BELT DRIVE CENTRIFUGAL FANS

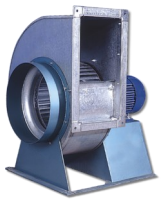
VFD Series

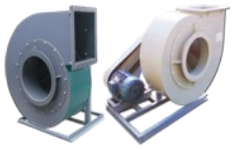
CONTENTS
Product Range

BELT DRIVE CENTRIFUGAL FANS 12

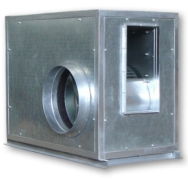
VFS/V Series	VFD Series	VBS/V Series	VBD Series
			
Page | 14	| 41	| 66	| 93

DIRECT DRIVE CENTRIFUGAL 188

VCD Series	VBR Series	VBSD Series	VFL Series	CZR/CZT Series	HG Series
					
Page | 120	| 124	| 126	| 130	| 132	| 135

VFB Series	VFC/VFCI Series	VWL Series	VWT Series	VDCB Series
				
Page | 139	| 140	| 141	| 145	| 149

CENTRIFUGAL CABINET FANS 150

VFCD Series	VFCS Series	VBUT Series	VBUD Series	VBI Series	VFIB	VBIC/T
						
Page | 152	| 166	| 177	| 188	| 193	| 206	| 211

222 INLINE CENTRIFUGAL DUCT

VCI Series	VIT Series	VDC Series
		
Page | 224	| 249	| 252

261 ADJUSTABLE BLADES AXIAL FLOW FANS

VAK Series	VAN Series	VPAS Series	VPA Series	VAD Series	VADT	VAP
						
Page | 264	| 266	| 268	| 270	| 271	| 271	| 271

VAM Series	VAB Series	VEP Series	VAT Series		VAS Series	VSHT Series
						
Page | 274	| 346	| 388	| 392	| 398	| 400	| 404

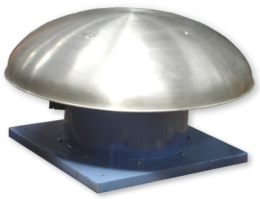
VZF Series	VAW Series	VBM Series	VAF Series	VFA Series	VWM Series	VGH/TH
						
Page | 407	| 414	| 417	| 421	| 429	| 435	| 437

AXIAL JET FANS

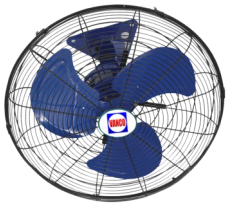
AXIAL MIXED FLOW FANS 440

VTA Series	VMX Series
	
Page | 442	| 446

ROOF FANS 481

VAR Series	VCR Series	VIDR Series
		
Page | 483	| 488	| 497

DOMESTIC FANS 504

VFE Series	VDS/W Series	VTS/W Series	VHC/D Series	Rotary Series
				
Page | 506	| 507	| 507	| 508	| 508

VSA/B/C Series	VWA Series	VWB Series	VSX Series	VLC Series
				
Page | 511	| 512	| 513	| 514	| 515

516 DOMESTIC CEILING MOUNTED FANS

VPW Series		VCE Series		
				
Page | 516	| 517	| 519	| 522	| 524

526 WALL MOUNTED FANS

VPD Series	VPD M Series
	
Page | 526	| 524

532 AIR CURTAIN

NOISE & VIBRATION CONTROL 533

VAC Series	VHSP Series	VFSP Series	VRA Series	VCA-S/L/P
				
Page | 532	| 533	| 534	| 536	| 539 - 540

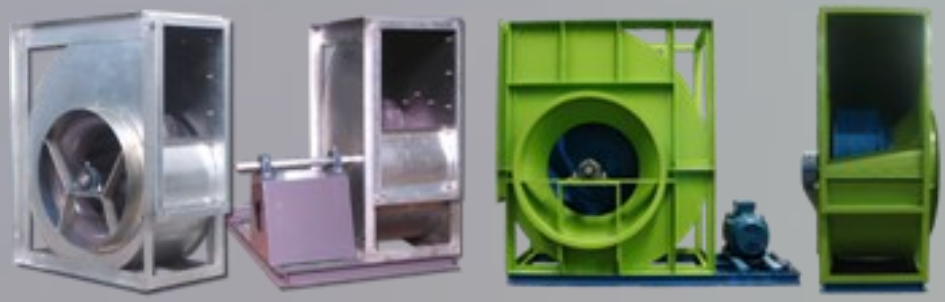
The Best Solution in Ventilation

BELT DRIVE CENTRIFUGAL FANS

14 VFS/V Series

41 VFD Series

66 VBS/V Series



93 VBD Series

VFD Series

- Compact design for space saving installations.
- High efficiency operation for economic running costs.
- Low operational noise levels and vibration free running.
- Wide volume range and high pressure development.
- Design for flexible applications.
- Super quality for long life.

Twin Type
(VFD2 models)

VFD Series are also available in twin fan version, with two double inlet fans mounted on the same shaft. To select for Twin Type, use the curves of the single fan with the following factors:
Volume × 2
Absorbed Power × 2.15
Speed × 1.05
Noise + 3dB.
For more information of Twin Type, please consult the technical department for details.

Introduction

VFD series are double inlet centrifugal fan with forward curved blades. These are suitable for supply or exhaust application in industrial and commercial buildings.

These series are available in eighteen (18) standard nominal diameters from 200 up to 1400mm.

Constructions

Impeller, The impeller has forward curved blades manufactured from high quality galvanized sheet steel. All impeller are statically and dynamically balanced to ISO 1940 standards.

Casing, For all sizes except 1400, the casing is manufactured from high quality galvanized sheet steel with the casing fixed to the side plates in lock form system. For size 1400, the casing is manufactured from mild steel finished with polyester paint coating.

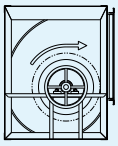
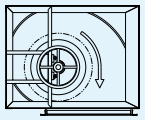
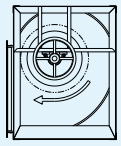
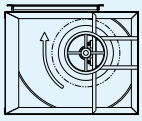
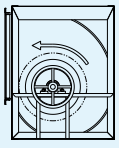
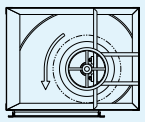
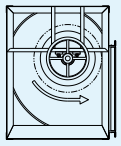
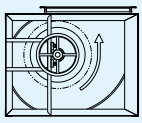
Frame, The frame is manufactured from galvanized angular bars, they are manufactured with sections of steel. For size 900 up to 1400, the frame finished with polyester paint finish.

Bearings, All bearings are either deep groove ball bearings type sealed at both sides. The bearings are lubricated for life and maintenance-free. If lubrication is necessary, it is recommended to use a lithium base grease suitable for all temperatures within the operational limits.

Shaft, The shaft are C40 carbon steel using automatic process for positioning and keyways cutting. All tolerance are 100% check to ensure precision fit.

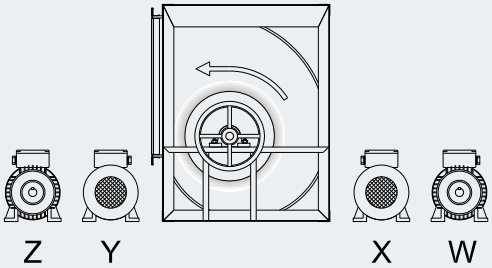
Fan Rotation and Discharge

The direction of rotation is determined from the drive side of the fan [refer to the following figure].

	90°	180°	270°	360°
Clockwise rotation (CW)				
Counter-clockwise rotation (CCW)				

Motor Position

Location of the motor is determined by facing the drive side of fan and designating the position by letter W, X, Y, or Z.



Motor Selection

The following safety margin should be added to the power requirements at the fan shaft as shown by the performance curves.

The safety margin is to compensate for transmission losses of the V-belt drive and for possible minor inaccuracies in the calculation of the system resistance.

$$P_M = P_W + S_M$$

P_M : Motor Rating [kW]

P_W : Absorbed Power [kW]

S_M : Safety Margin [%]

- up to 10 kW = 20%
- Over 10 kW = 12%

Performance Data

Fan Models	Max. Abs. Power [kW]	Max. Fan Speed [rpm]	Max. Total Pressure [mmWG]	Impeller		
				Dia-meter [mm]	Number of Blades [N°]	Mass Moment of Inertia [kgm²]
VFD-200	4	3250	168	200	76	0.018
VFD-225	5	2850	168	225	84	0.028
VFD-250	5	2550	167	250	76	0.044
VFD-280	6.3	2250	167	280	84	0.06
VFD-315	7	1980	165	315	76	0.104
VFD-355	9	1770	165	355	84	0.15
VFD-400	9	1550	160	400	76	0.3
VFD-450	11	1375	160	450	84	0.44
VFD-500	11	1230	154	500	76	0.85
VFD-560	13.5	1080	154	560	84	1.34
VFD-630	13.5	960	151	630	76	2.2
VFD-710	22	800	142	710	84	3.4
VFD-800	25	750	150	800	76	5.8
VFD-900	32	650	148	900	84	8.9
VFD-1000	40	600	153	1000	96	13.5
VFD-1120	40	500	120	1120	96	44.5
VFD-1250	60	450	105	1200	108	76.5
VFD-1400	70	400	105	1400	108	128.5

Sound Levels

The Sound Power Level L_W, required for calculation and design of sound absorbing units is marked in the performance curves.

The Sound Data of the Fans is determined as follow :

1. The total Sound Power Level L_W [dB] can be ascertained from the performance curves.
2. The Sound Power Level L_W* [dB] at the different Octave Band Mid-Frequencies is determined from following equations:

$$L_W^* = L_W - \Delta L_W$$

The value for ΔL_W are given in *Table 1*

Oct. band f_m [Hz]	63	125	250	500	1K	2K	4K	8K
ΔL_W [dB]	6	7	10	12	13	15	19	23

Table 1

3. The non weighted Sound Pressure Level L_P [dB] of for all fan sizes at various measuring distances is obtained from the following equation :

$$L_P = L_W - \Delta L$$

The values for ΔL are given in *Table 2*

Distance	1m	2m	3m	4m	5m
ΔL [dB]	6	12	15	18	20

Table 2

4. The Sound Pressure Level L_P* [dB] at the different Octave Band Mid-Frequencies is obtained from the following equation :

$$L_P^* = L_P - \Delta L_W$$

The value for ΔL_W are given in *Table 1*

5. The weighted Sound Pressure Level L_{PA} [dB(A)] is determined by the following equation :

$$L_{PA} = L_W - \Delta L_A$$

The values for ΔL_A are given in ***Table 3***.

