BLOWTECH
we make air move

Double Inlet Centrifugal Fans
(Forward Curved)

FPD Series
(Square Outlet Metric Size)

www.blowtech.in

Blowtech Air Devices Pvt. Ltd. was founded in 1988 and quickly established itself as a leading manufacturer and exporter of HVAC fans and ventilation products in India. The company has excelled in the design, development and manufacture of the following high quality product line for a wide range of HVAC&R applications:

- Centrifugal and Axial Flow Fans
- Inline Duct Fans
- Cabinet Fans
- Commercial Kitchen Ventilation Fans
- Fan Filter Units
- Evaporative Coolers & Scrubbers
- Energy Recovery Ventilators (ERVs)
- Impellers, Housings & Propellers

Blowtech's Fan Test Lab as per AMCA210

The company's 40,000 sq. ft., state of the art manufacturing facility near New Delhi (India) incorporates the most modern equipment & machines, a skilled workforce & over thirty years of rich experience. The production process is supported by a complete in house design and development facility and a full fledged tool room. All tools, jigs, fixtures and special purpose machines (SPMs) are designed and developed in house. All fan components are manufactured exclusively with the aid of precision tools and dies. This ensures inbuilt quality and consistency in fan performance fan after fan, year after year.

Blowtech passed ISO-9001 QMS certification in 2003 and is a member of the Air Movement and Control Association International (AMCA). Consistent with its objectives of designing for optimum quality and performance, the company has its own Fan Test Laboratory which houses a Multiple Nozzle Test Chamber in accordance with AMCA Standard 210.The line of products including centrifugal fans, tube axial fans, kitchen exhaust fans, cabinet fans, direct driven fans, fan blades and impellers are tested in this in-house laboratory for performance evaluation and design validation.

Blowtech's 40,000 Sq. Ft. state of the art manufacturing plant near New Delhi (India)

To ensure long life and vibration-free operation, each impeller is first checked for eccentricity and run-out. Only after passing this quality check, the impeller is ready for balancing on computerized dynamic balancing machines. Balancing is done as per balance quality grade G 4.0 of the International Standard ISO 1940.

On the basis of advanced management ideas and perfect quality systems, Blowtech constantly strives to absorb and adopt latest technologies, precisely control the quality in each of its working processes and actively promote its products to keep it at the leading position in the HVAC&R industry in India. Our stakeholders' and affiliate relationship networks ensure that we remain at the forefront of industry knowledge and future technology trends. Our skills, infrastructure and experience are trusted by our customers to optimize performance, minimize costs and increase efficiencies of their products. Our people ensure the success of our company, bringing the best in commercial understanding, technical capabilities and market know-how to bear on our customers' business.

FPD Series

Double Inlet Centrifugal Fans with Forward Curved Wheels

(Square Outlet Metric Size)

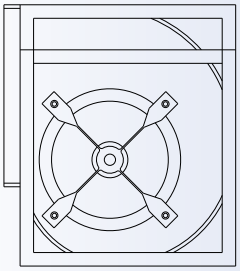
Blowtech Air Devices Pvt. Ltd. certifies that the **FPD Series Fan Models 500 to 1120** shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

FPD Series - Double Inlet Forward Curved Centrifugal Fans

The FPD Series is made of Double Inlet Double Width (DIDW) Centrifugal Fans with Forward Curved Impellers. These fans are suitable for supply and exhaust applications in commercial and industrial heating, ventilation and air-conditioning (HVAC) systems. Typical applications include evaporative cooling units, air handling units, indoor units of packaged air-conditioners, fresh air supply units, exhaust units and general ventilation and pressurization. The superior design of the Blowtech FPD series fans - optimum blade curvature, width and angle, aerodynamically shaped inlets, matching of the inlets to the wheel and optimum design of cut-off - has resulted in them being one of the most efficient fans in their category. The FPD series is an economic choice for low to medium pressure range applications requiring high air volume and quiet operation.

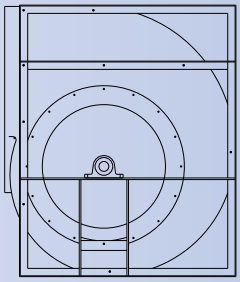
FPD Series fans are available in 9 sizes from wheel diameter of 500mm to l250mm. The sizes are as per AMCA Standards Handbook 99, Section 5, R20. The Air Volume capacity of FPD fans ranges from 7000 m3/h to 150000 m3/h. The performance of sizes 1250 mm is not licensed by AMCA International. Sizes smaller then 500 can be made available on request.

The FPD series is available in type R and K as shown below.



Type R has rectangular side frames made from Galvanized Steel sheets which are bolted to the Fan Housing. This improves rigidity and strength and allows easy mounting of the fan in various orientations. The wheel-shaft assembly is supported in bearings which are mounted to the fan housing using specially designed brackets

Type K has side frames made of welded heavy gauge mild steel sections. The Wheel Shaft assembly is supported in self-aligning bearing pillow blocks which are mounted on the steel side frames.



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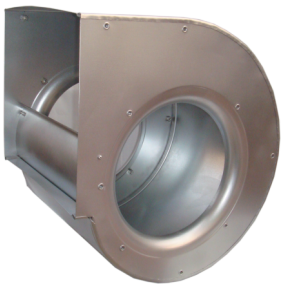
Fan Construction Specifications

Impeller (Wheel)

The BLOWER WHEEL is made from high quality rust resistant galvanized sheet steel and has forward curved blades.

A large forged steel or die cast aluminium hub with a precisely machined bore and a key Way is fitted to the wheel back plate. Use of precision tooling for the punching and assembling of wheel components results in extremely low levels of eccentricity and run out. The Wheel is statically and dynamically balanced on computerised dynamic balancing machines to balance quality grade G 4.0 of ISO 1940 and AMCA 204 standard.

Housing



The FAN HOUSING is also made from high quality rust resistant galvanized sheet steel with the housing Wrapper fixed to the side plates using 'Pittsburg Lock'. This method of locking is superior to spot Welding as it is leak proof and provides better rigidity Side plate profiles are cut on precision machines which results in proper centering of the Impeller - Shaft assembly and precise overall fan dimensions for quiet performance. Aerodynamically shaped inlet venturies form an integral part of the side plates in sizes upto 630 mm. Larger Fans have inlet venturies made from FRP.

Shaft

The FAN SHAFT is manufactured from high quality EN9 carbon steel with keyways at both ends (for pulleys) and at the centre (for wheel hub) and is ground to close tolerance for precision fit.

Bearings

The WHEEL - SHAFT ASSEMBLY is supported at both ends in imported pre-greased permanently sealed ball bearings with an eccentric locking collar. For Fan type R, Each bearing sits inside a moulded rubber housing which in turn is mounted on to the fan housing using a set of 4 specially designed die - formed sheet steel brackets on each side. In Fan Types K, the shaft is supported in self-aligning bearing pillow blocks which are mounted on the steel side frames.

