User manual

Qualyfan selection software

HW Ventilation s.r.l.

User manual

1 Summary

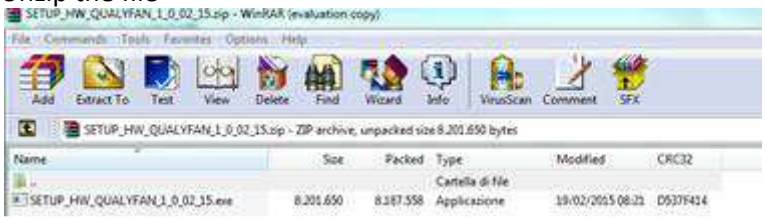
2 System requirements

- Hardware architectures supported by Qualyfan:
  - x86
  - x64 (WOW)
- Supported operating systems:
  - Windows Vista (x86 and x64) Service Pack 2, every version except Starter Edition
  - Windows 7 (x86 and x64)
  - Windows 8 (x86 and x64)
  - Windows Server 2008 (x86 and x64) Service Pack 2, every version
  - Windows Server 2008 R2 (x64), every version
- Hardware requisites:
  - 1,6 or more GHz processor
  - 1024 MB RAM (1,5 GB in case of virtual machine)
  - 100 MB free hard drive space
  - 5400 rpm hard drive speed
  - DirectX 9 video card, with 1024 x 768 or superior monitor resolution

3 Qualyfan installation instructions

In order to install the program:

1. Download the installation .zip file and save it on your computer.
2. Unzip the file



3. Click on the .exe file
4. Follow the instructions and install the program on your computer

If the installation is successful, you should be able to see these icons on your desktop:

Click on the Uninstall icon if you want to properly uninstall Qualyfan from your computer.

4 Start Qualyfan

4.1 Language selection

Figure 1 Qualyfan welcome menu

When the program starts you can choose your preferred language between English or Russian, by clicking the relevant flag button.

If you click on the ErP 2015 Ready logo, you will be redirected to a page dedicated to the ErP Directive on HW Ventilation official website. Qualyfan has been created for you as a tool to select the best fan for your application and verify its compliance to the Energy-related-Products directive 2015.

5 Qualyfan selection screen features

Once the user has chosen their preferred language, the selection screens opens up.

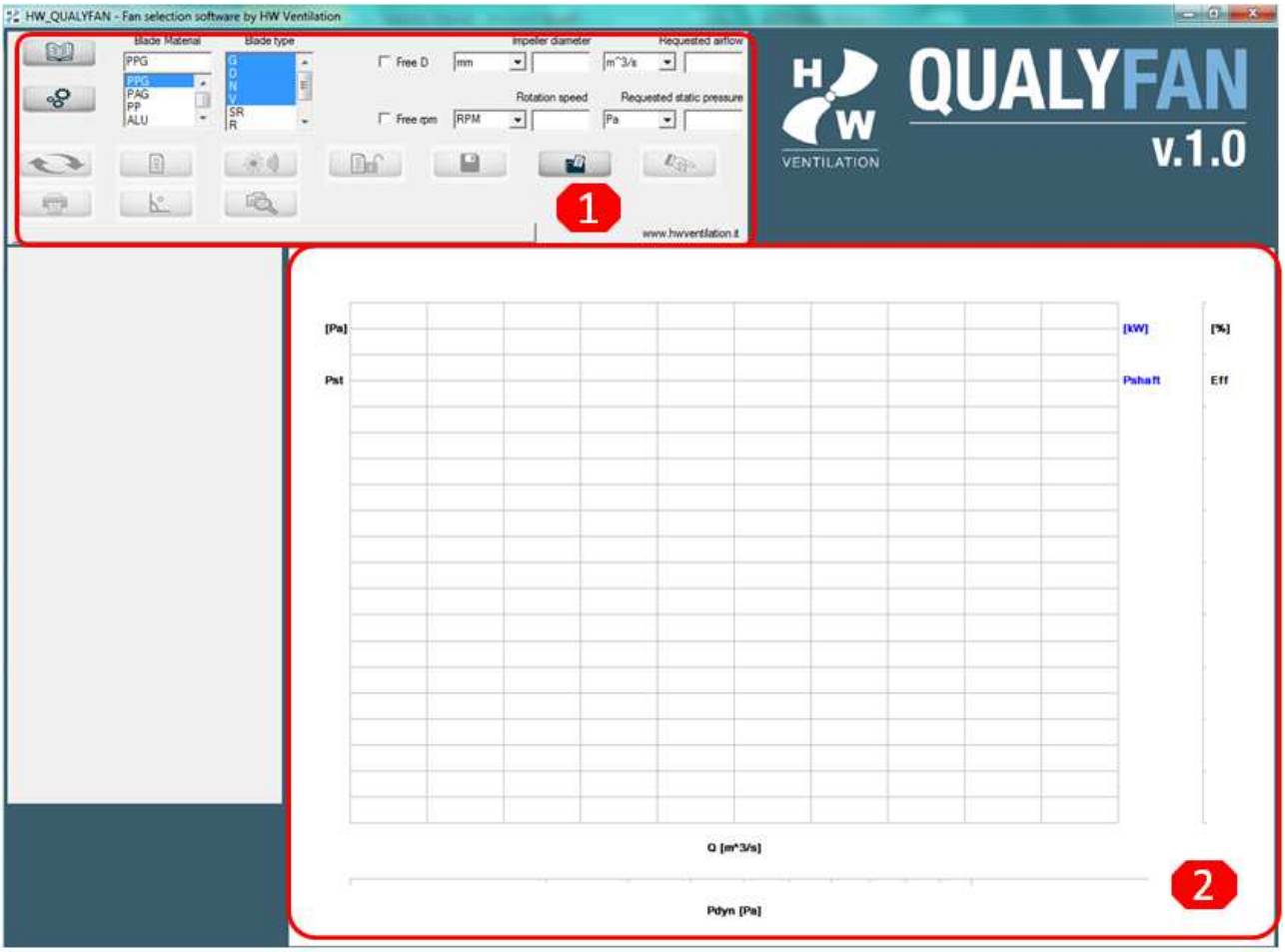


Figure 2 Qualyfan selection screen layout

Two main sections are displayed:

1. Fan selection dashboard
2. Graphs area

5.1 Selection options

Figure 3 Selection options button

To change the selection default settings, click the Select options button at the top left corner of the fan selection page.