Fan Sizes	ΔL_A [dB] at				
	1m	2m	3m	4m	5m
200	10	16	19	22	24
225	11	17	20	23	25
250	11	17	20	23	25
280	11	17	20	23	25
315	11	17	20	23	25
355	12	18	21	24	26
400	12	18	21	24	26
450	12	18	21	24	26
500	12	18	21	24	26
560	13	19	22	25	27
630	13	19	22	25	27
710	13	19	22	25	27
800	13	19	22	25	27
900	14	20	23	26	28
1000	14	20	23	26	28
1120	14	20	23	26	28
1250	14	20	23	26	28
1400	15	21	24	27	29

Table 3

■ Selection Example of VFD Series

Required :

Air Volume Q = 20000 m3/hTotal
Pressure ΔP_t = 80 mmWG

To determine :

Fan Size, Fan Speed, Dynamic Pressure, Static Pressure, Outlet Velocity, Efficiency, Power consumption, Motor output and Sound power level.

Selected from the Curve :

- Fan Size = 500 mm
- Fan Speed n = 850 rpm
- Dynamic Pressure P_d = 12 mmWG
- Static Pressure P_s = 68 mmWG

  P_s = Total Pressure ΔP_t - Dynamic Pressure P_d

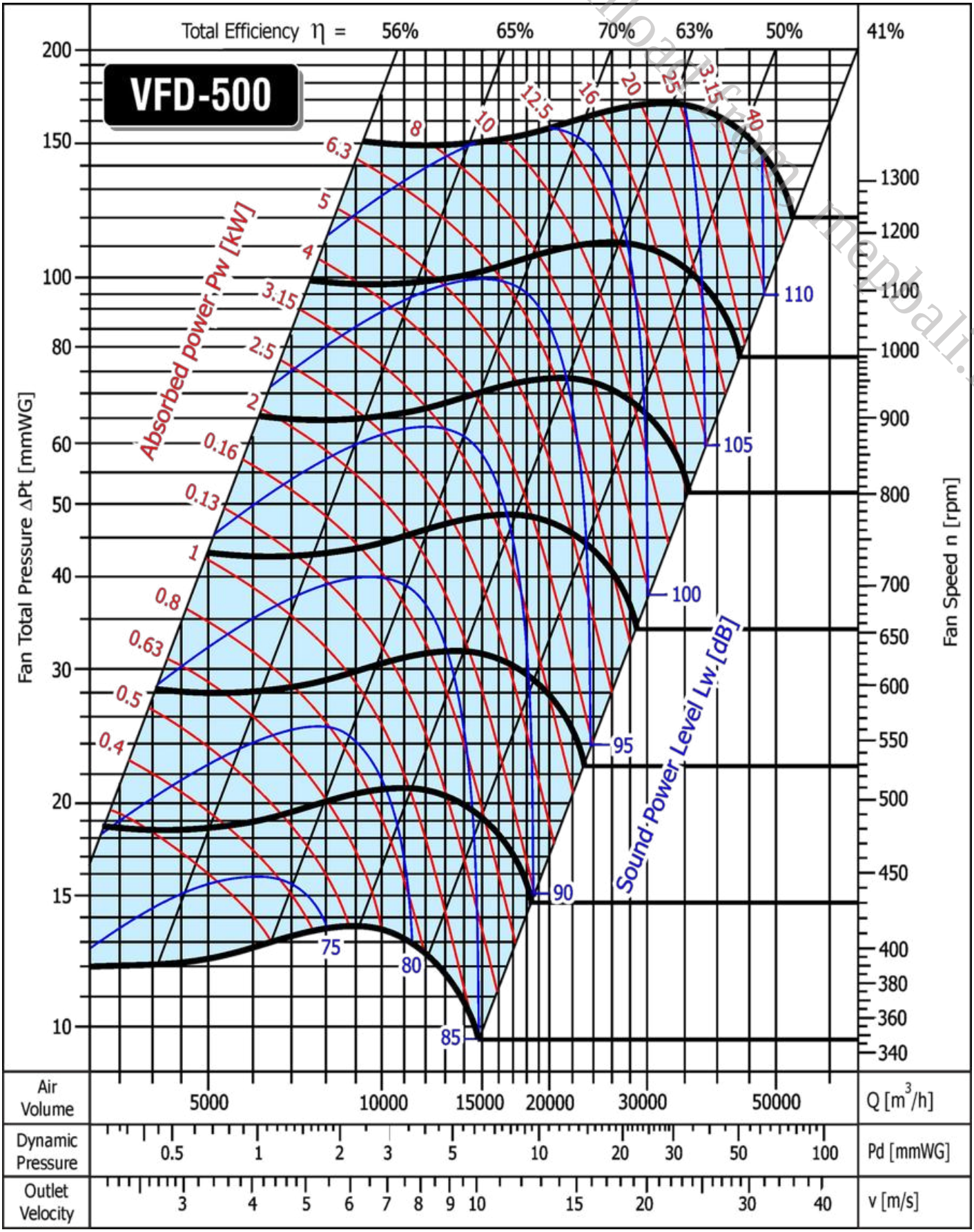
- Outlet Velocity v = 13.8 m/s
- Efficiency η = 66 %
- Absorbed power P_W = 7 kW
- Motor rating P_M = 8.4 kW

  P_M[kW] = Absorbed Power P_W [kW] + Safety Margin [%]

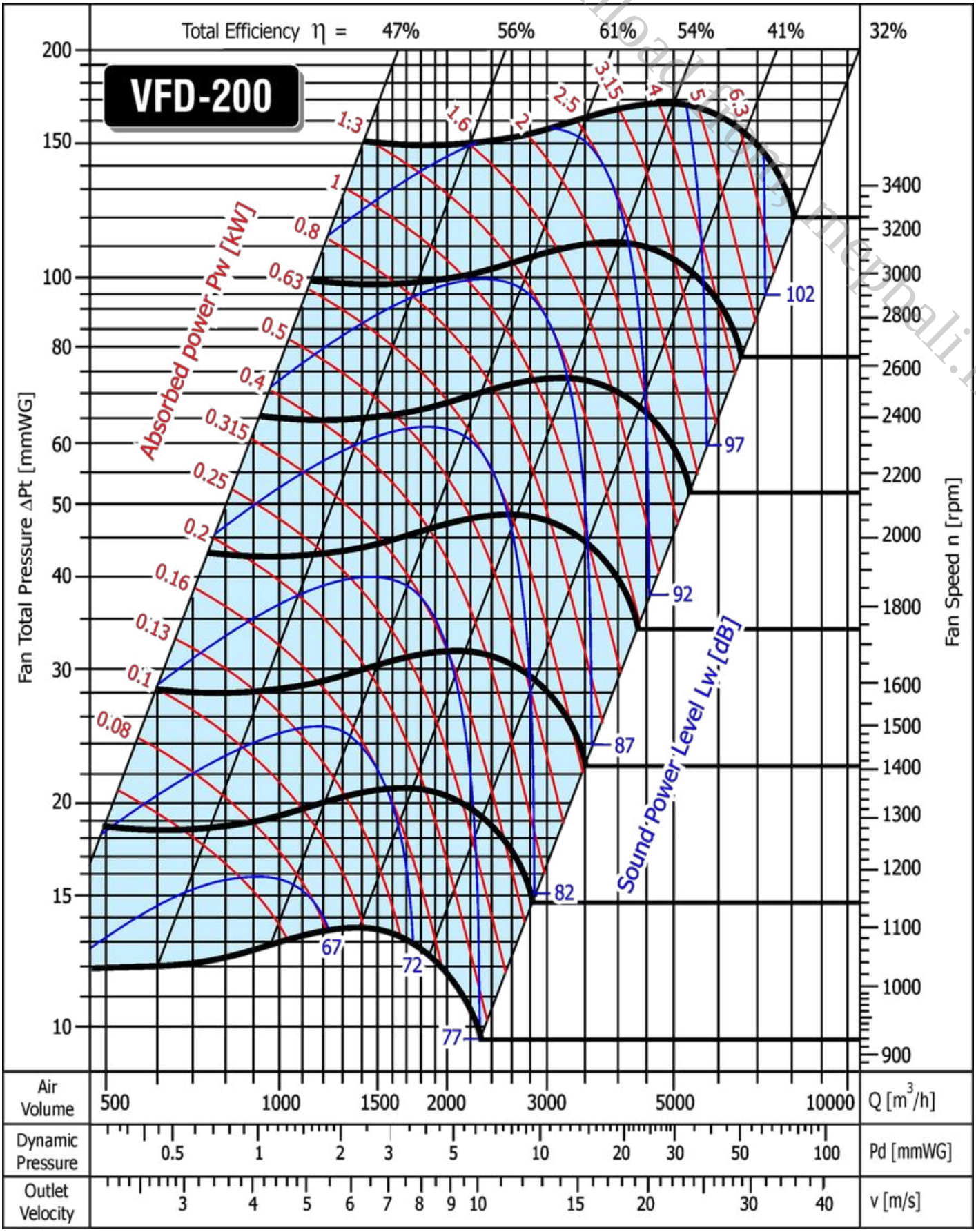
  Safety Margin :
  up to 10 kW = 20 %
  Over 10 kW = 12 %