Frames

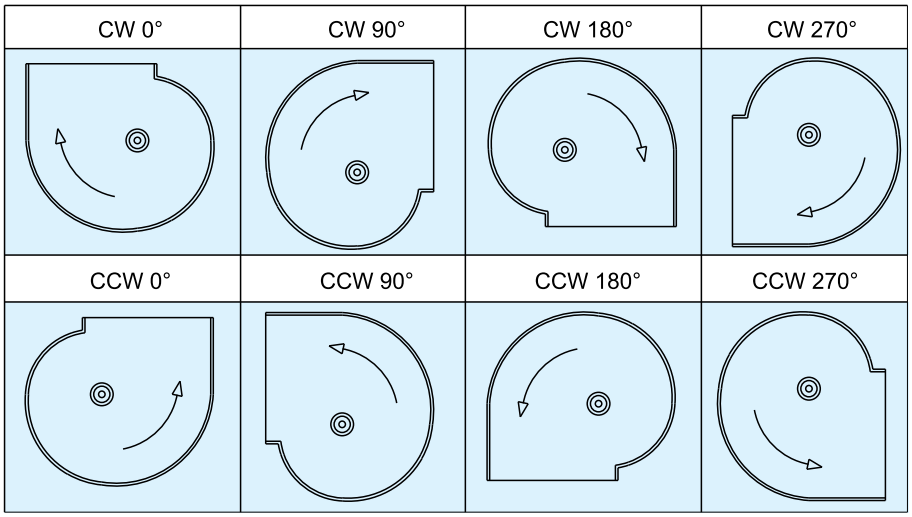
The frame is manufactured in Galvanized Steel sheets in type 'R'.

For Type 'K', side frames are made of welded heavy gauge mild steel sections.

Accessories such as Casing Drain Plug, Outlet Flange, Inspection Door and inlet and discharge guards are optional and can be supplied on request.

Fan Rotation and Orientation

Standard fans are supplied with both shaft ends prepared to fit a pulley. They can be used with either Clockwise (CW) or Counter Clockwise (CCW) rotation. All **FPD** Series fans can be easily turned to install them in any one of the four orientations 0^{o}, 90^{o}, 180^{o} and 270^{o} as shown below. The direction of rotation (CW or CCW) is specified looking at the wheel from the motor end.



Motor Selection

The shaft power (H) lines shown on each performance curve indicates the input power at the fan shaft in kW.

To determine the minimum motor power required to drive the fan, this fan shaft power H has to be multiplied by a safety coefficient which accounts for power losses in belt drives and a reasonable safety margin. The recommended values for the safety coefficient are as under:

Safety Coefficient = 1.20 for $H \leq 3$kW
1.15 for 3kW $< H \leq 10$ kW
1.10 for $H > 10$ kW

The reasonable safety margin mentioned above takes care of any small change in the operating point or fan speed, which may be due to possible minor inaccuracies in calculation of system pressure drop or a pulley ratio slightly different from the design value.

For conversion to horsepower (hp), 1 hp = 0.746 kW.

With motors larger than 7.5 kW (10 hp), the use of a star/delta (Y/Δ) starter is highly recommended.

Fan Pressure under Free Outlet Conditions

The outlet velocity V and velocity pressure Pv shown on each performance curve has been determined under ducted outlet conditions, i.e. with an outlet duct having a cross section area equal to fan outlet area. When operating under "free outlet" conditions (no outlet duct connected), the outlet velocity and the resulting velocity pressure is higher (due to a smaller outlet area produced by the presence of the cut-off baffle). Thus the available static pressure, which is the difference between fan total pressure and fan velocity pressure, will be lower under "free outlet" conditions.

The velocity pressure under free outlet conditions can be reasonably estimated by multiplying the velocity pressure Pv from the performance curves by the following correction factor Kv.

$$Kv = 1.67$$

Fan performance calculated with this correction factor is not licensed by AMCA International.

Interpretation of Fan Sound Power Levels

The sound power levels Lwi(A) shown on the performance charts are at fan inlet for installation type "free inlet ducted outlet" in accordance with AMCA standard 301. The single total A-weighted value has been calculated by summing the measurements over the 8 octave bands using the following A-weighting correction factors:

Octave band mid-frequency (Hz)	63	125	250	500	1000	2000	4000	8000
A-weighting correction (dB)	-26.2	-16.1	-8.6	3.2,	0	+1.2	+1	-1.1.

Since what humans hear are sound pressure levels (and not power levels), an approximate value of the Sound Pressure Level Lpi(A) can be obtained from the power levels Lwi(A) shown on the curves using the following formulae :

a) **In spherical free field :** $Lpi(A) = Lwi(A) - 20 \cdot \log_{10}(d) - 11$

b) **In room conditions :** $Lpi(A) = Lwi(A) - 20 \cdot \log_{10}(d) - 7$

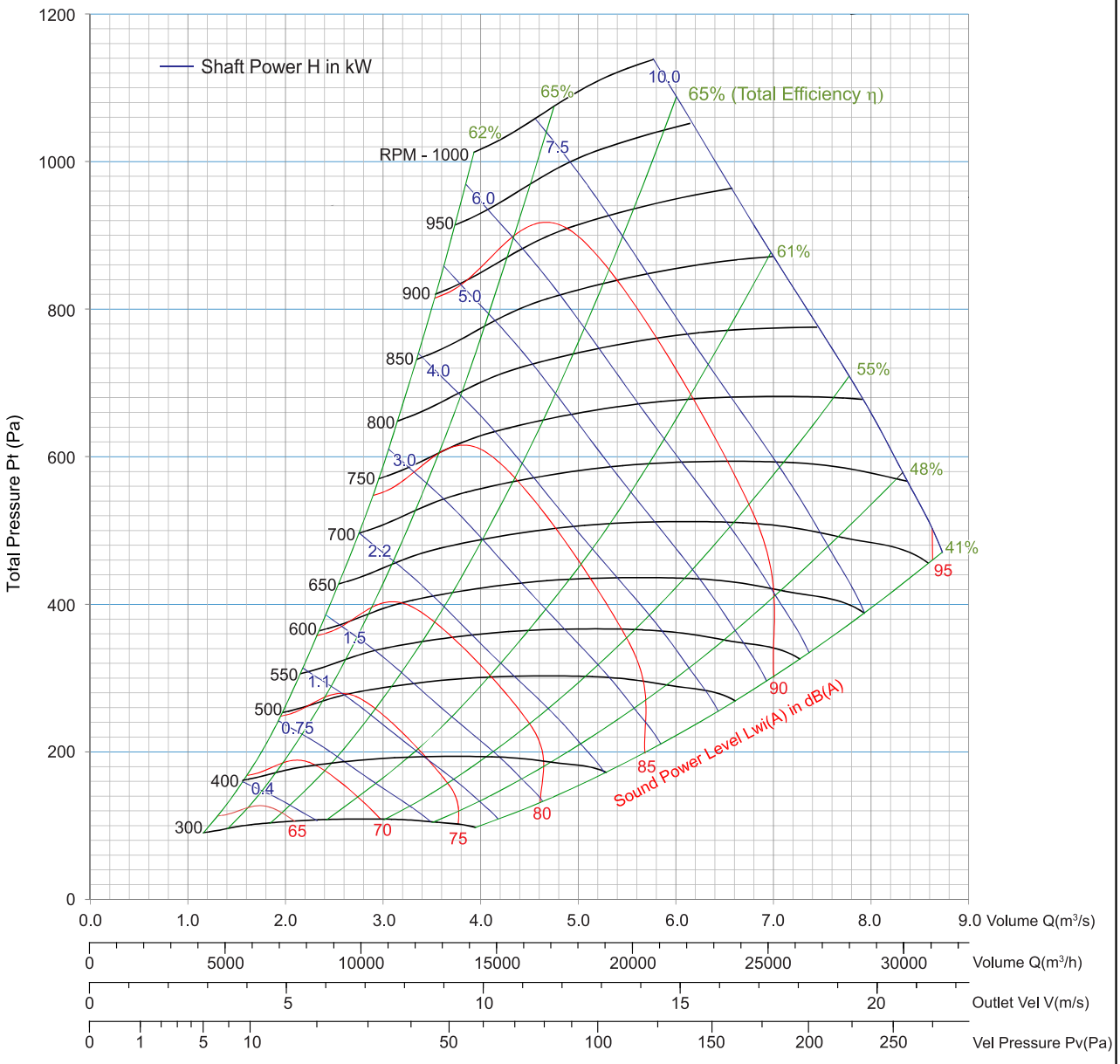
where d = distance between the fan and the microphone in meters.