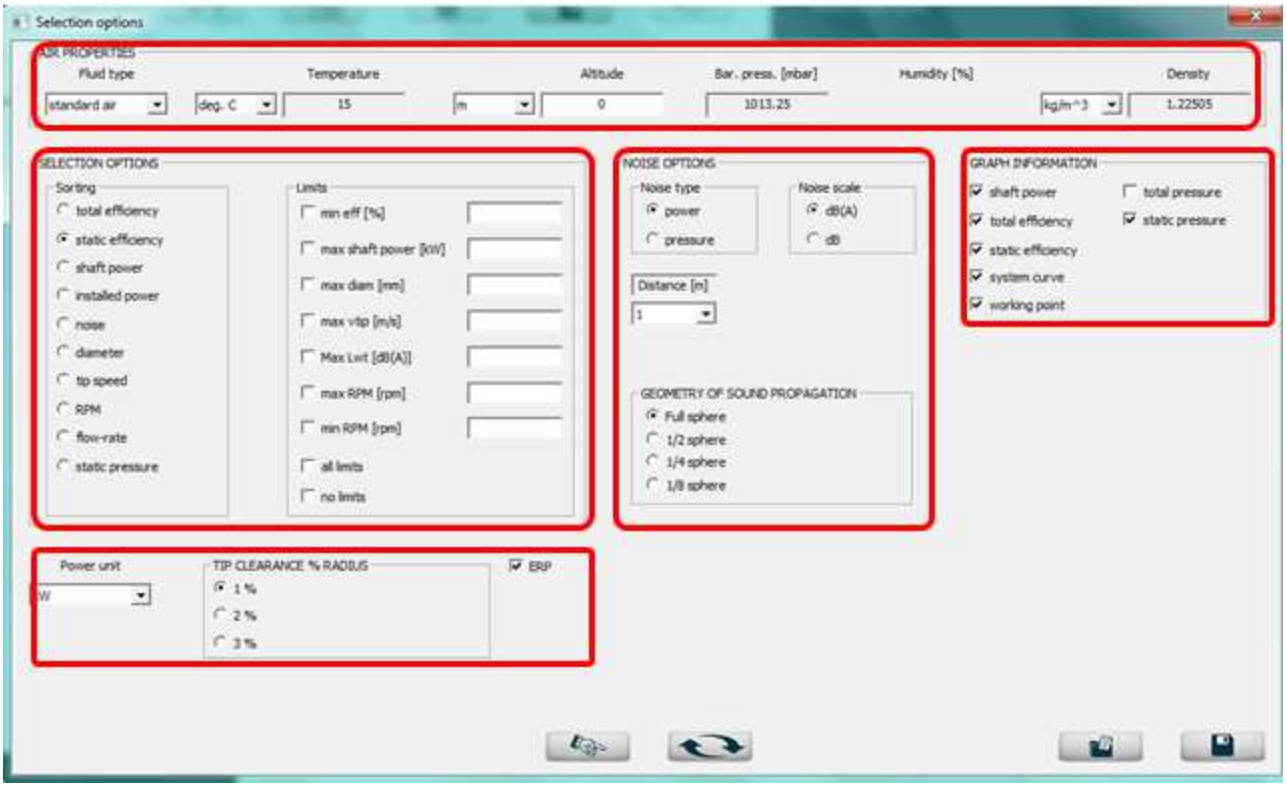


Figure 4 Selection options pop-up screen

5.1.1 Air properties

Figure 5 Air properties menu

- Fluid type – set as “standard air” by default:
  Possible options:
  - Standard air (15°C at 0 m above sea level) – based on the altitude, the SW automatically calculates temperature, pressure, density
  - Other – the user can choose temperature, pressure, humidity; the SW automatically calculates the barometric pressure (which can be modified manually)

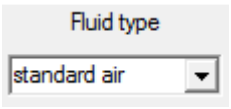


Figure 6 Fluid type setting menu

- Temperature
  - [degr. C]: <-50° ; +180°>
  - [degr. F]

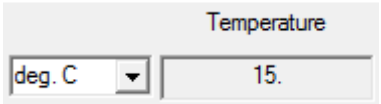


Figure 7 Temperature menu

- Altitude
  - [m]: <-2000 ; +11.000>
  - [ft]

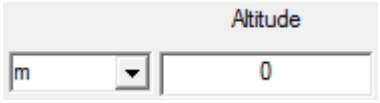


Figure 8 Altitude menu

- Barometric pressure [mbar] – auto

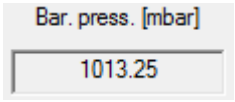


Figure 9 Barometric pressure menu

- Humidity [%] – option available only if working with “other” fluid type

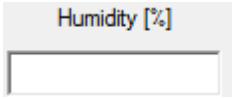


Figure 10 Humidity menu

- Fluid density – auto
  - [kg/m^3]
  - [lb/ft^3]

Figure 11 Fluid density menu

5.1.2 Selection options

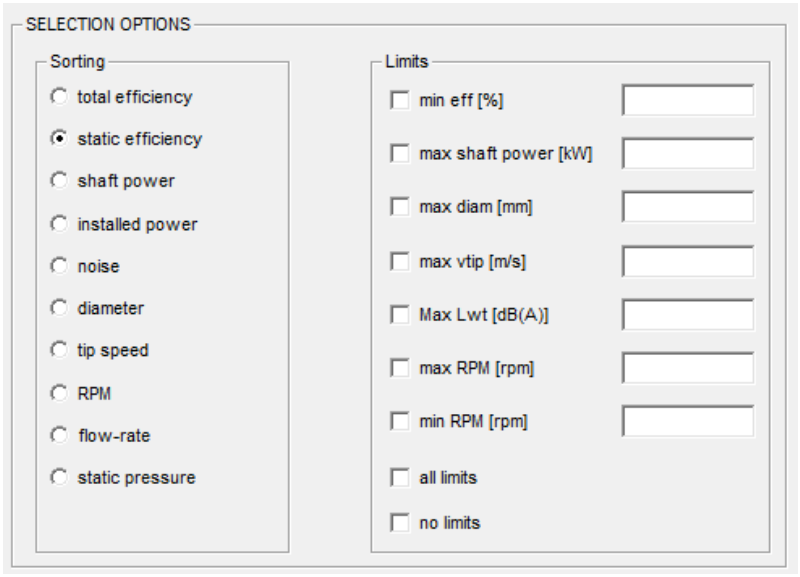


Figure 12 Selection options - sorting and limits setting

- Sorting – the user can choose the criteria based on which the impellers are sorted and displayed on the selection screen
- Limits – the user can set limit values for specific performance characteristics of the fans

5.1.3 Noise options

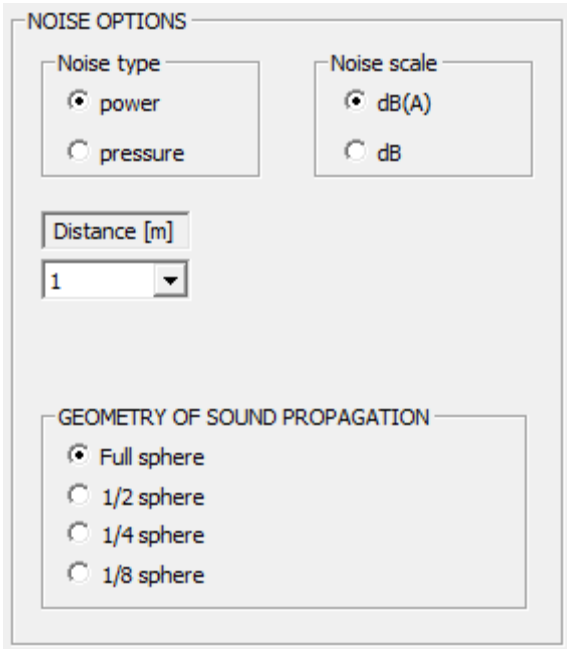


Figure 13 Noise options settings menu

- Noise type
  - Noise power
  - Noise pressure
- Noise scale
  - dB(A)
  - dB
- Distance [m] – the user can set at what distance from the selected fan the noise is calculated
- Geometry of sound propagation

5.1.4 Graph information

The user is free to flag the information they wish to display in the selection graph.