- Sound power level L_W = 95 dB

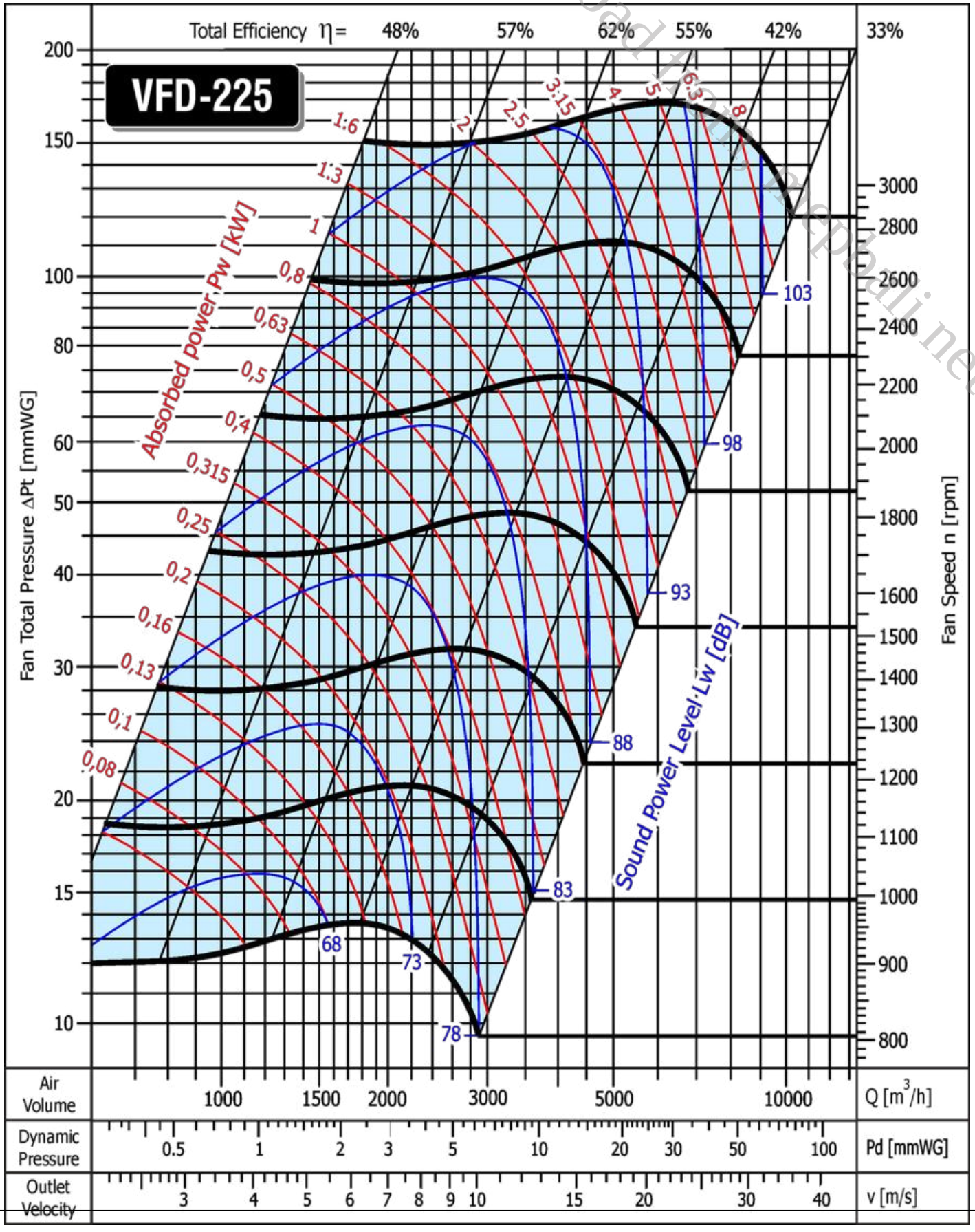
■ Performance Curves



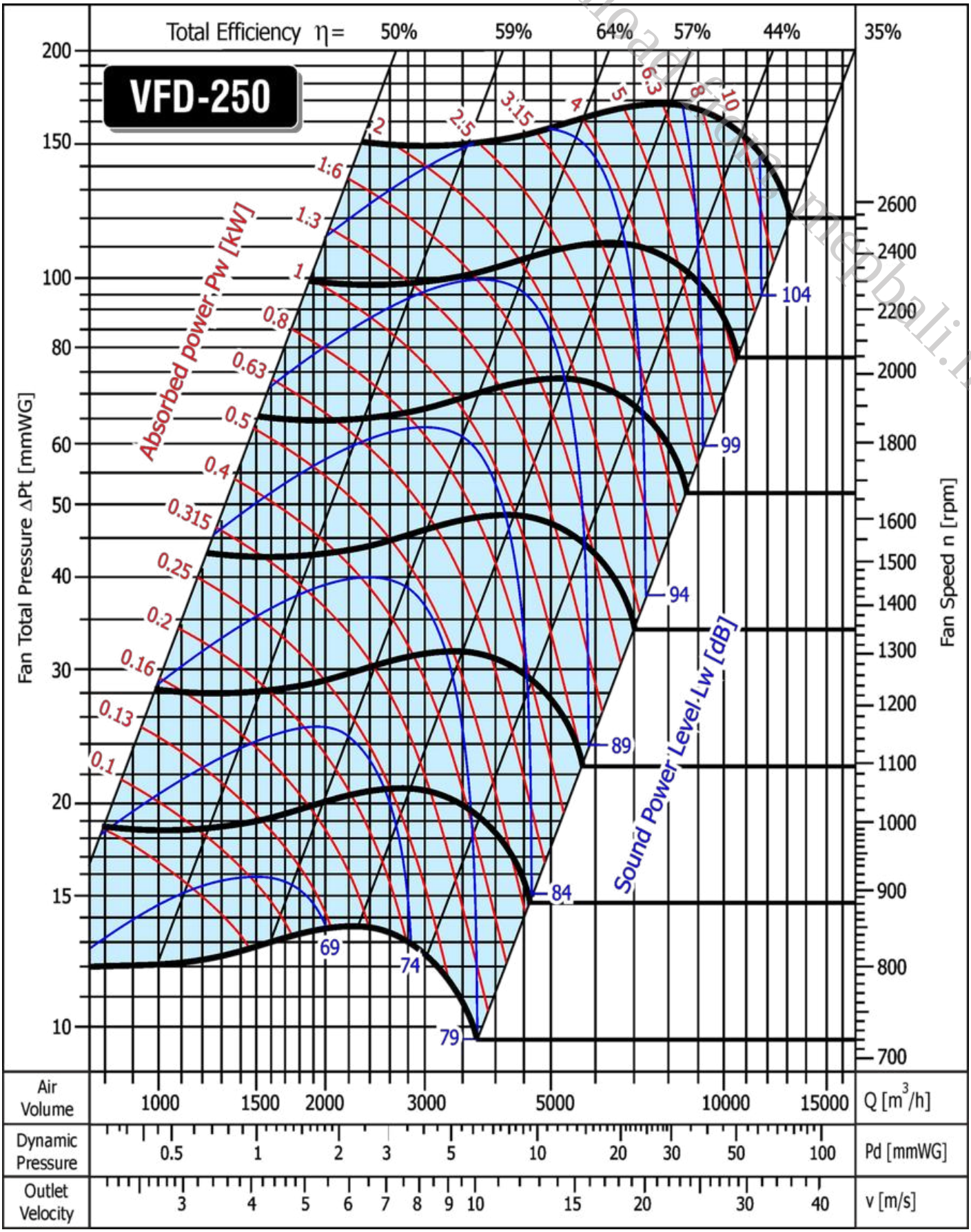
■ Performance Curves



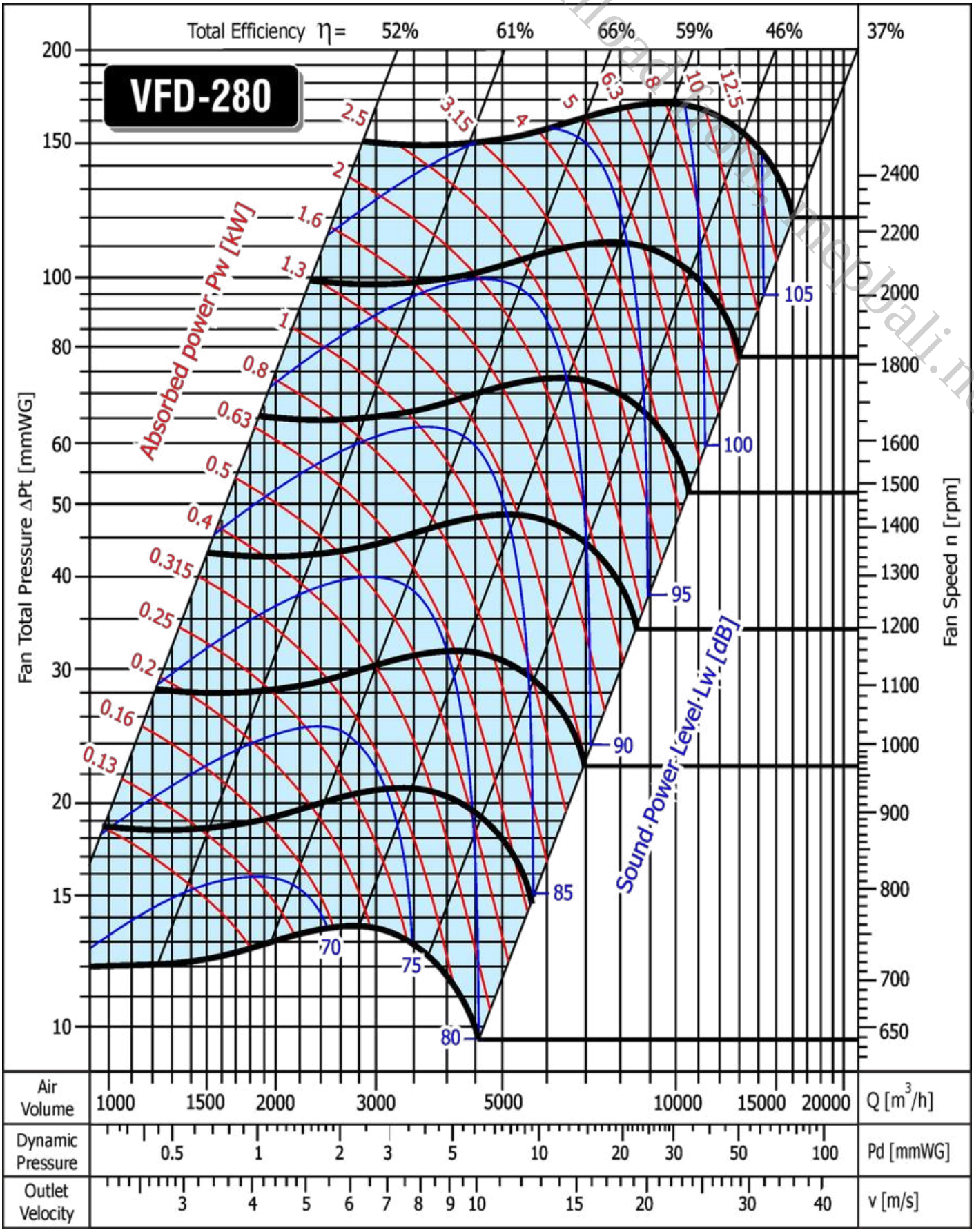
■ Performance Curves