It should be noted that the sound power level of a fan, as installed in practice, could be significantly higher than that measured in laboratory conditions, due to a host of factors such as vibrations in the drive motor, stiffness of fan installation, air leakage through the connections, or turbulence produced by guards, diffuser grids or transition pieces. Also the above equations to estimate sound pressure levels must be used with extreme caution. The sound pressure level depends not only on the distance 'd' but also on the acoustic properties of the enclosure in which the fan is installed. The above equations are only valid for theoretical acoustic environments. In real life situations, the actual pressure levels may be significantly different.

FPD 500

Density ρ: 1.2kg/m³

FEG 71



- Performance certified is for installation type B - Free Inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for Inlet LwiA sound power levels for installation Type B: free inlet, ducted outlet.

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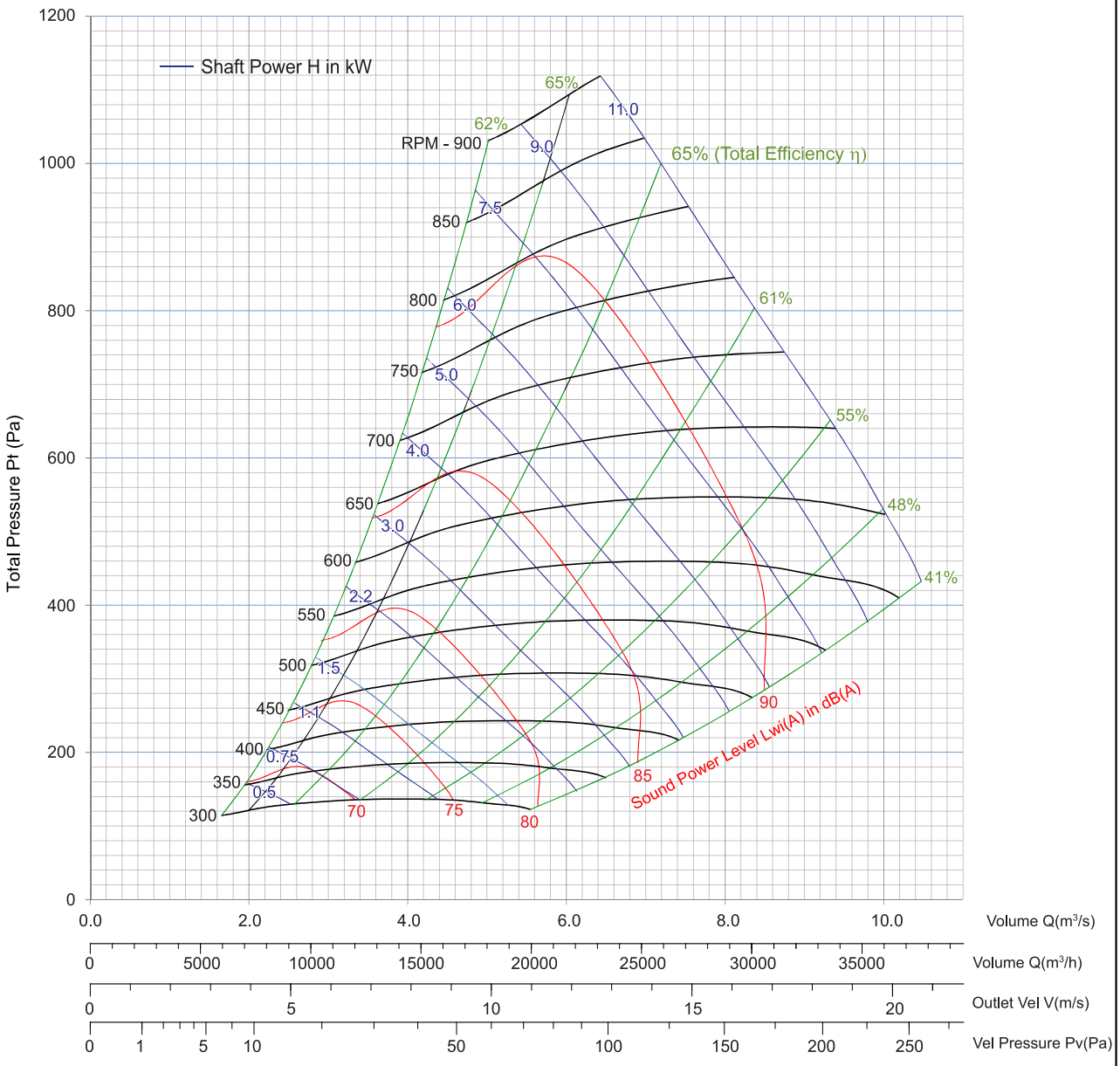
Forward Curved Centrifugal Fan

FPD 560

Density ρ: 1.2kg/m³

FEG 71



- Performance certified is for installation type B - Free Inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for Inlet LwiA sound power levels for installation Type B: free inlet, ducted outlet.

