made in Italy. The undisputed success of HW Ventilation in the industry we serve is the result of our clear corporate philosophy and mission. 70% of the company's revenue comes from worldwide export through selected distributors and agents.

Qualyfan selection software

Qualyfan by HW Ventilation is our advanced fan selection software. It supports developers and engineers to select the best impeller for any application which requires to move air. The user is free to select customized performance conditions and compare performance curves.

Finite Element Method (FEM) analysis

All products designed and manufactured by HW Ventilation have passed through FEM analysis software. This software is used to perform structural analysis of the fans, and help to predict and prevent stress loads and deformations.

CAD / CAM

We provide our customers with customized 2D drawings and 3D models of the fans and ventilators to aid the design layout and documentation procedures. We use our CAD system for the drawings and the development of new products in conjunction with Finite Element Method (FEM) analysis. The analysis is also used to determine the design of the mould for plastic injection and die cast components.

Sampling for testing and analysis

Customers can request any time samples of HW Ventilation products so to test our products directly on their final applications. Sampling is a key factor of our strategy, and has helped us establish long-lasting relationships with our customers. The basis of these relationships is the continuous support provided by our engineers during the process of designing new products, or revamping existing products.

ISO / AMCA Wind Tunnel

Designed according to ANSI/AMCA 210/07 standard, HW Ventilation wind tunnel can perform a wide range of performance testing on fans and ventilators. Our wind tunnel enables us to accelerate the design phase of our products, and test the performance of prototypes and products under development. It is also used by customers to test their products and get detailed test reports. HW Ventilation wind tunnel is the ideal support to design customized solutions and get wanted performances.

Engineering services

Customers rely on HW Ventilation in each stage of development of their products. We are the ideal partners to advise customers' engineers on the best solutions to design high-performance products at a reasonable price. We provide customized analysis and offer our extensive experience in CAD design, FEM analysis, Prototyping, Performance testing, Molding tools design. We develop complete ventilators for special applications (i.e. ATEX) with a high level of customization. We support the design and construction of wind tunnels, in accordance with the existing international standards (AMCA, EN ISO, AAMA, etc.).

The phases of Q-blade project: from concept to shelf

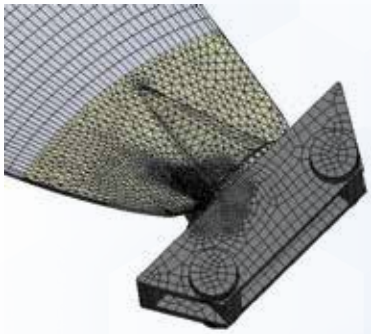
- **Scope of the project:**
  - produce an efficient axial impeller made of Polypropylene/Polyamide, ideal for large scale productions
  - guarantee higher efficiency and lower noise emission at high rpm
- **Target applications:** compressors, heat-exchangers, radiators, HVAC/R, ventilators, generators...

The phases of Q-blade project: From the industrial idea to the prototypes

- **Concept:** borrow the best from each product of the HW Ventilation family – reliability and easiness-to-assemble from TS series, low noise and efficiency from SR/C series

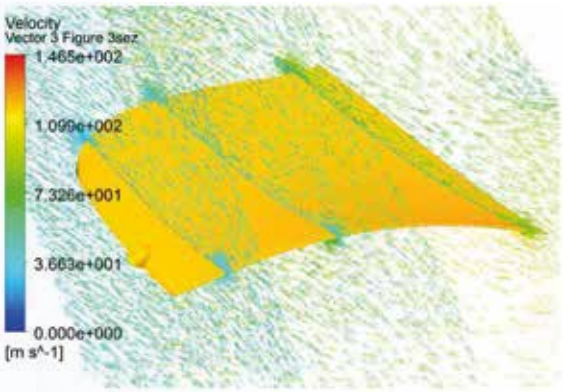
- **CAD drawings of the concept:** fixed pitch sickle-profile axial fan, diameters from 230 mm to 750 mm, tip of the blade larger than the root

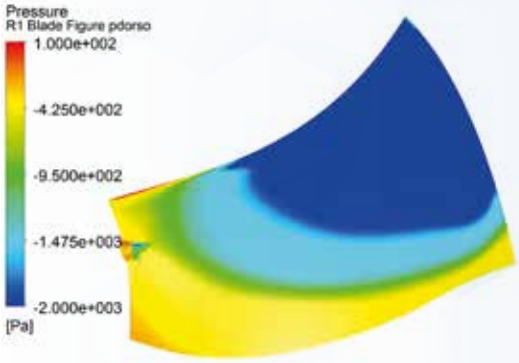
- **FEM analysis:** structural analysis of a single blade and of a complete fan through meshes and simulations in order to determine and prevent possible deformations and criticalities