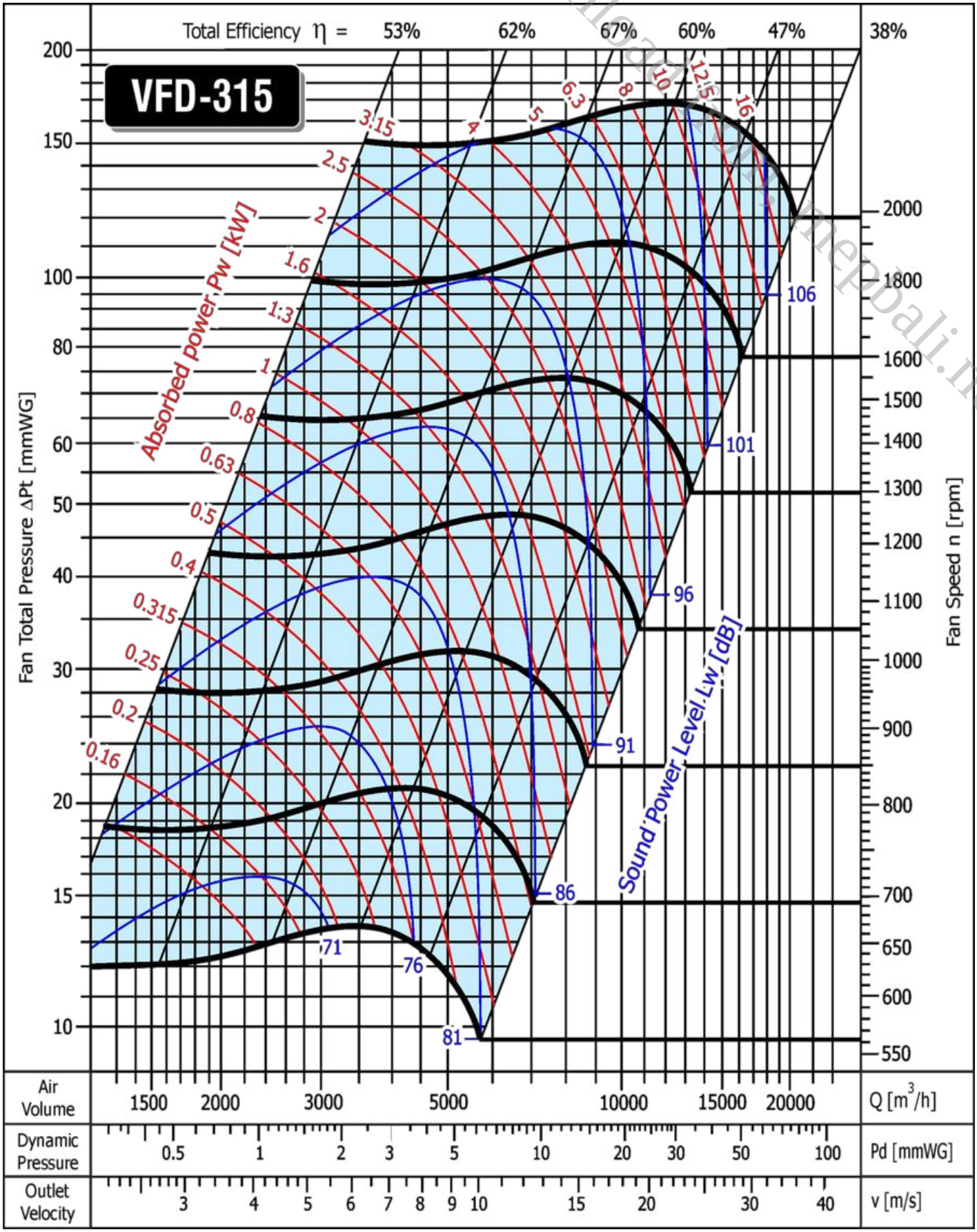
■ Performance Curves



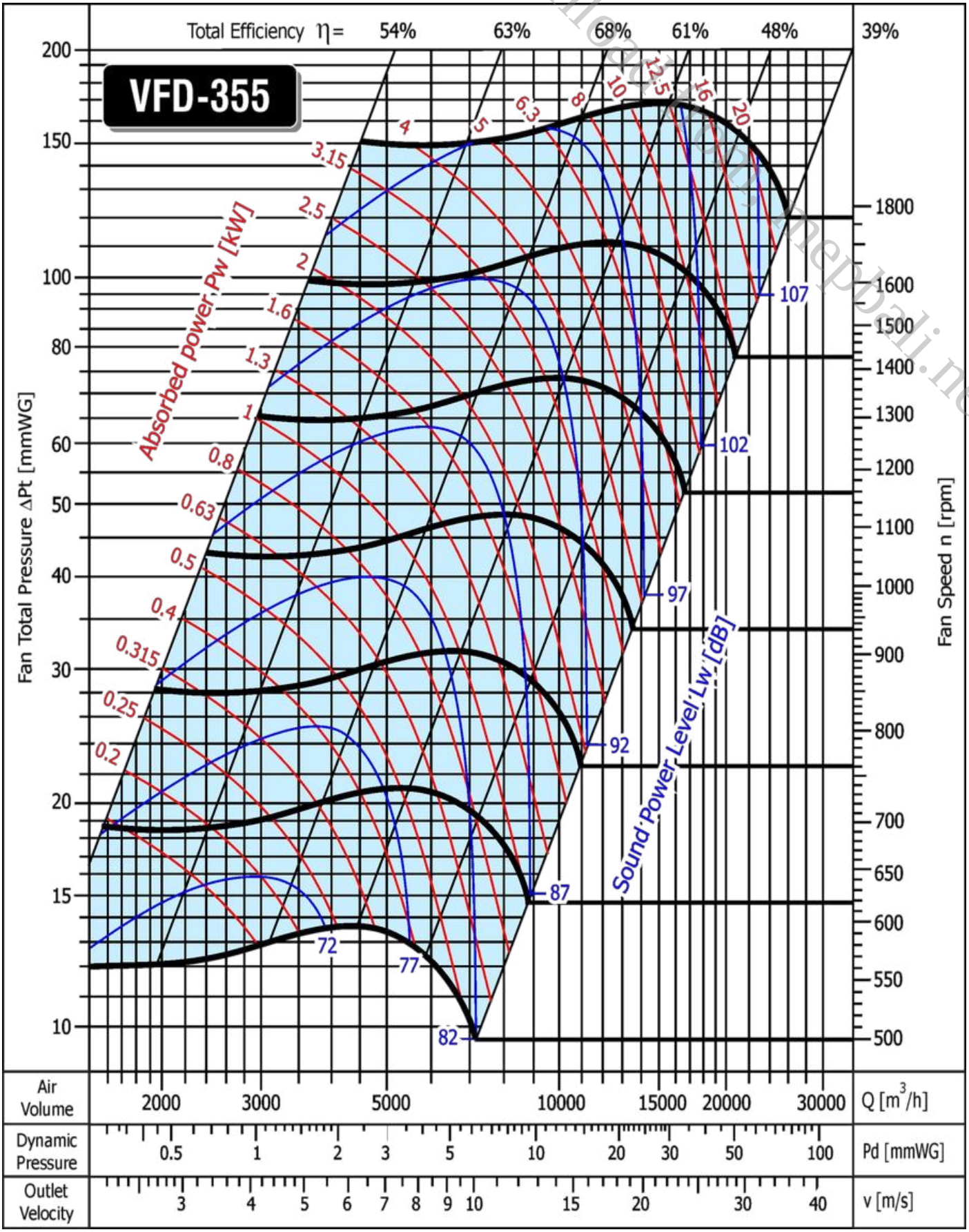
■ Performance Curves



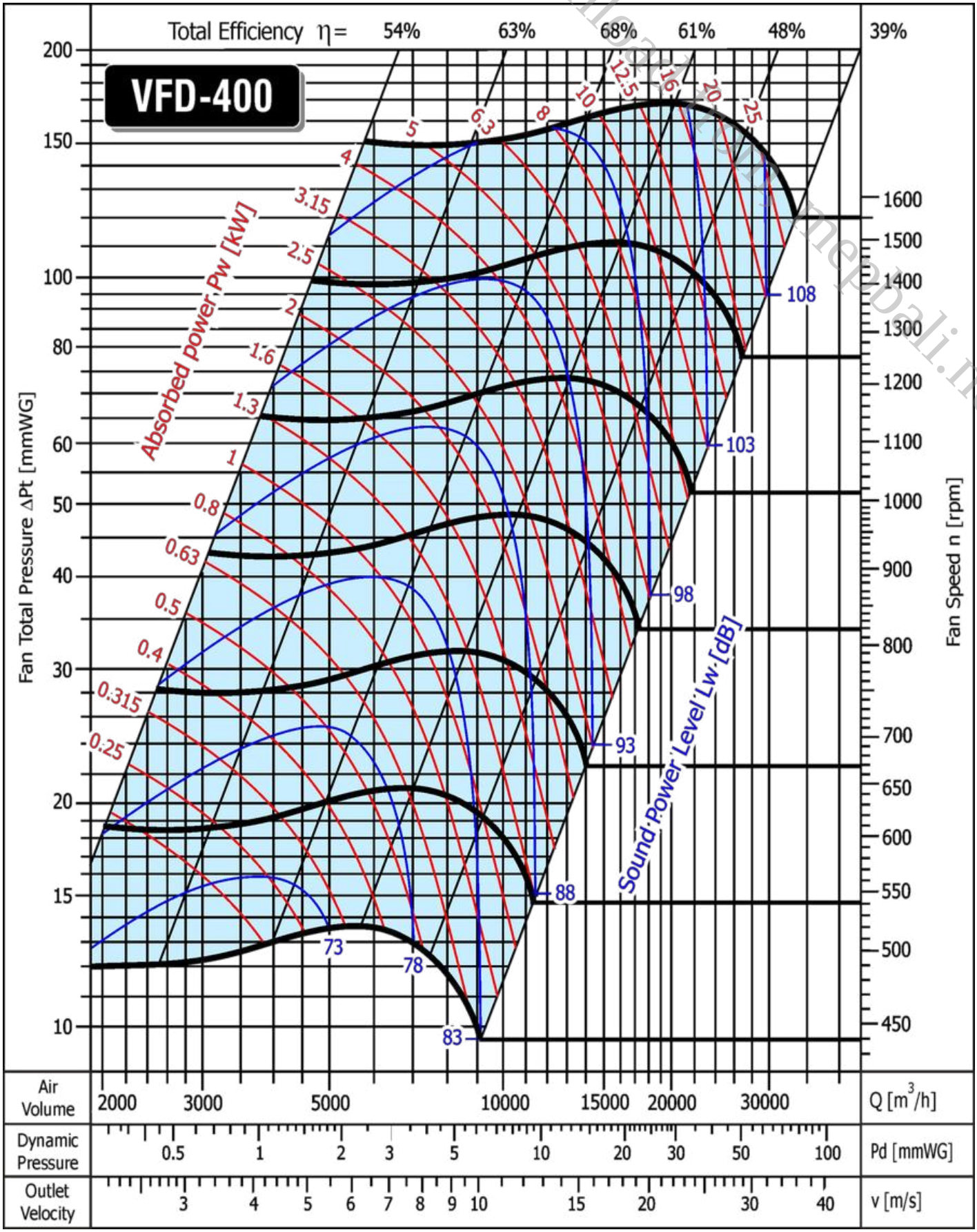
■ Performance Curves



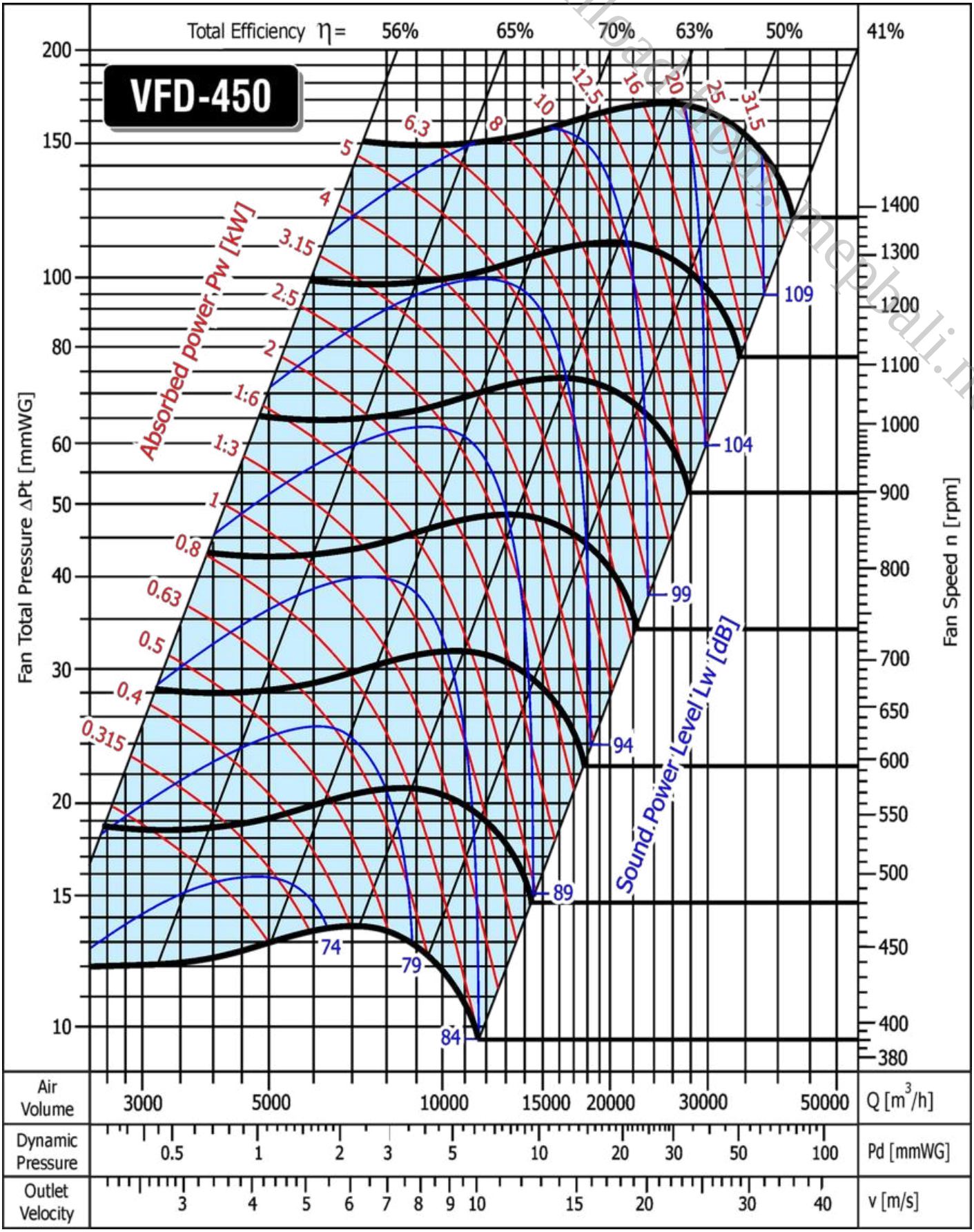