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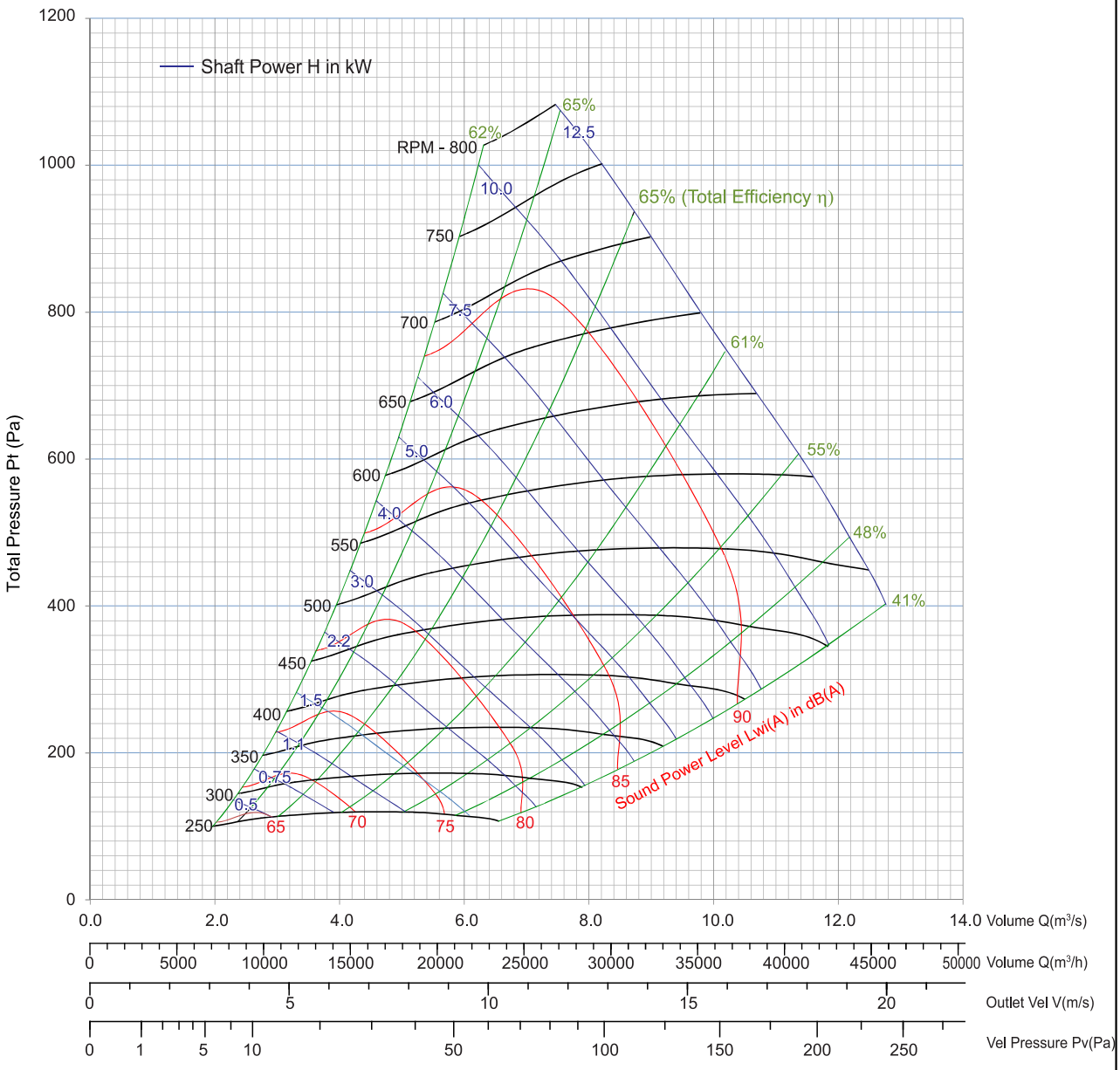
FPD 630

Density ρ: 1.2kg/m³

FEG 67



- Performance certified is for installation type B - Free Inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for Inlet LwiA sound power levels for installation Type B: free inlet, ducted outlet.

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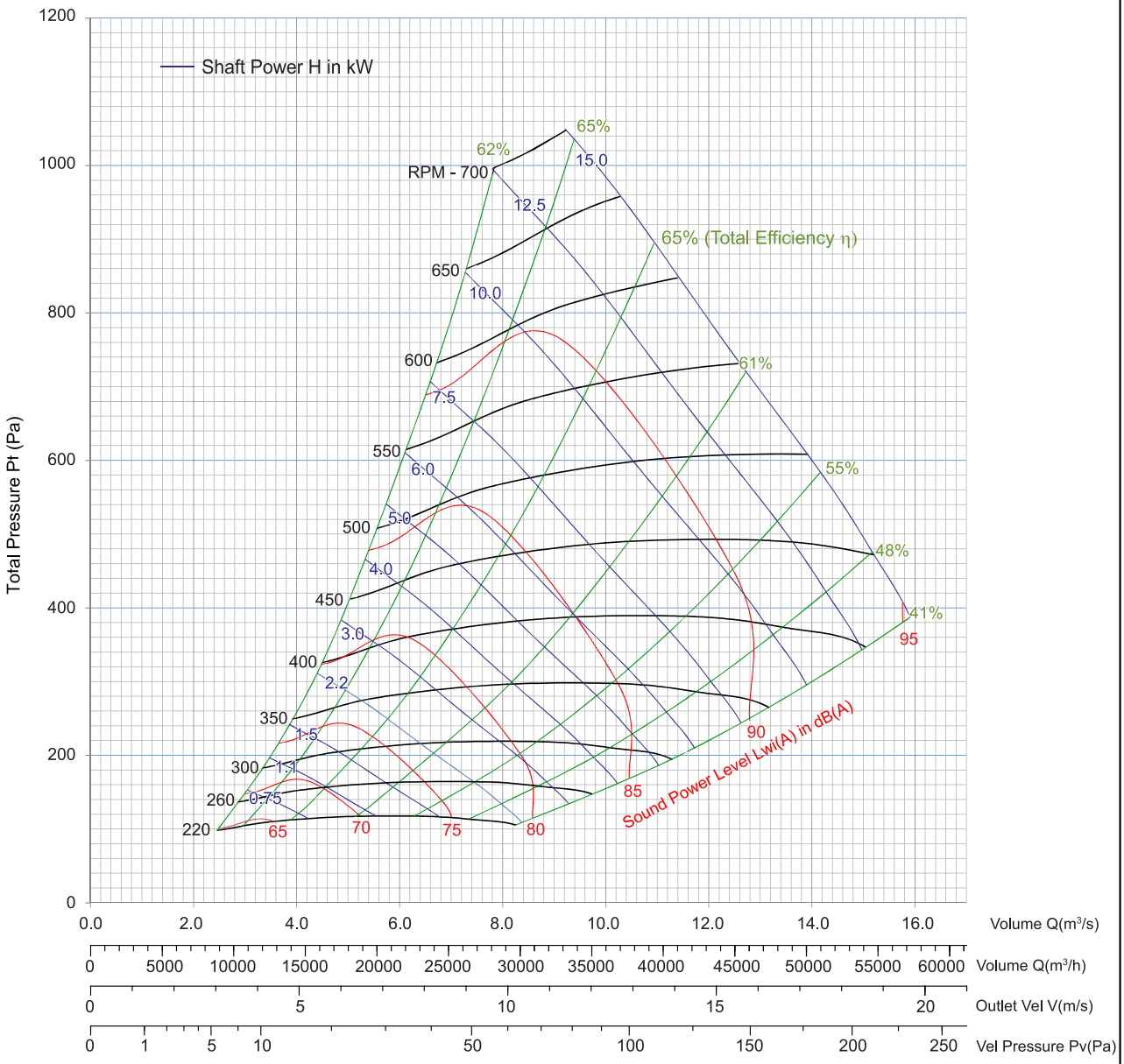
Forward Curved Centrifugal Fan