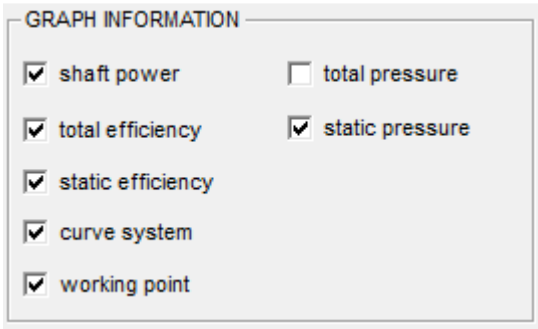


Figure 14 Graph info menu

5.1.5 Other options

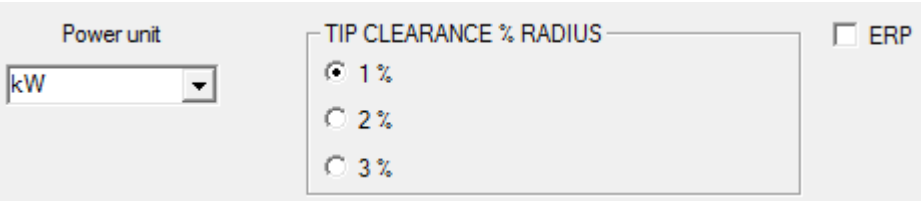


Figure 15 Other options menu

- Power unit
  - [kW]
  - [W]
  - [HP]
  - [BTU/h]

- Tip clearance % radius – radial distance between the tip of the blade and the casing, represented in terms of % of the impeller's radius:
  - 1%
  - 2%
  - 3%

- ErP – the user can verify compliance of the fan with the European Directive for energy related products

5.2 Selection – impellers search

Figure 16 Selection dashboard

The selection dashboard is divided into the following fields:

- Blade material – the user must first select the required blade material, choosing among the following options:
  - PP – Polypropylene, yellow
  - PPG – Glass reinforced (30% glass) polypropylene, orange
  - PAG – Glass reinforced polyamide (PA6), white
  - PAS – Glass reinforced polyamide (PA6), black
  - ALU – Aluminum

- RYT – Ryton, brown
- PAA – Antistatic polyamide (ATEX), black
- PAX – Antistatic, self-extinguishing polyamide (ATEX), black
- PAM- Antistatic, self-extinguishing, magnetically shielded polyamide (ATEX), black

- Blade type – once you select the material, an array of possible blades are available to be selected:
  - G – fixed pitch airfoil profile
  - D – fixed pitch airfoil profile
  - N – variable pitch airfoil profile
  - V – variable pitch airfoil profile
  - R – reversible profile
  - SR – variable pitch sickle-right profile
  - C – variable pitch sickle profile
  - Q – fixed pitch sickle profile

Material	Description	Color	Applications	Op. temperature
PP	Polypropylene (PP)	Yellow	TS	From -10°C to +80°C
PPG	Glass Reinforced Polypropylene (PP 30% glass)	Orange	SR, TM, TS, Q, C	From -20°C to +85°C
PAG	Glass Reinforced Polyamide (PA6)	White	SR, TM, TS, Q, C	From -40°C to +120°C
PAS	Glass Reinforced Polyamide (PA6)	Black	SR	From -40°C to +120°C
ALU	Aluminum		R, C-ALU	From -80°C to +250°C
RYT	Ryton	Brown	TM, TS, Q, C	From -50°C to +200°C
PAA	Antistatic Polyamide	Black	TM, TS, Q, C	From -40°C to +120°C
PAX	Antistatic, Self extinguishing PA	Black	TM, TS, Q, C	From -40°C to +120°C
PAM	Antistatic, Self extinguishing, Magnetically shielded PA	Black	TM, TS, Q, C	From -40°C to +120°C

Table 1 Available materials and blades

- Impeller diameter:
  - Tick “Free D” box for automatic selection
  - Fill in the blank for manual selection
- Rotation speed (rpm)
  - Tick “Free rpm” box for automatic selection
  - Fill in the blank for manual selection
- Requested airflow
- Requested static pressure

5.2.1 Automatic selection

Once the user ticks the chosen material and the blade/s, and enters the requested airflow and the requested static pressure in the dedicated blanks, the software will automatically show the list of impellers which meet the requirements. The user is free to decide whether to enter the impeller diameter and/or the rpm, or they can tick the free diameter and/or free rpm boxes.