■ Performance Curves



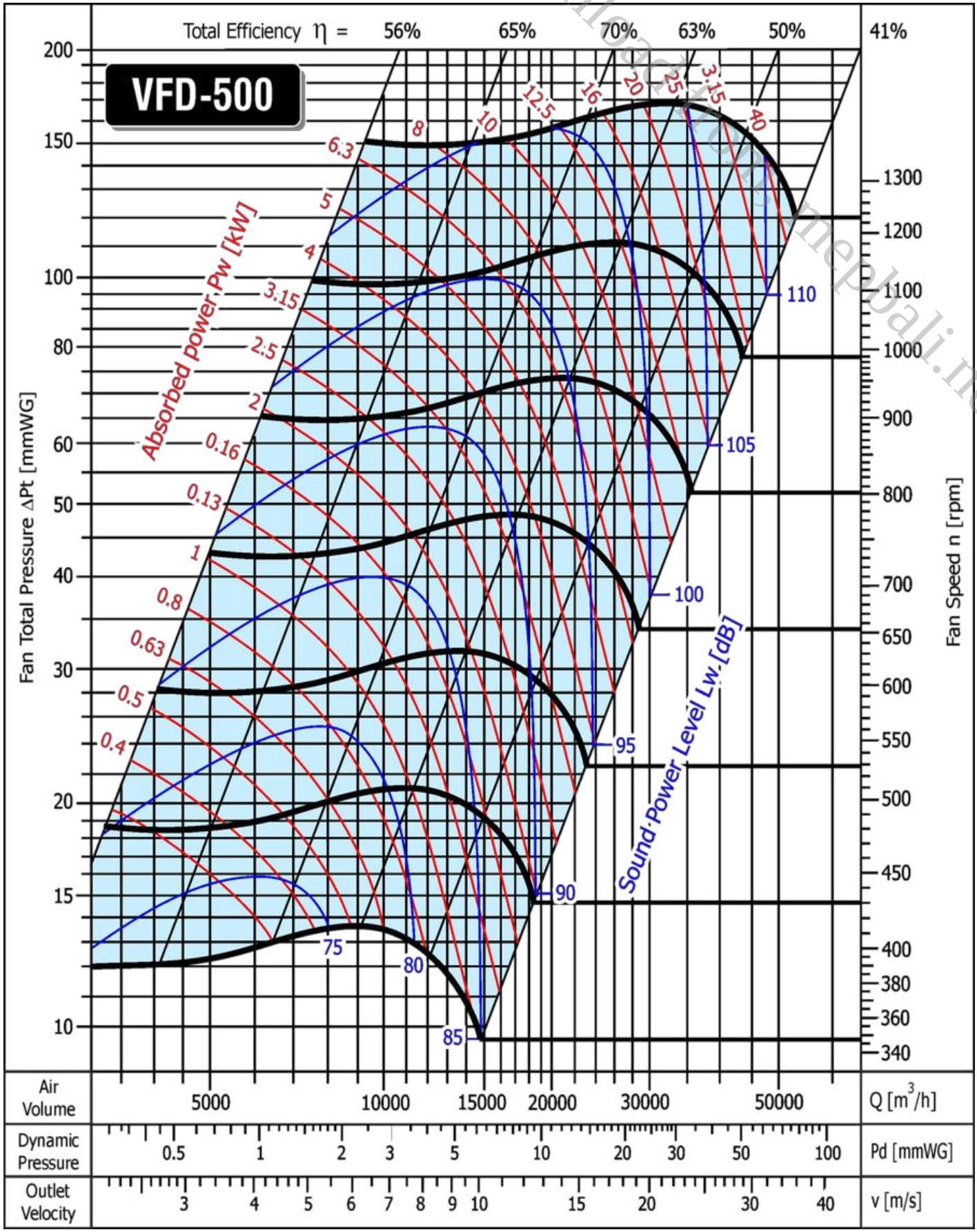
■ Performance Curves



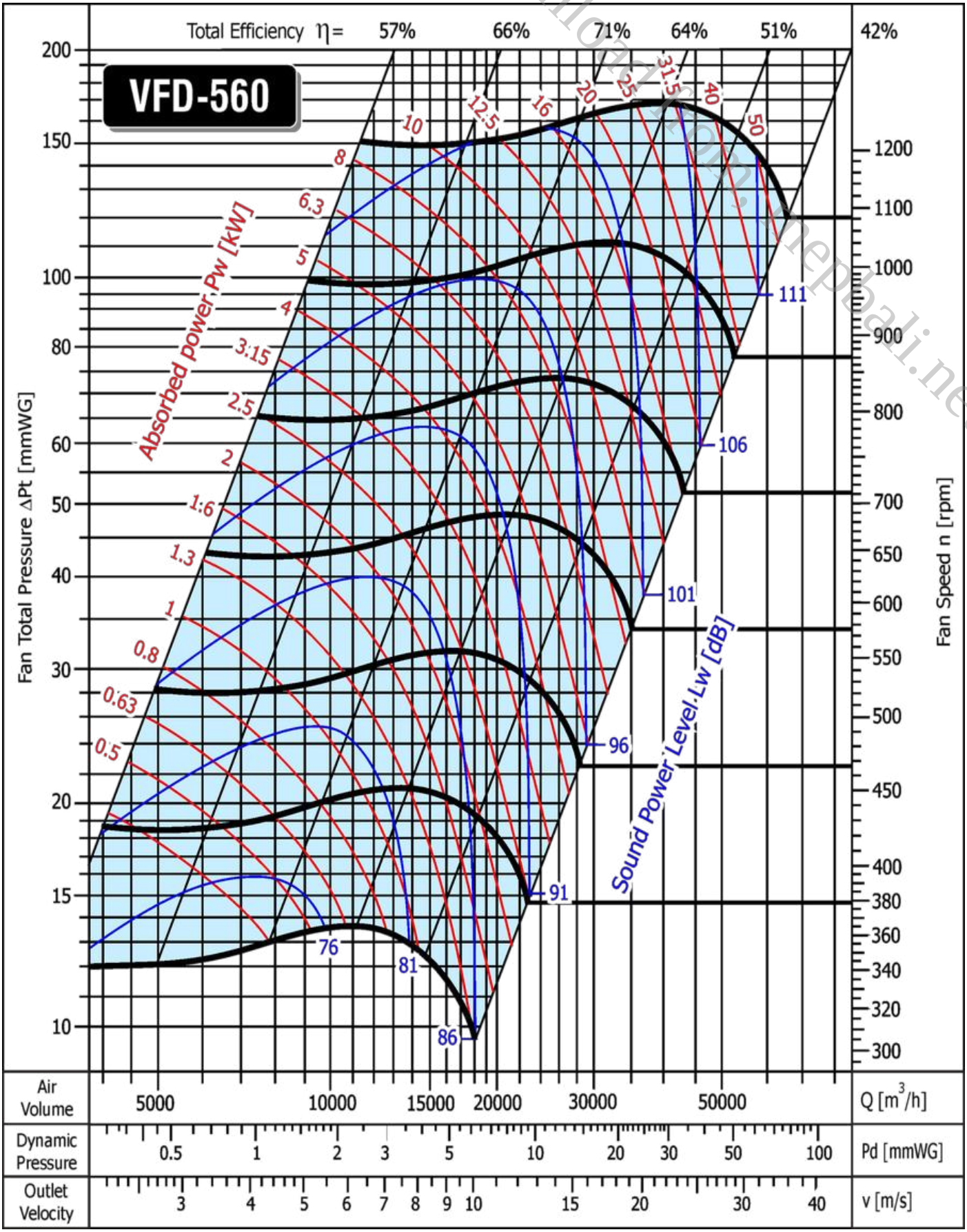
■ Performance Curves



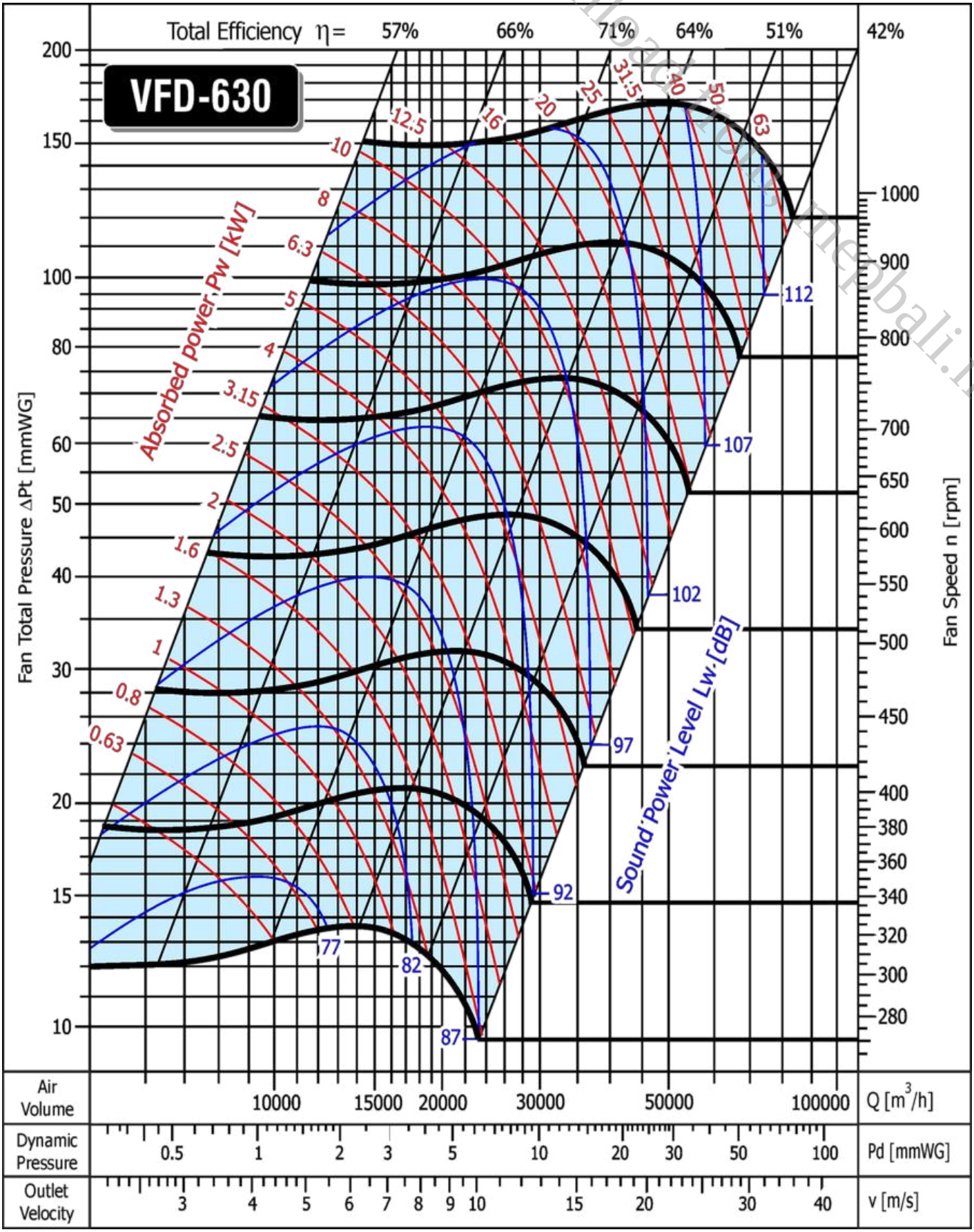
■ Performance Curves