FPD 710

Density ρ: 1.2kg/m³

FEG 67



- Performance certified is for installation type B - Free Inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).
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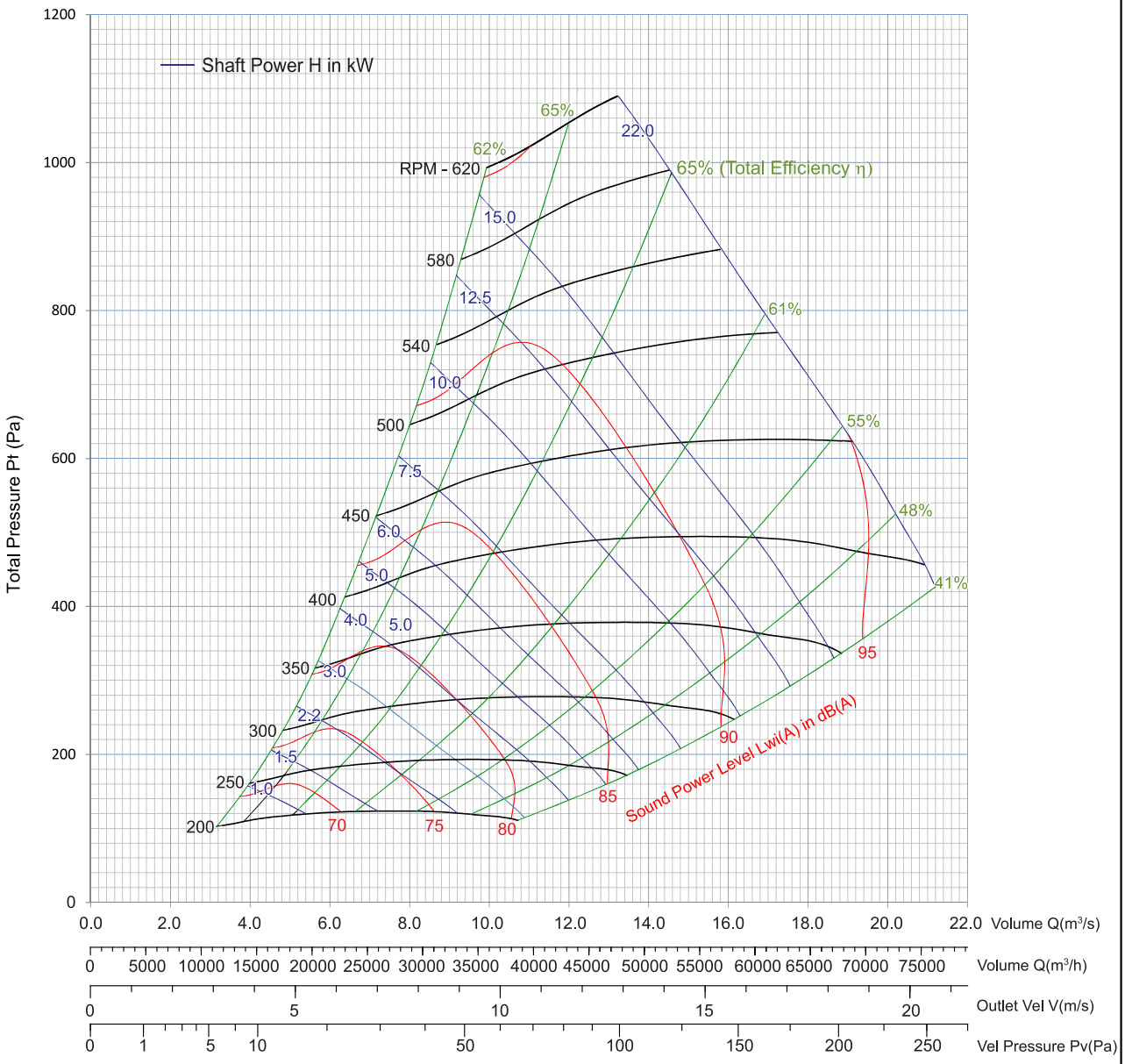
FPD 800