The phases of Q-blade project: From the industrial idea to the prototypes

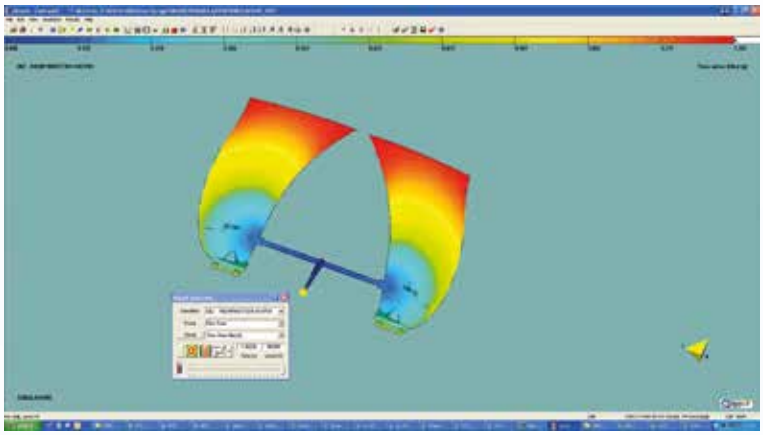
- **Material analysis**: mechanical, thermal, flammability and other properties
- **Performance simulations and analysis of pressures:**





- **Prototyping and performance testing at our AMCA 210-07 wind tunnel**

- **Design, filling simulations and actual construction of the mold tools**



- **Mass Production**

Performance analysis

Intro:

The launch of Q family has represented the attempt to widen HW Ventilation product portfolio, through a new blade able to guarantee improved performances in terms of airflow and pressures, compared to the classic airfoil profile D blade.
Another important driver of the project is the reduction of noise.
The study of the new blade has been impacted by the applications for which the new blade has mainly been conceived, that is radiators and heat exchangers.

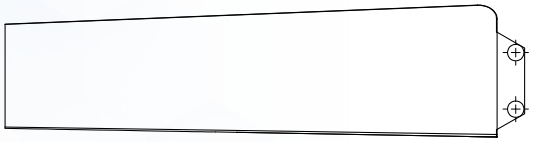


Figure 1: airfoil profile D blade (tapered)

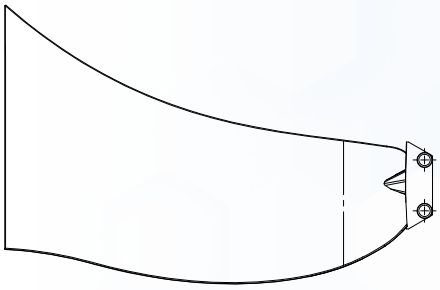
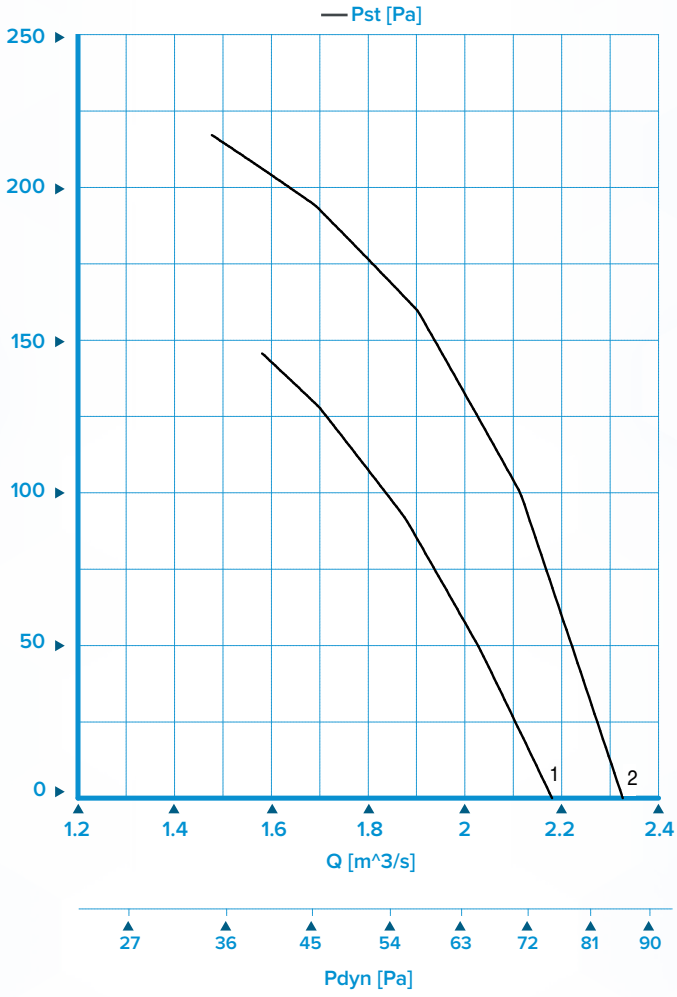


Figure 2: sickle profile Q blade (wider tip)

Improved air flow / pressures:



1. 8-8 , 35° , D-PAG , Ø = 500 mm , rpm = 1500
2. 8-8 , 35° , Q-PAG , Ø = 500 mm , rpm = 1500

Performance analysis

▶ **Comparison between the performances of two fans with the same characteristics:**

- Same configuration: 8-8
- Same setting angle: 35°
- Same diameter: 500 mm
- Same rpm: 1500