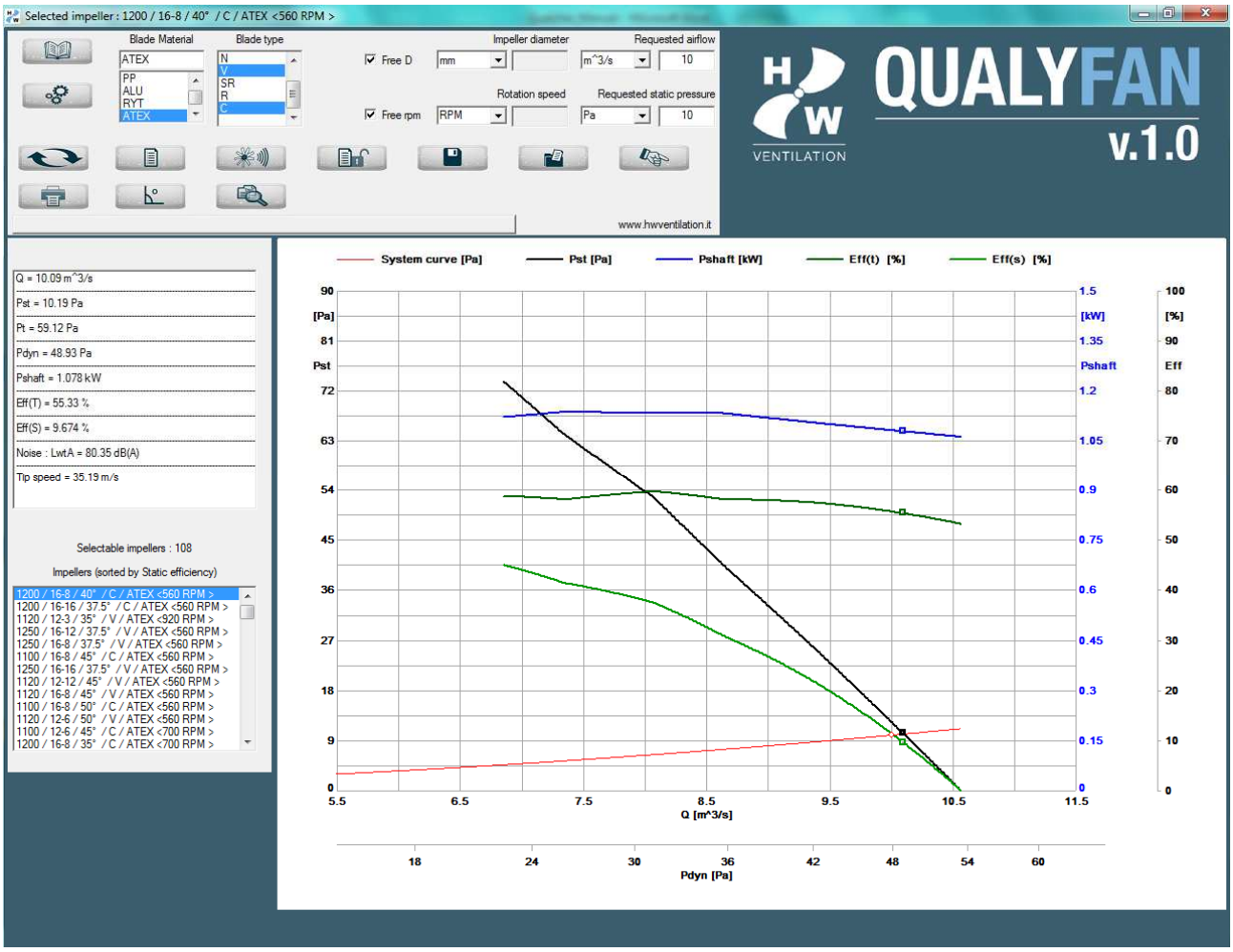


Figure 17 An example of automatic selection

5.2.2 Manual selection

When airflow and static pressure are unknown, the user can manually enter the diameter and the rpm, and leave the requested airflow and static pressure sections blank. The software will plot the performance graphs of the entire family (full range of angles) of the selected impeller.