Density ρ: 1.2kg/m³

FEG 67

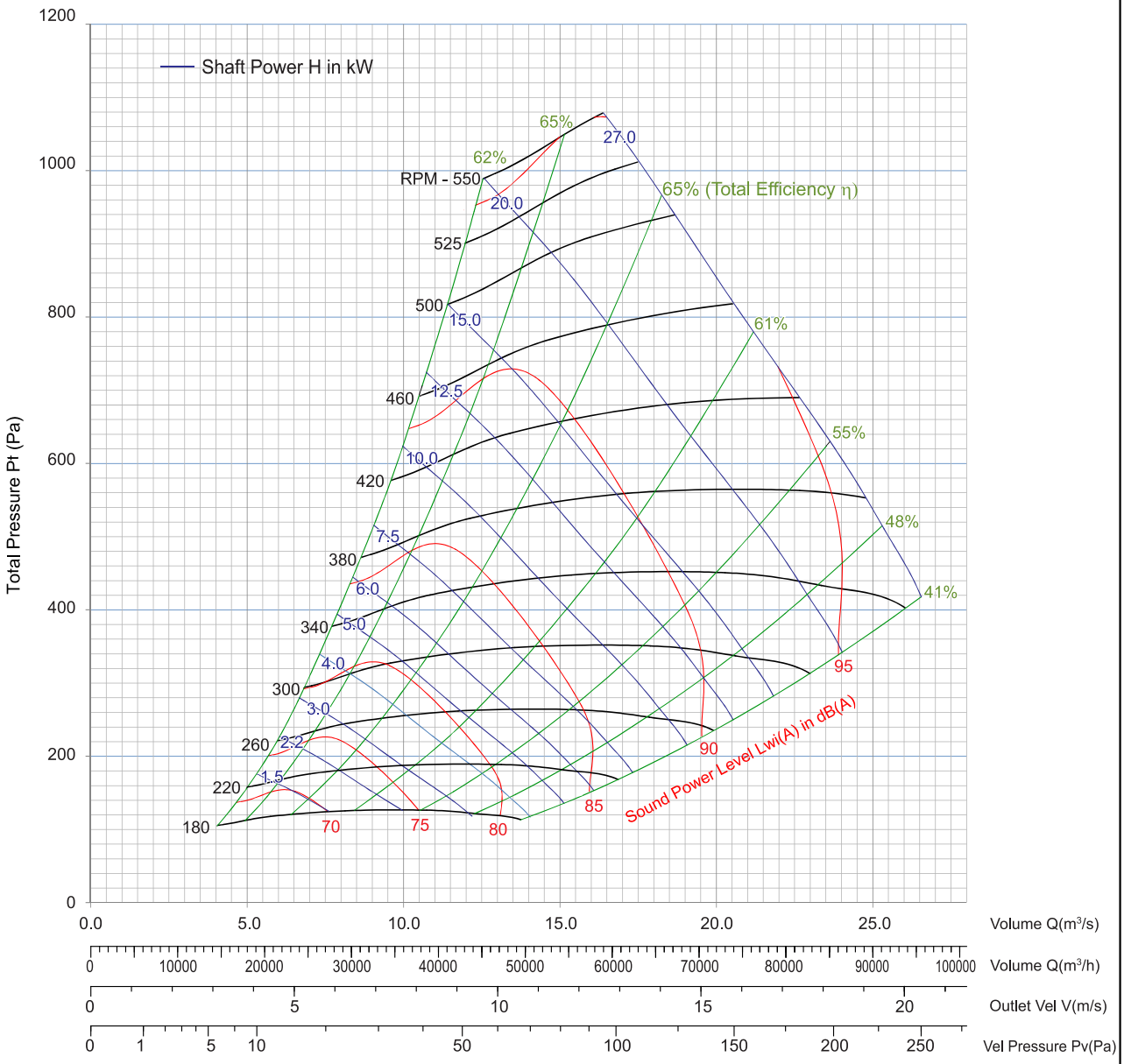


- Performance certified is for installation type B - Free Inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for Inlet LwiA sound power levels for installation Type B: free inlet, ducted outlet.

FPD 900

Density ρ: 1.2kg/m³

FEG 67

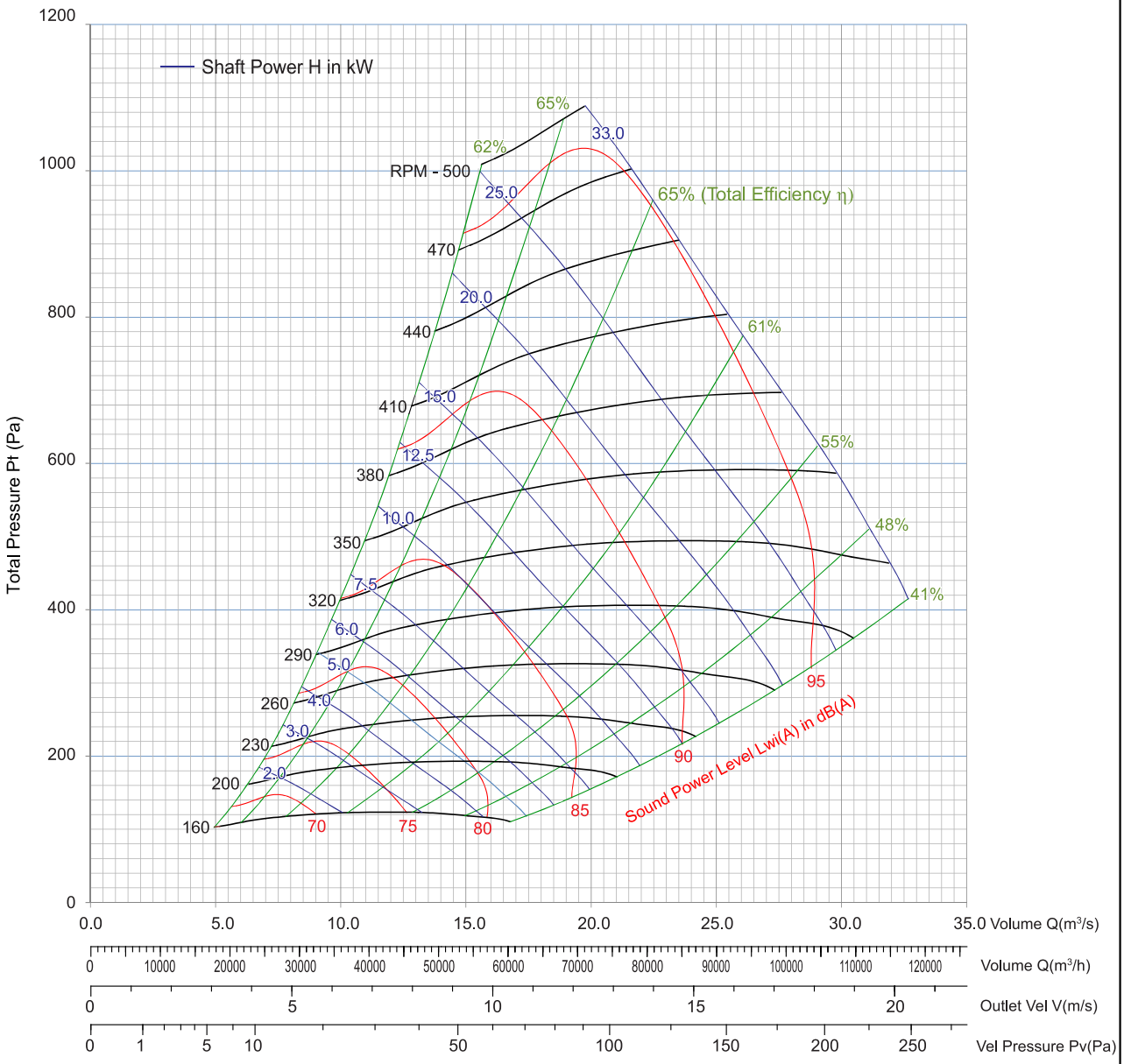


- Performance certified is for installation type B - Free Inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for Inlet LwiA sound power levels for installation Type B: free inlet, ducted outlet.