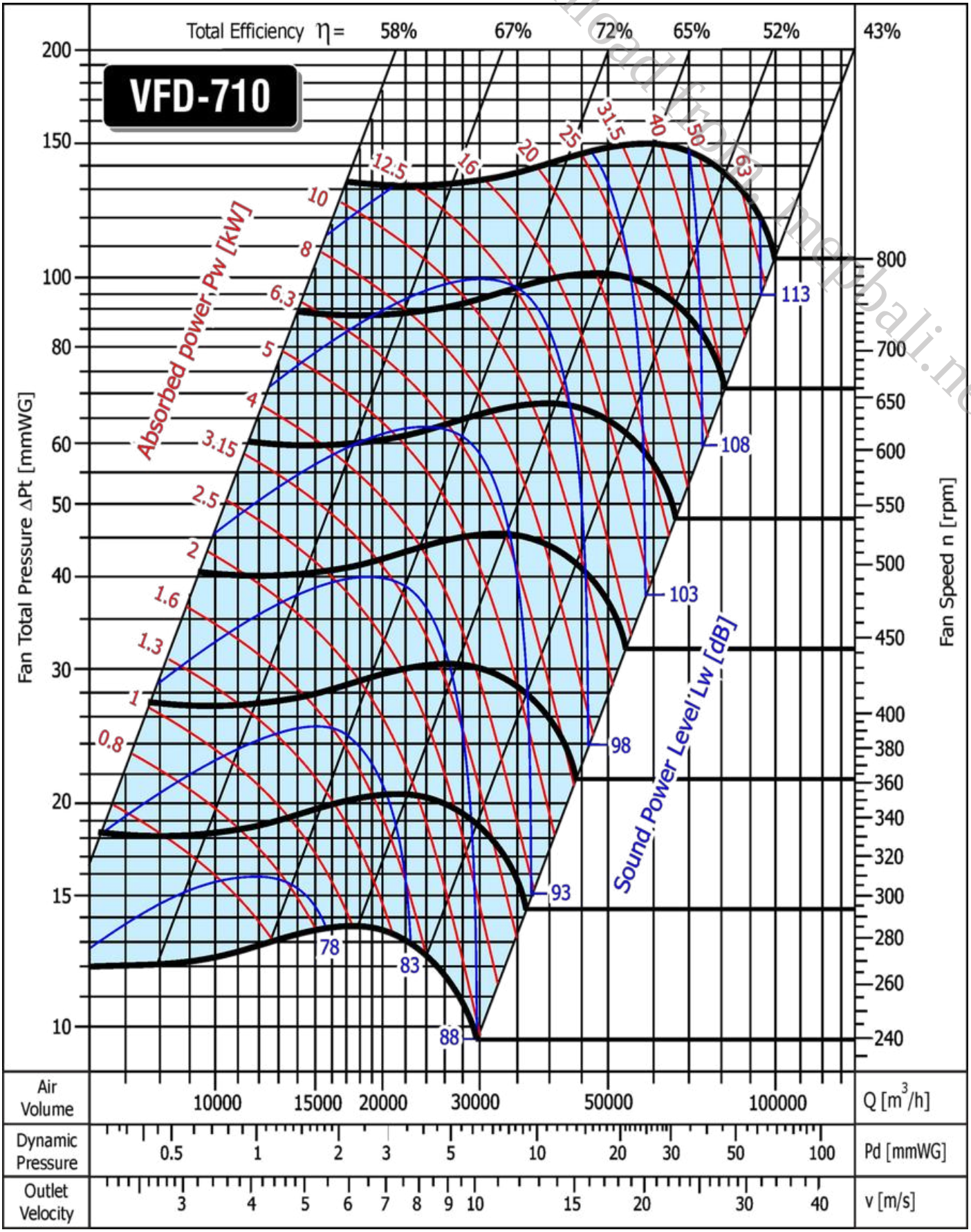
■ Performance Curves



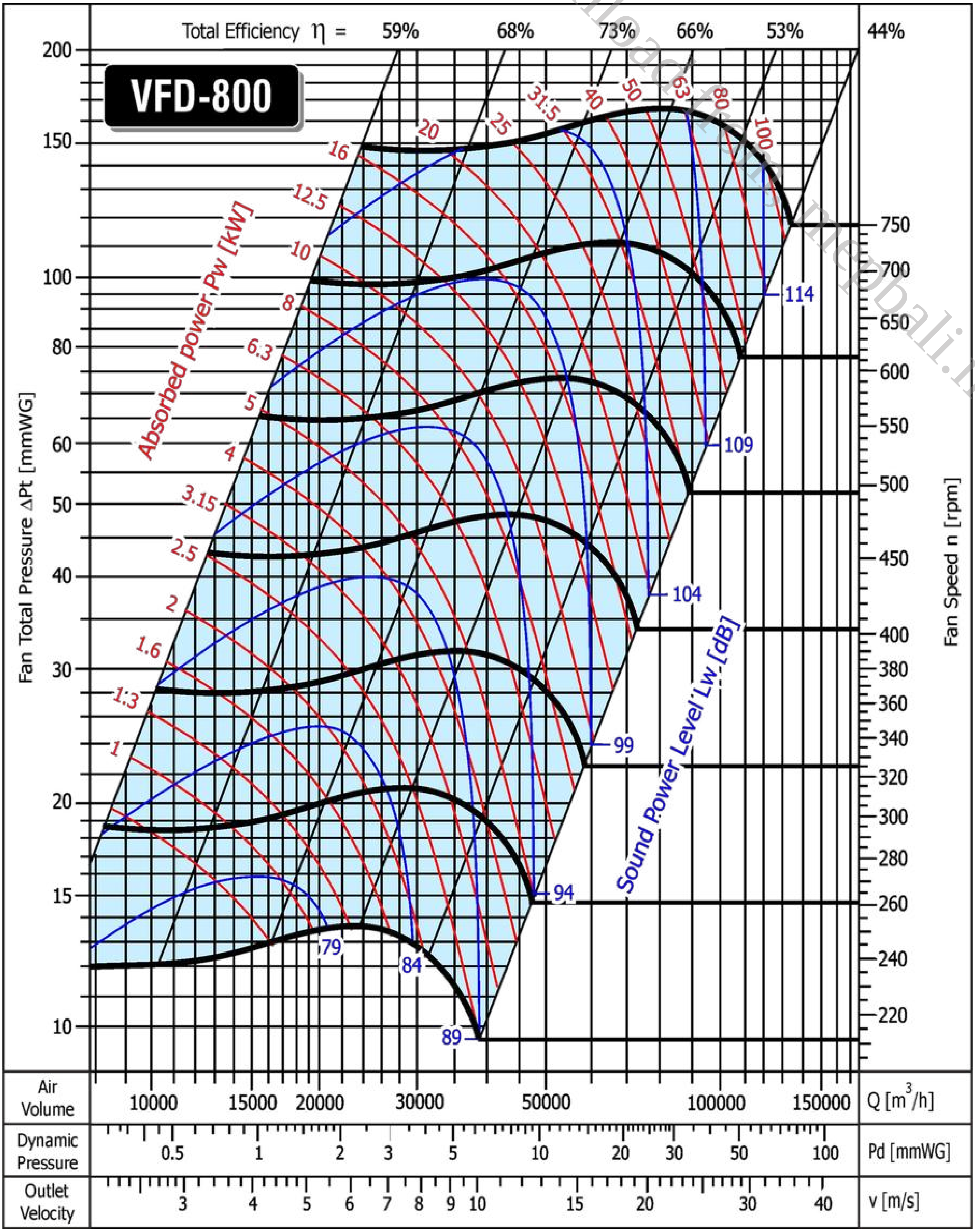
■ Performance Curves



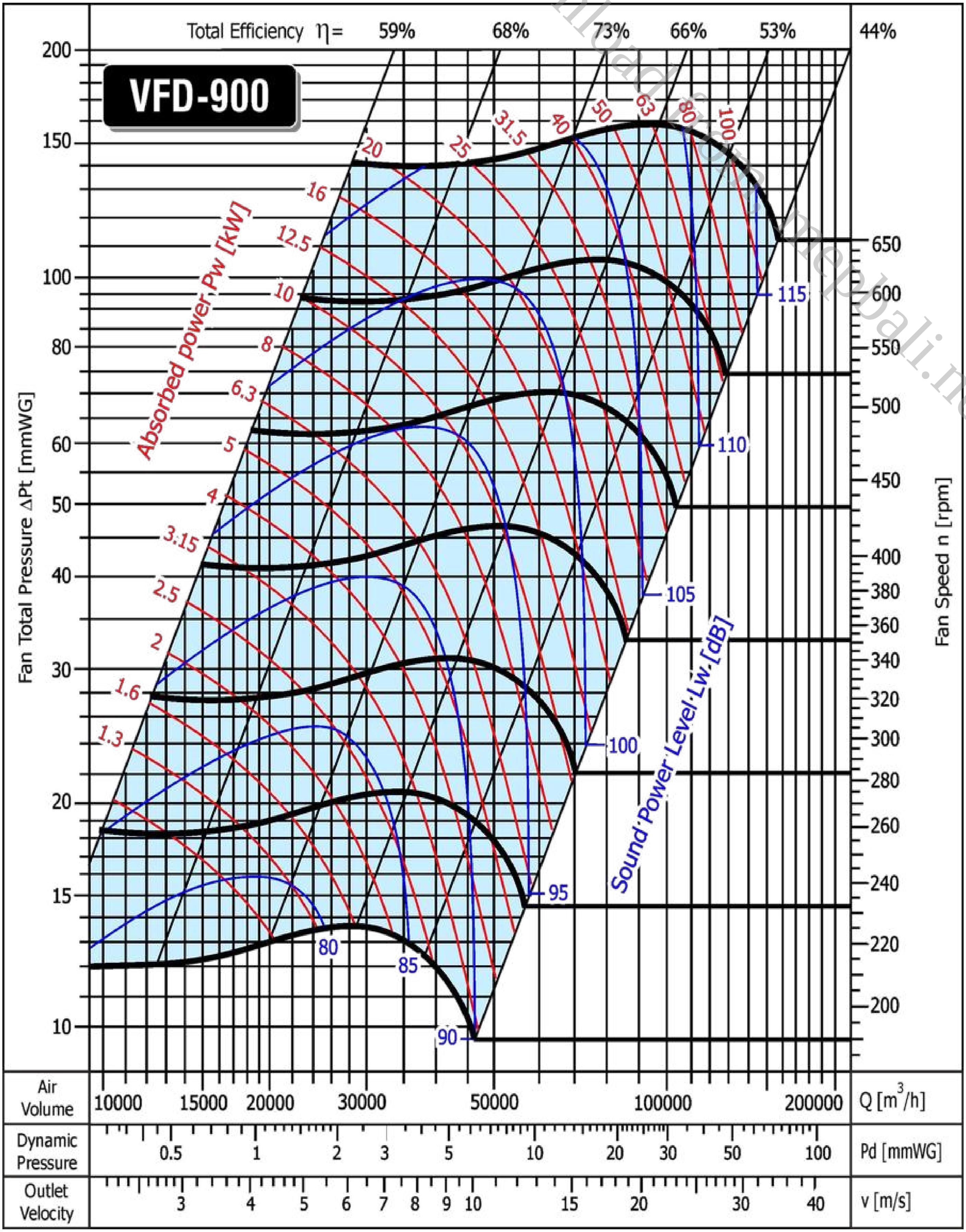
■ Performance Curves