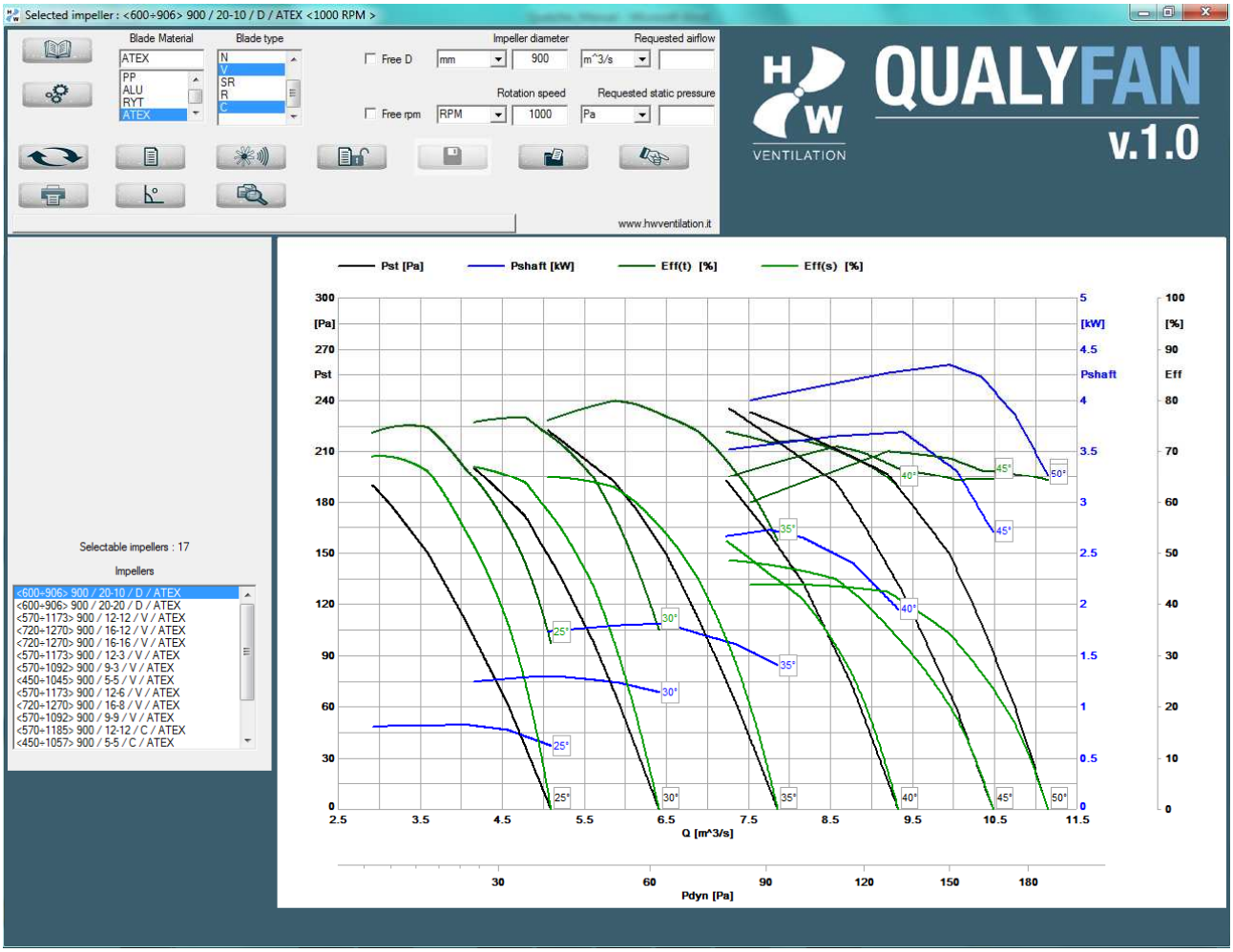


Figure 18 Manual selection example

5.3 Other tools

Figure 19 Selection screen – other tools

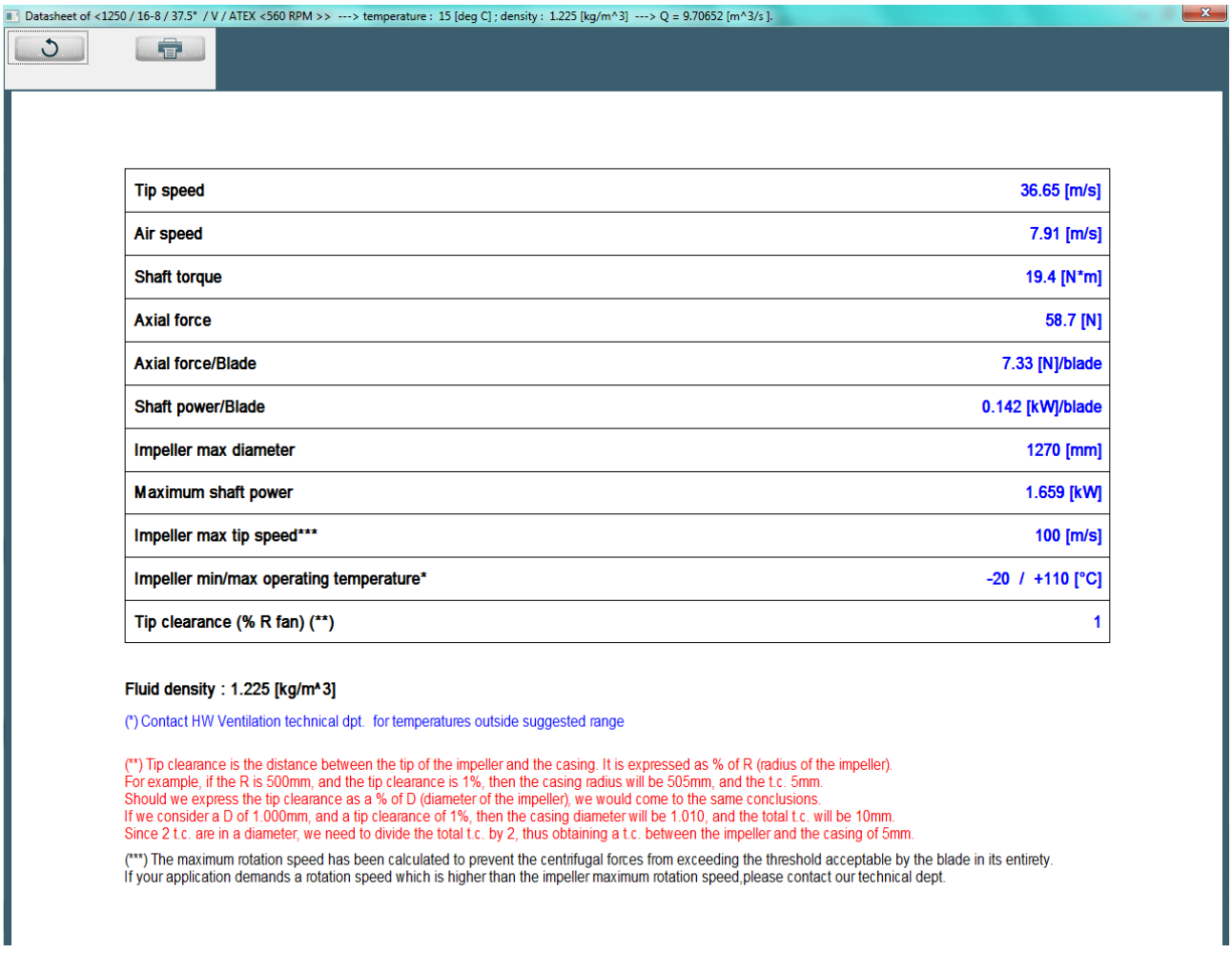
5.3.1 Refresh button

Figure 20 Refresh button

5.3.2 Datasheet button

Figure 21 Datasheet button

Clicking on the datasheet button, the user will be able to generate a screen in which the main characteristics of the selected impeller are summarized: tip speed, air speed, shaft torque, etc.



Tip speed	36.65 [m/s]
Air speed	7.91 [m/s]
Shaft torque	19.4 [N*m]
Axial force	58.7 [N]
Axial force/Blade	7.33 [N]/blade
Shaft power/Blade	0.142 [kW]/blade
Impeller max diameter	1270 [mm]
Maximum shaft power	1.659 [kW]
Impeller max tip speed***	100 [m/s]
Impeller min/max operating temperature*	-20 / +110 [°C]
Tip clearance (% R fan) (**)	1

Fluid density : 1.225 [kg/m^3]

(*) Contact HW Ventilation technical dpt. for temperatures outside suggested range

(**) Tip clearance is the distance between the tip of the impeller and the casing. It is expressed as % of R (radius of the impeller).
For example, if the R is 500mm, and the tip clearance is 1%, then the casing radius will be 505mm, and the t.c. 5mm.
Should we express the tip clearance as a % of D (diameter of the impeller), we would come to the same conclusions.
If we consider a D of 1.000mm, and a tip clearance of 1%, then the casing diameter will be 1.010, and the total t.c. will be 10mm.
Since 2 t.c. are in a diameter, we need to divide the total t.c. by 2, thus obtaining a t.c. between the impeller and the casing of 5mm.

(***) The maximum rotation speed has been calculated to prevent the centrifugal forces from exceeding the threshold acceptable by the blade in its entirety.
If your application demands a rotation speed which is higher than the impeller maximum rotation speed,please contact our technical dept.

Figure 22 Impeller datasheet

5.3.3 Noise button

Figure 23 Noise button

Clicking the noise button, the program will show the graphs of the sound power and the sound pressure. The distance (meters) from the impeller at which the noise is calculated, can be manually changed by the user. The graphs can be represented as spectrum or curve.