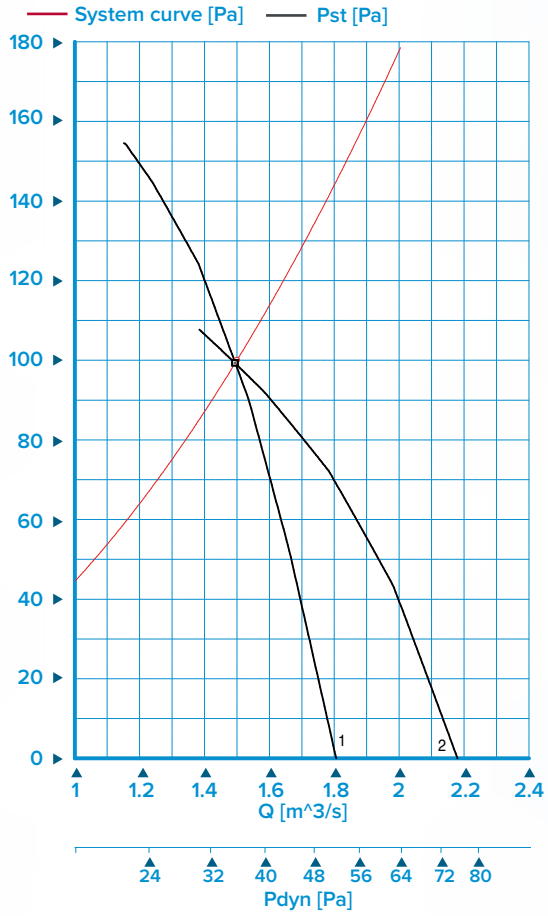
Fan 1. employs classic fixed pitch D blades, while fan 2. employs the new sickle-profile fixed pitch Q blades. The new Q-bladed fan shows better performances in terms of airflow and pressure, and offers good levels of efficiency. At any given value of the airflow, pressures originated by the Q-bladed fan are much higher (+40/50%). As a consequence, the stall region is delayed.

▶ **Lower noise emissions:**

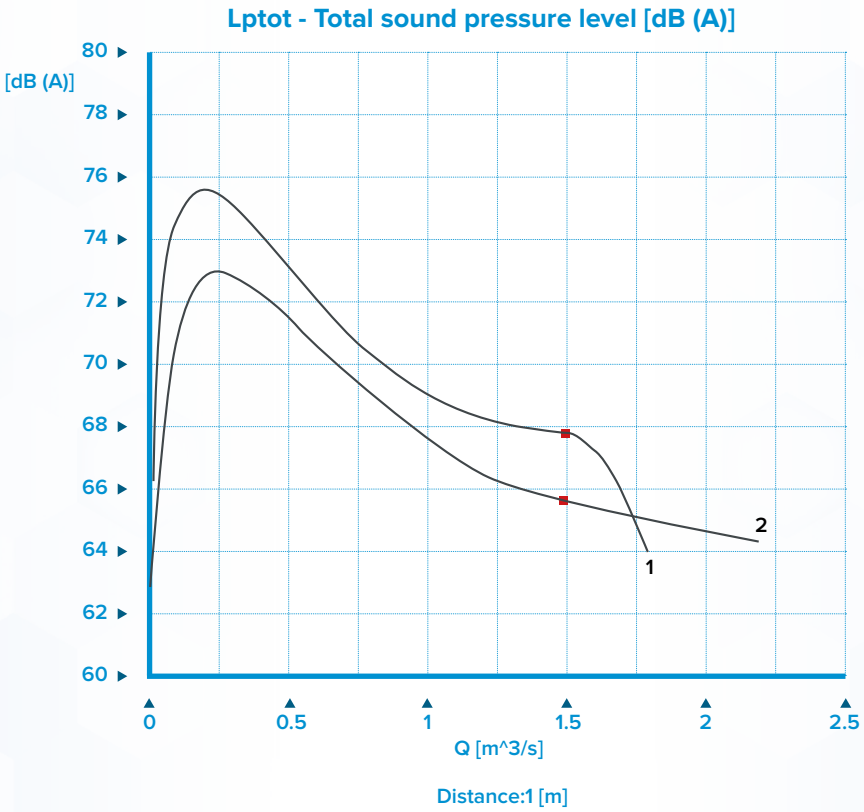
Comparison between the performances of two fans at the following working point: Q = 1.5 m3/s, and Pst = 100 Pa.

	1	2
	8-8 , 30° , D-PAG , Ø = 500 mm , rpm = 1500	6-3 , 35° , Q-PAG , Ø = 500 mm , rpm = 1500
Airflow [m^3/s]	1.492	1.492
P_{st} [Pa]	99.97	99.43
P_{dyn} [Pa]	35.37	35.37
Lpt [dB(A)]	67.75	65.69

Fan 2, employing Q blades, has a lower noise emission: -3%.



Performance analysis



The noise measurement at 1 meter from the two fans reveal that the new Q-bladed fan has better noise emissions: more than 2 dB[A] less than the D-bladed fan.

more on
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HW VENTILATION S.r.l.
Viale dei Kennedy 81/83
20027 Rescaldina (MI) – ITALY

Phone +39 0331 1558 815
Fax +39 0331 1225 767
email info@hwventilation.it