FPD 1000

Density ρ: 1.2kg/m³

FEG 67

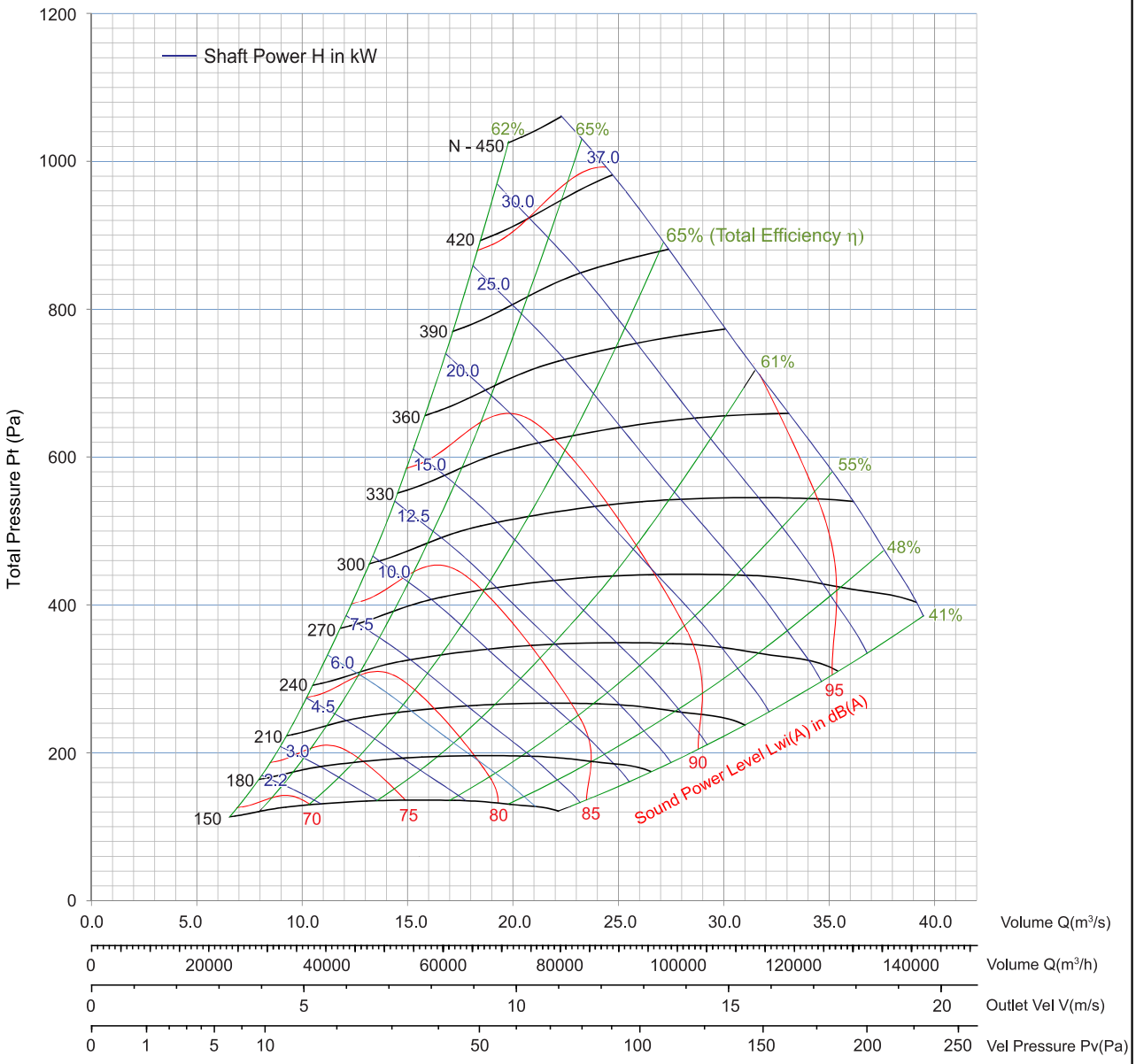


- Performance certified is for installation type B - Free inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for Inlet LwiA sound power levels for installation Type B: free inlet, ducted outlet.

FPD 1120

Density ρ: 1.2kg/m³

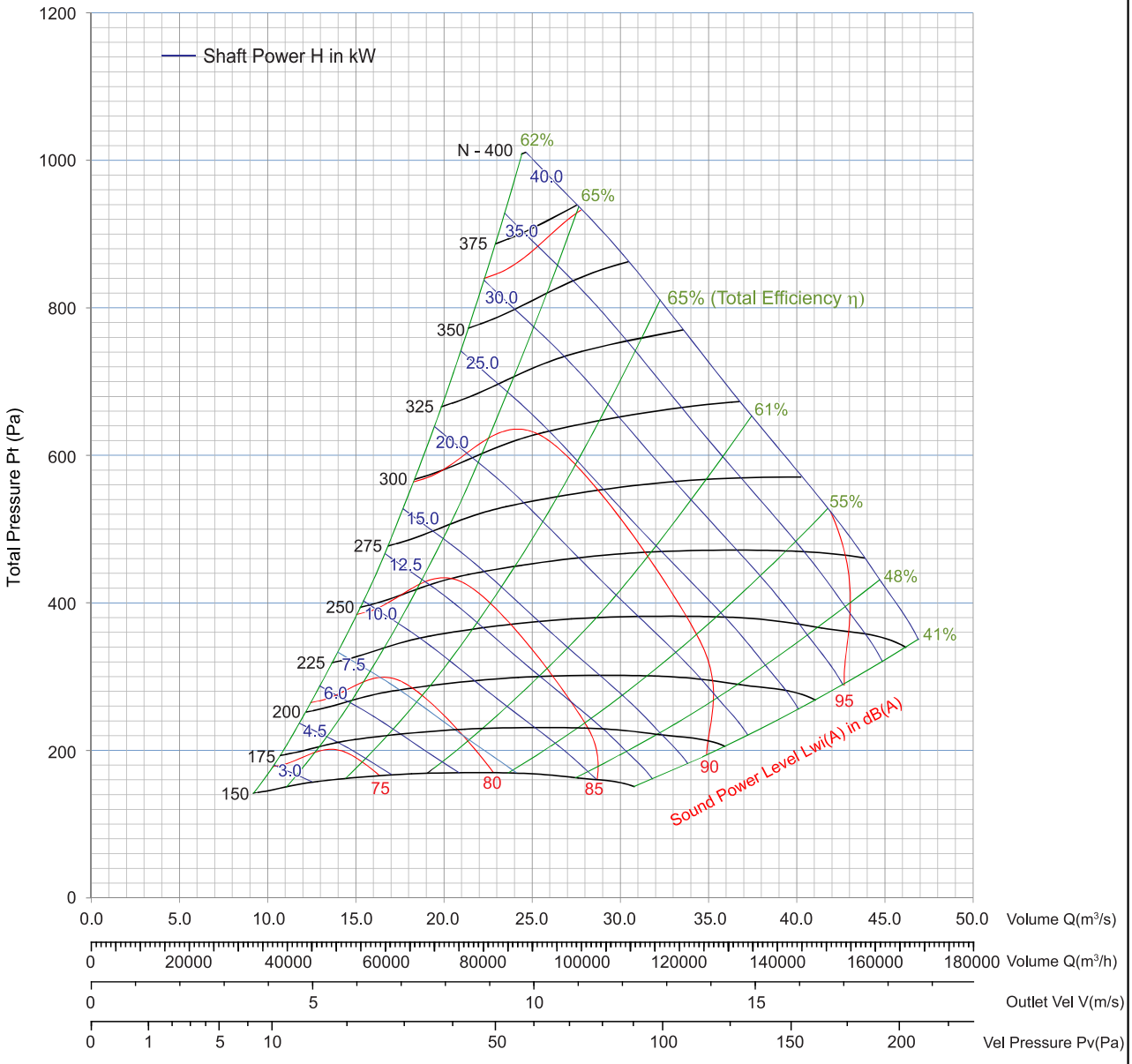
FEG 67



- Performance certified is for installation type B - Free Inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for Inlet LwiA sound power levels for installation Type B: free inlet, ducted outlet.