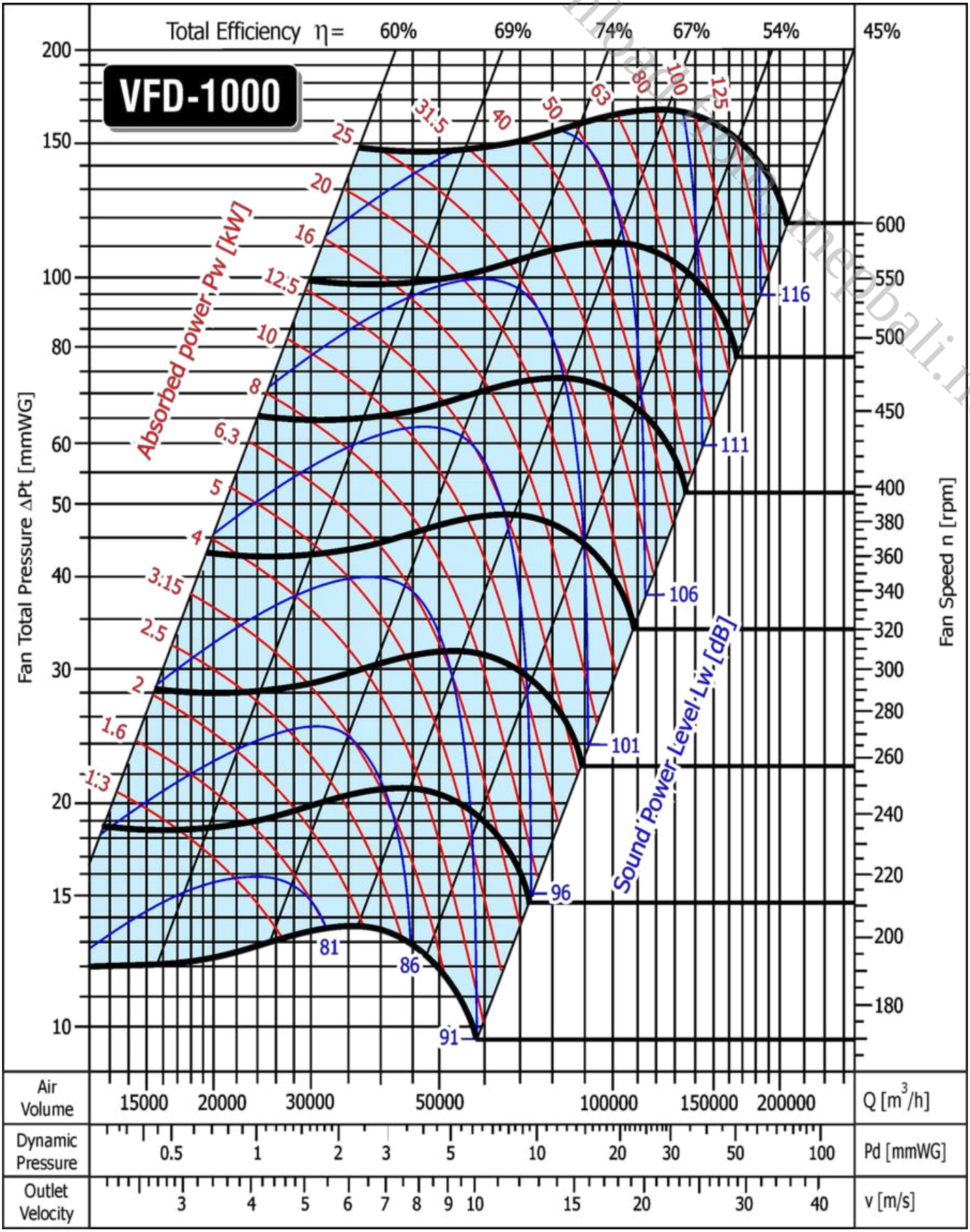
■ **Performance Curves**



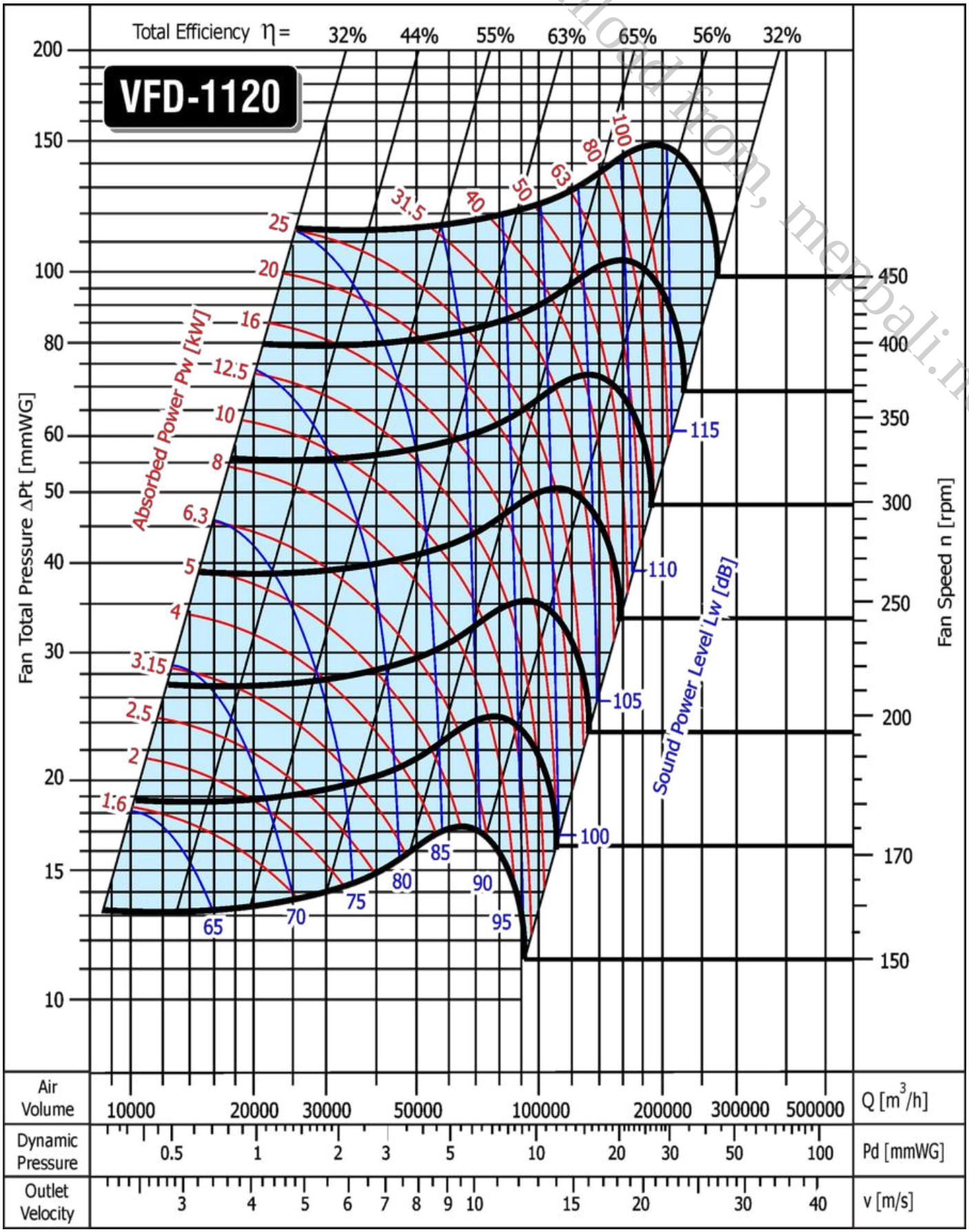
Performance Curves



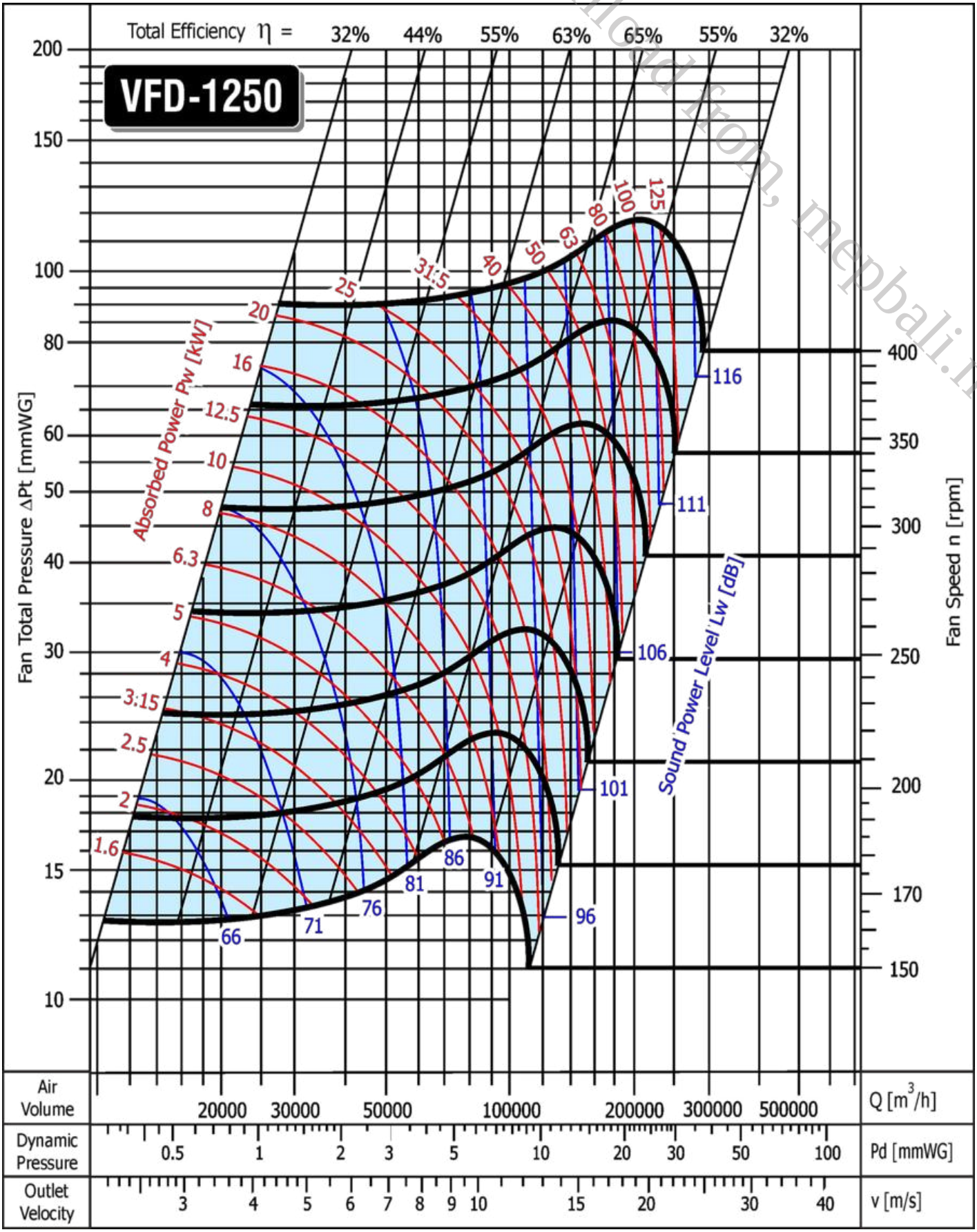
■ Performance Curves



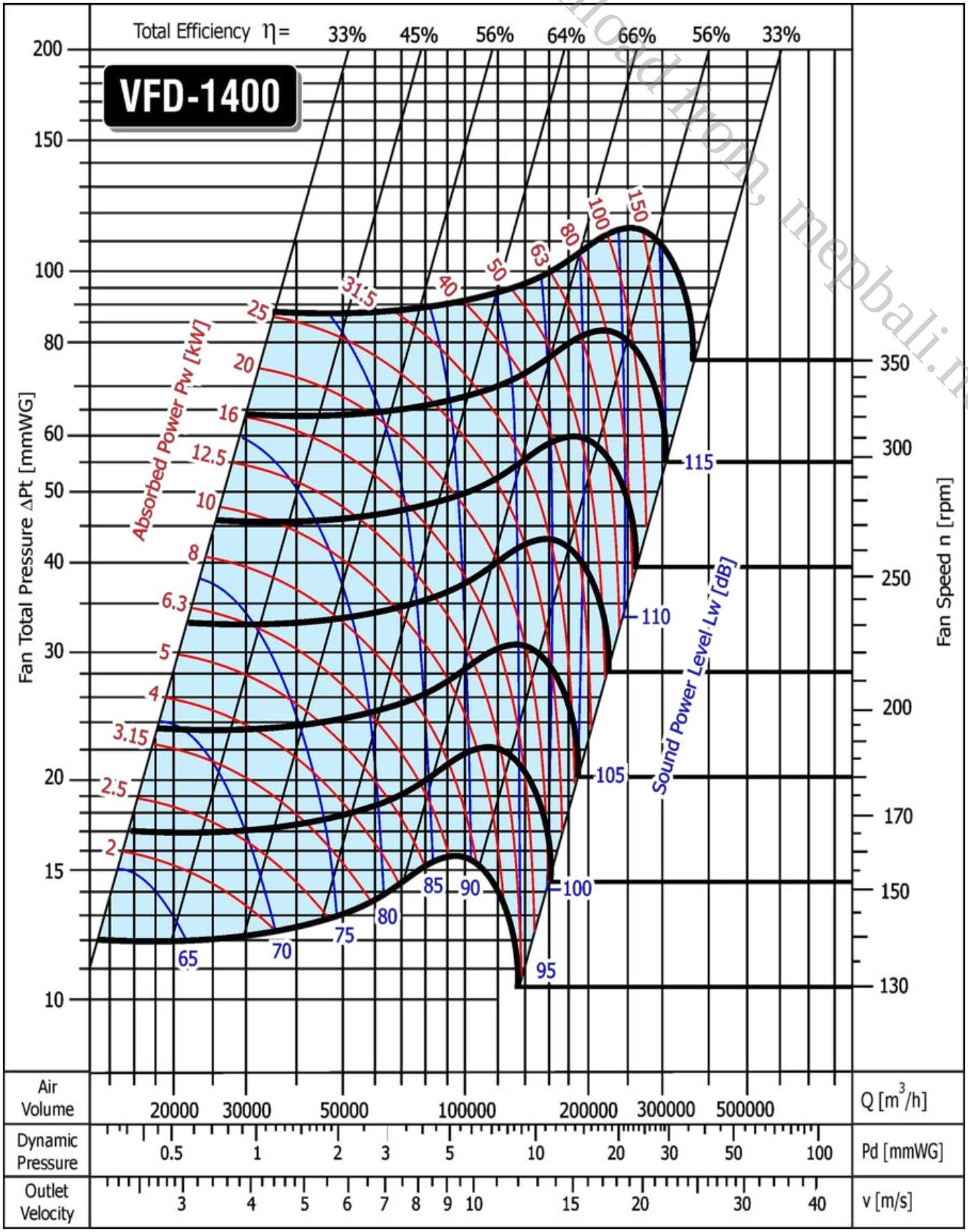