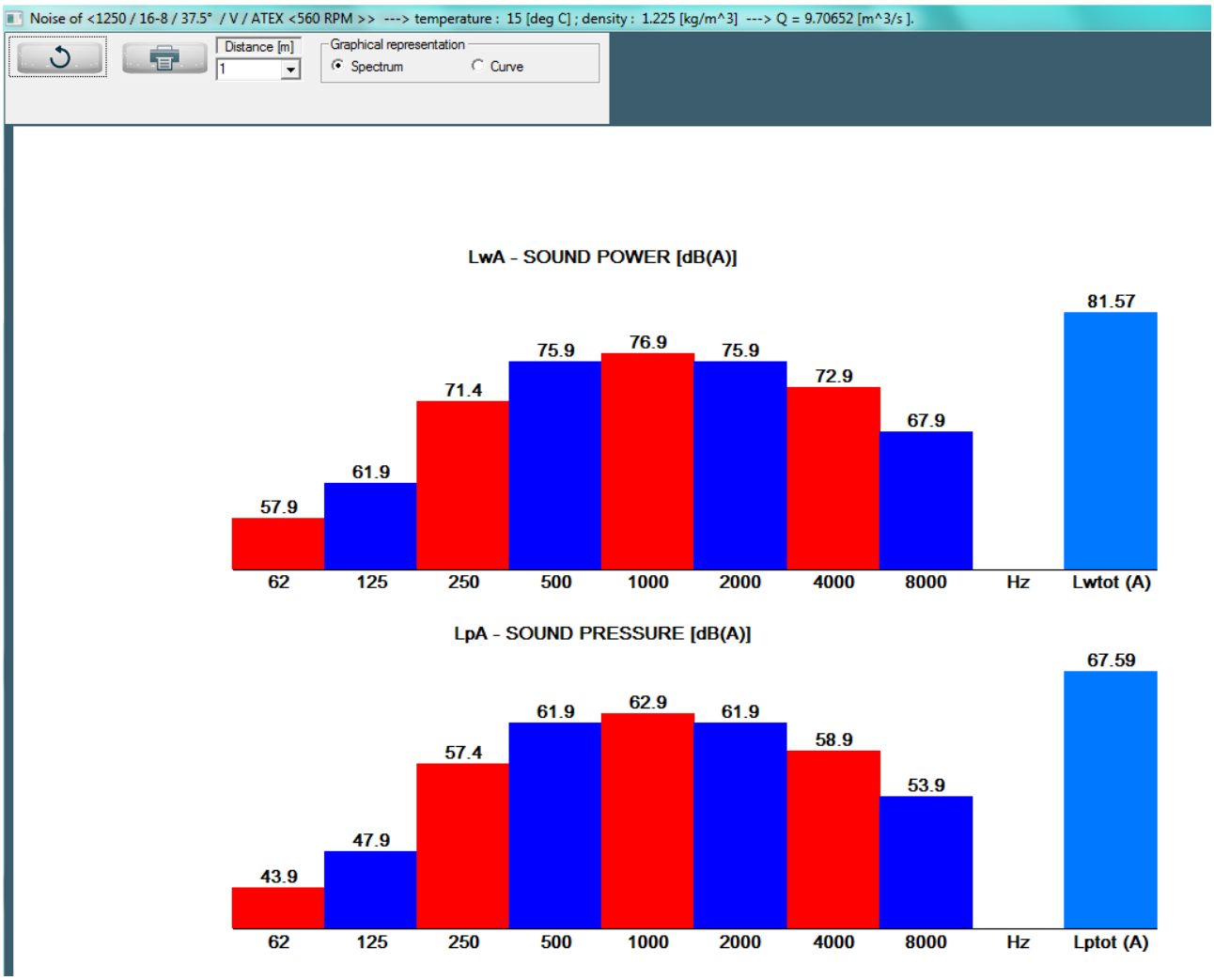


Figure 24 Noise graphs

5.3.4 Performance points button

Figure 25 Performance points button

Through this tool, the performance data can be saved and made available for KULI software.

5.3.5 Save selection button

Figure 26 Save selection button

This tool allows the user to save the current selection on the user's computer.

5.3.6 Open selection button

Figure 27 Open selection button

Clicking on this button, the user can open a saved selection.

5.3.7 Angle button

Figure 28 Angle button

By clicking the angle button, the user can compare the performance parameters of a given impeller set at different pitch angles.

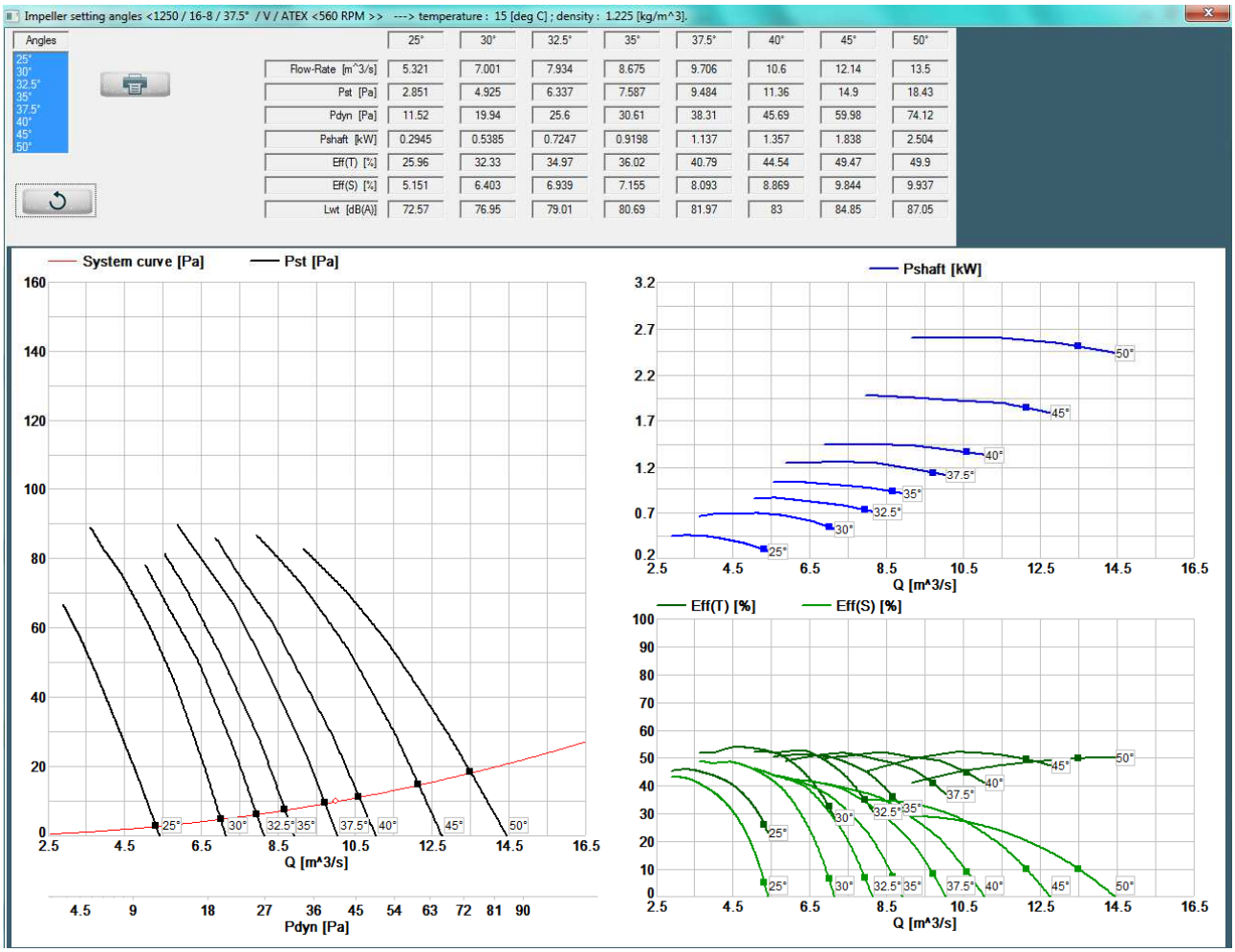


Figure 29 Performance of an impeller at different setting angles

5.3.8 Print button

Figure 30 Print button

Clicking the print button, the following screen will pop-up:

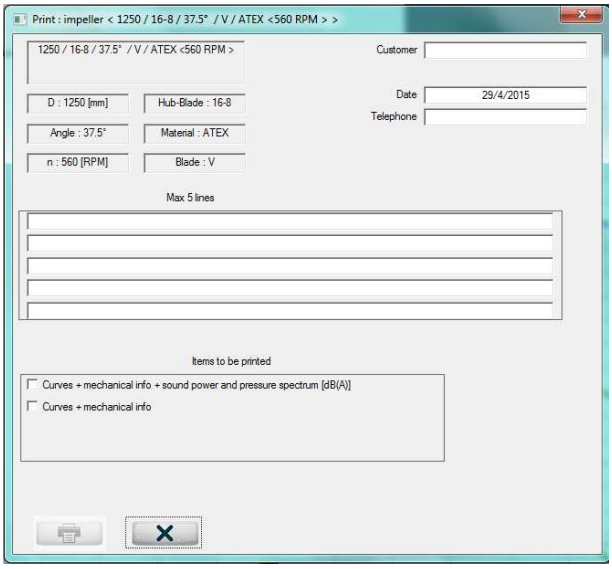


Figure 31 Print pop-up

The user can fill in the blanks with the information they want to be shown on the printed pages:

- Customer name, date, telephone
- Comments (5 lines)

The user has to decide the items they want to print, by ticking the relevant box:

- Curves + mechanical info + sound power and pressure spectrum,
- Curves + mechanical info

The document can be printed (on paper, as a pdf,…) by clicking the printer icon at the bottom left corner of the screen.