FPD 1250

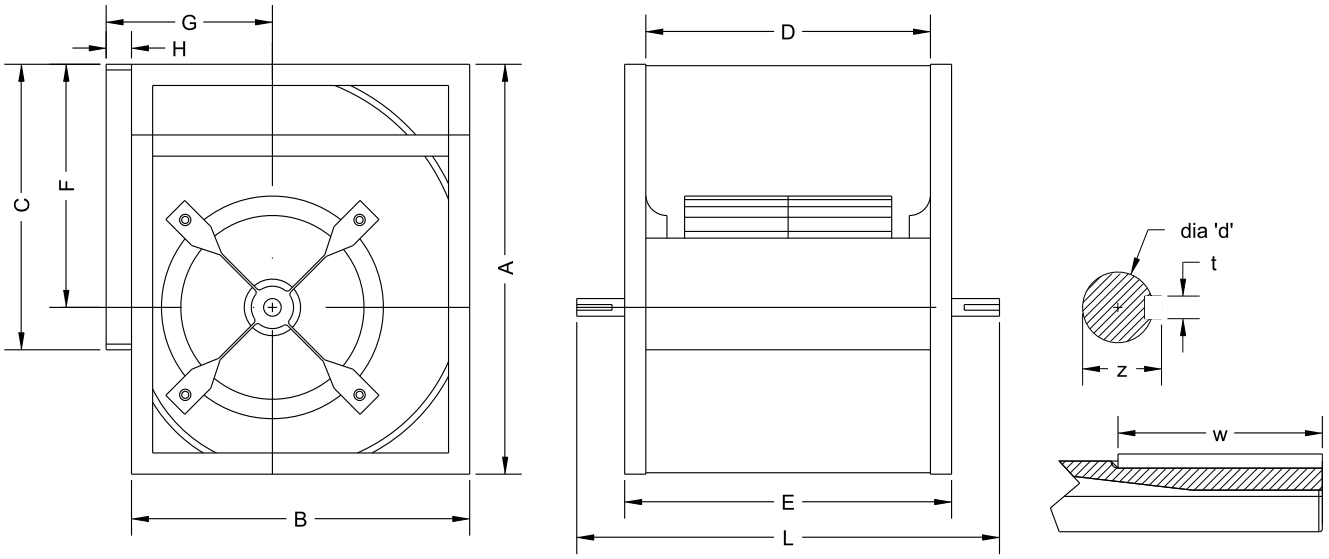
Density ρ: 1.2kg/m³



- Performance shown is for Installation type B - Free Inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for Inlet LwiA sound power levels for Installation Type B: free Inlet, ducted outlet.
- Model FPD 1250 is not licensed to bear the AMCA Certified Ratings Seal.

Dimensions :

FPD 500 - 630 'R'

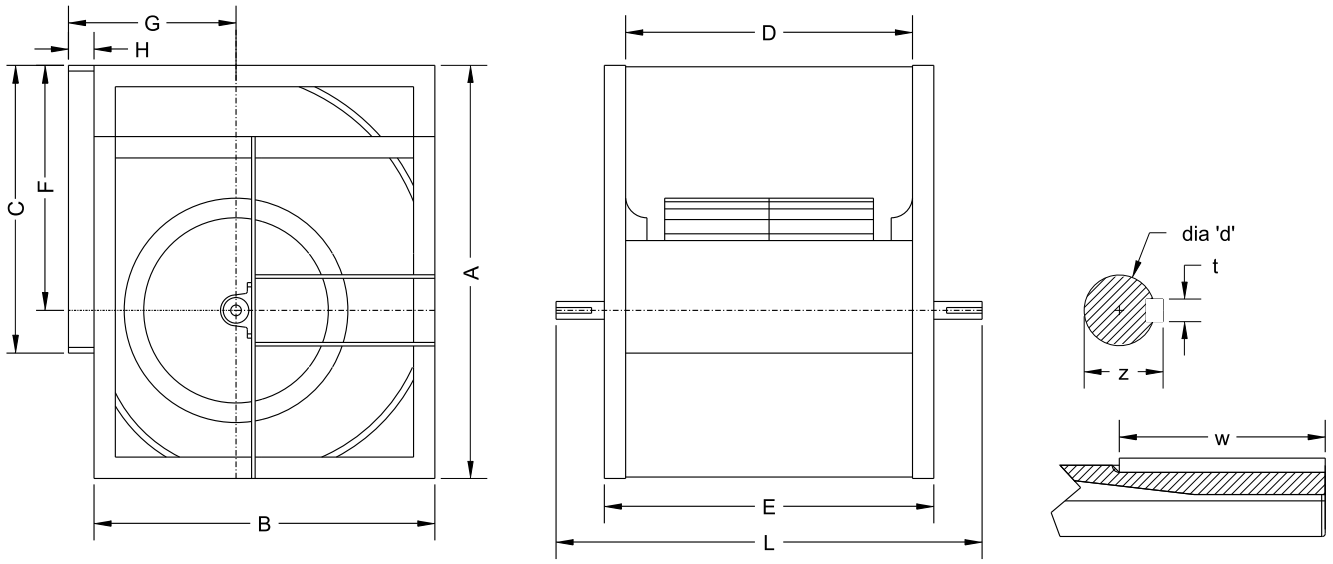


Model	A	B	C	D	E	F	G	H	L	d	t	z	w
500	918	750	637	637	718	540	352	50	875	35	10	38	60
560	1030	845	715	715	815	605	390	48	1000	40	12	43	70
630	1158	946	800	800	900	680	434	53	1090	40	12	43	70

All dimensions are in mm.

Dimensions :

FPD 710 - 1250 'K'



Model	A	B	C	D	E	F	G	H	L	d	t	z	w
710	1303	1061	898	898	998	765	485	60	1255	50	14	53.5	90
800	1468	1181	1008	1008	1107	862	540	74	1350	50	14	53.5	90
900	1648	1311	1134	1134	1230	971	604	97	1520	60	18	64	90
1000	1810	1450	1267	1267	1367	1066	657	90	1660	60	18	64	90
1120	2025	1625	1420	1420	1540	1194	745	100	1880	65	18	69	110
1250	2260	1815	1570	1570	1690	1332	832	112	2040	70	20	74.5	110

All dimensions are in mm.

Operational Limits - FPD Series

Model		500R	560R	630R	710R	800K	900K	1000K	1120K	1250K
Maximum Fan Speed	rpm	1000	900	800	700	620	550	500	450	400
Maximum Shaft Power	kW	10	11	12.5	15	22	27	33	37	40
Maximum Temperature (Minimum -20°C)	°C	85	85	85	85	85	85	85	85	85
Fan Weight	kg	70	91	110	173	230	285	330	535	680

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