5.3.9 Compare impellers

Figure 32 Compare impellers button

This feature can be used to compare the performance of a selected impeller

- To the performance of other selectable impellers (up to 7 other impellers)
- To the performance of the same impeller, working at different tip clearance
- To the performance of the same impeller, working at a different temperature
- To the performance of the same impeller, working at a different rpm
- To the performance of the same impeller, working at a different diameter

and to have them plotted on the same graph.

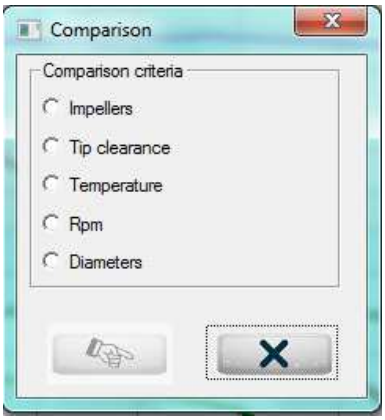


Figure 33 Comparison criteria pop-up

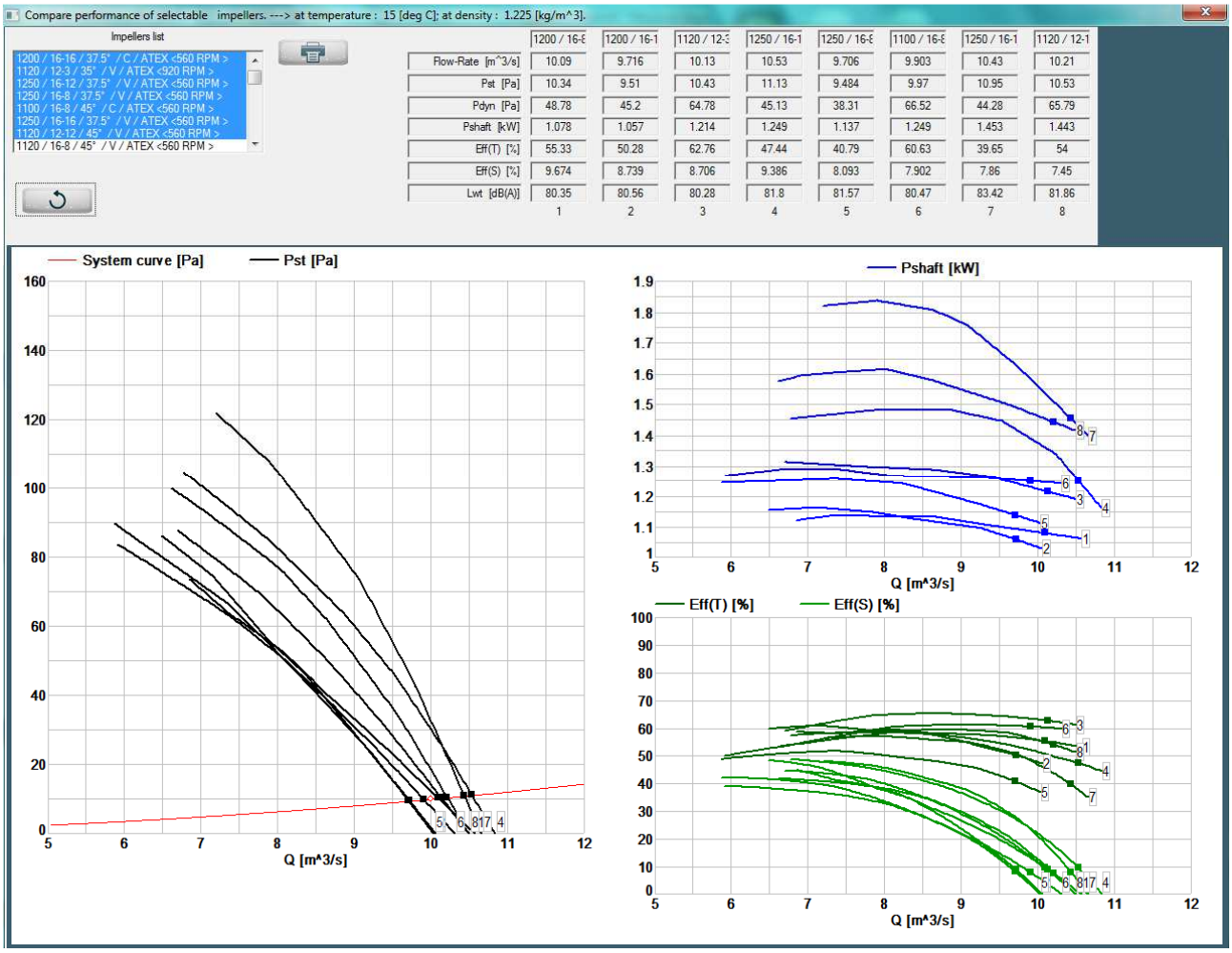


Figure 34 Performance comparison example

5.3.10 Select button

Figure 35 Select button

Once all the selection data are filled in the dedicated blanks, the user has to click on the select button to start the selection. In case of mistakes/omissions, the select button will appear blurry, and will be inactive.

If the selection is successful, the user will be able to visualize:

- Performance data at chosen working point
- List of selectable impellers

on the left hand side of the main screen.
The characteristic curves of the selected impeller will be plotted at the center-right portion of the screen.

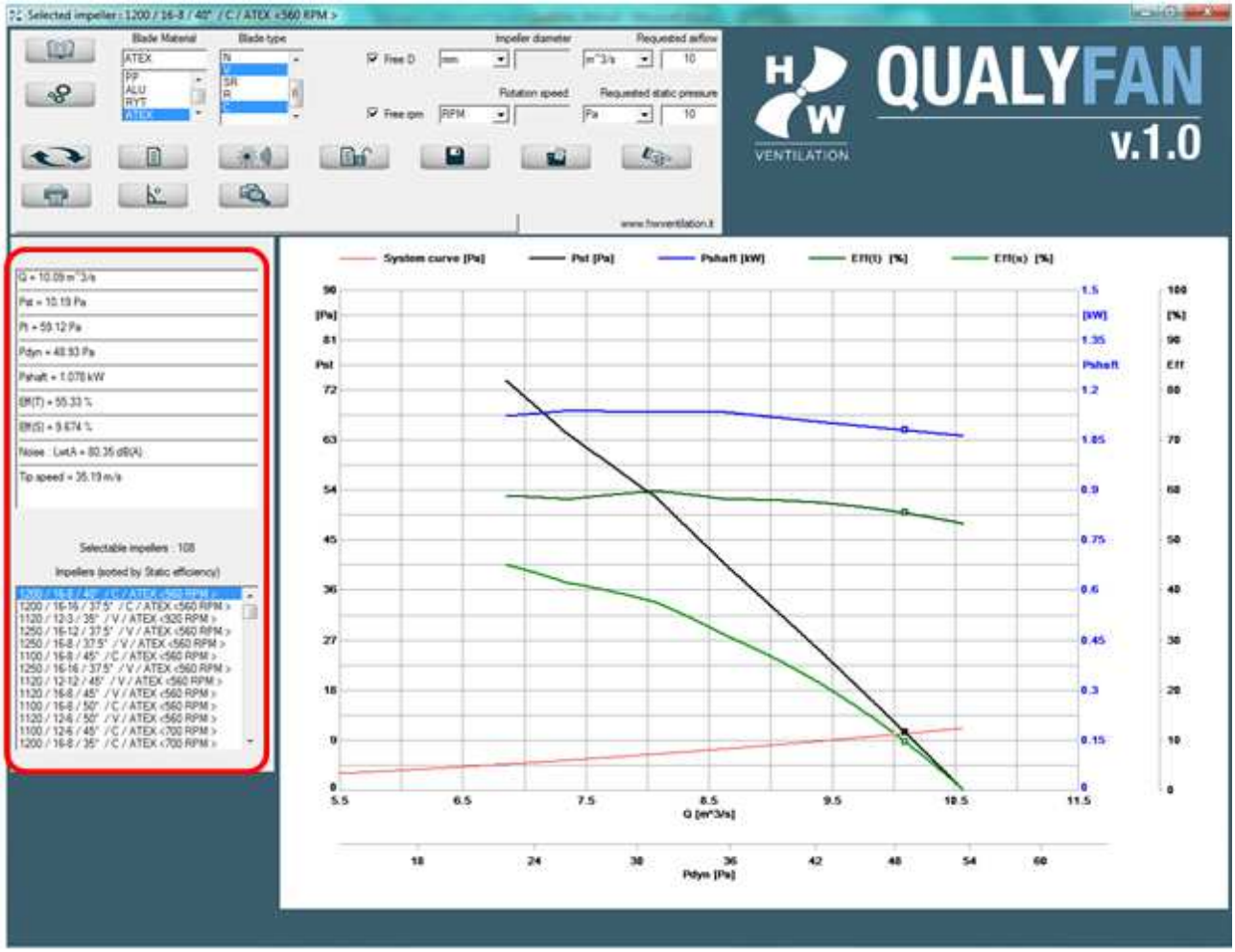


Figure 36 Working point and selectable impellers

5.4 Impellers coding system

The impeller name is composed as follows:

1200 / 16-8 / 40° / C / ATEX <560 RPM>

Diameter / number of hub cavities–number of blades / op. temperature / blade type / material <rpm>

6 ErP

In order to verify whether your application is compliant with the requirements of ErP Directive 2015, the user must first tick the ErP button in the Selection options.

A ErP 2015 icon will appear in the selection screen beside the compare impellers button.

Figure 37 ErP button

Click on the icon and follow the instructions that will guide you through the verification process.
If your application is compliant, a screen like the following will pop-up:

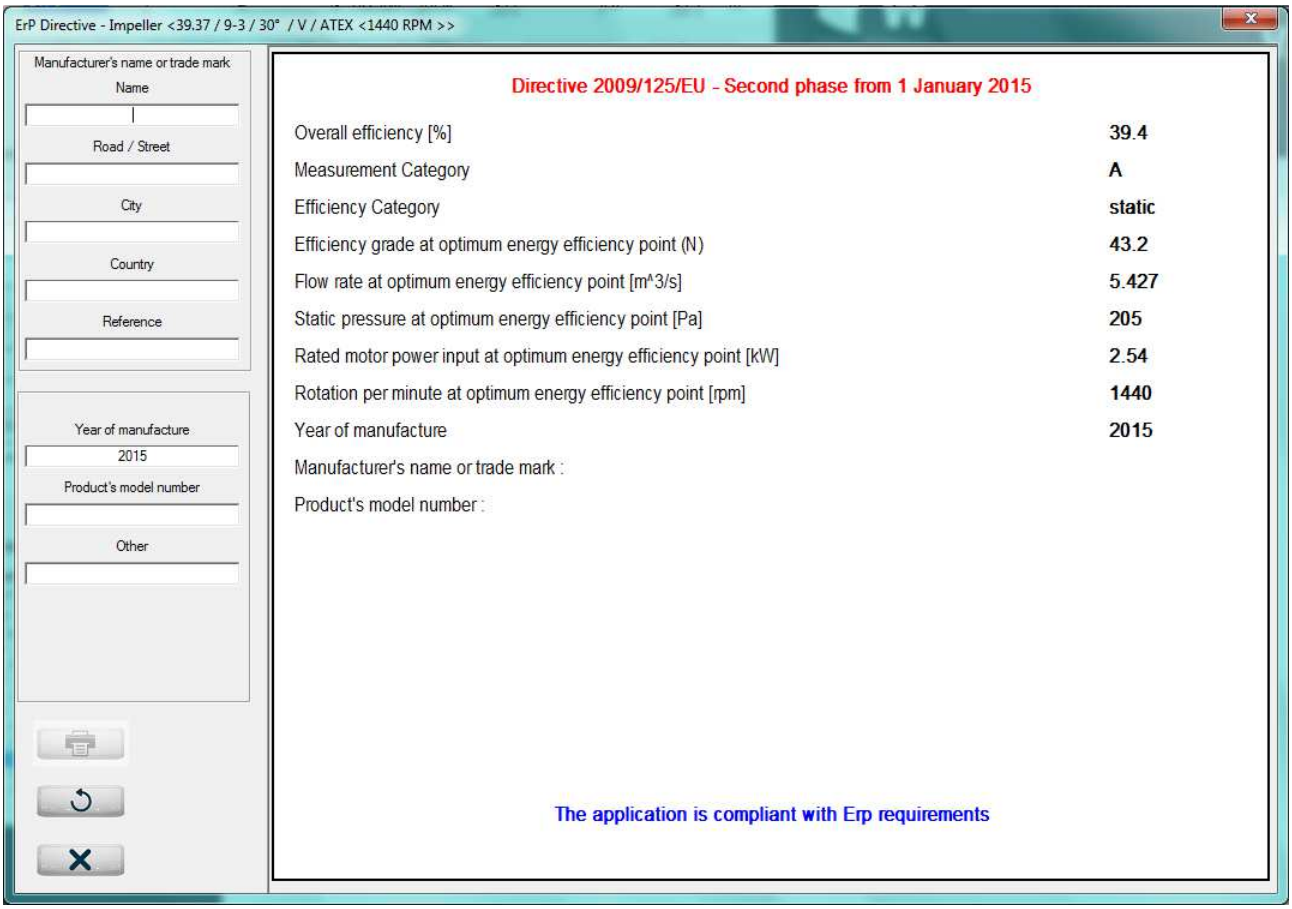


Figure 38 ErP Certificate