■ Performance Curves



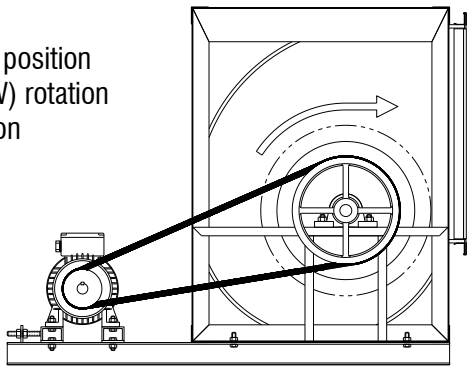
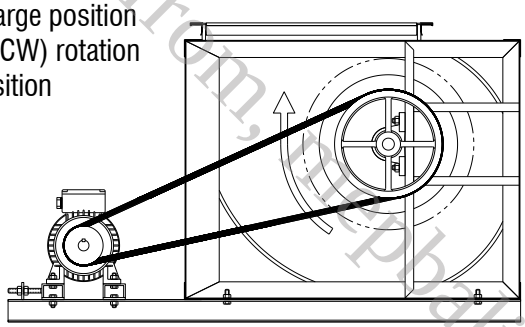
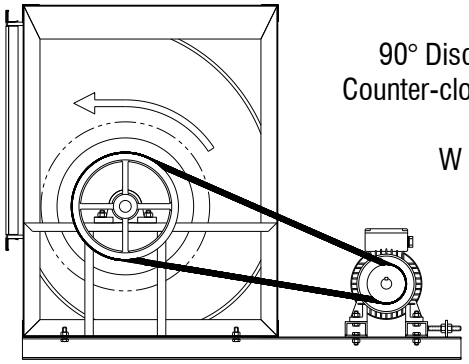
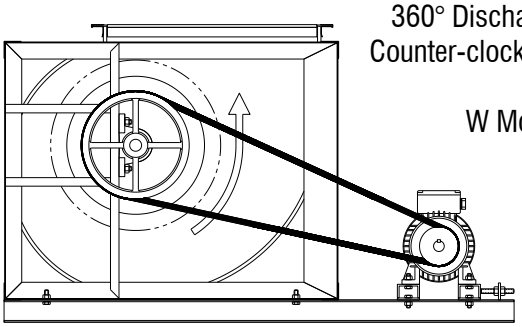
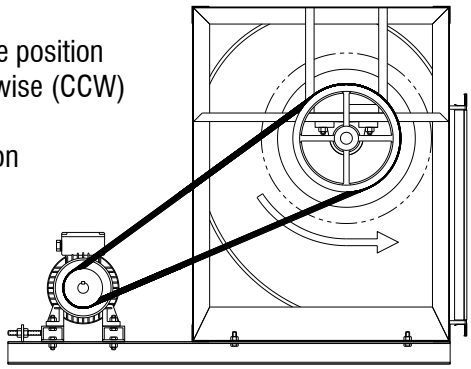
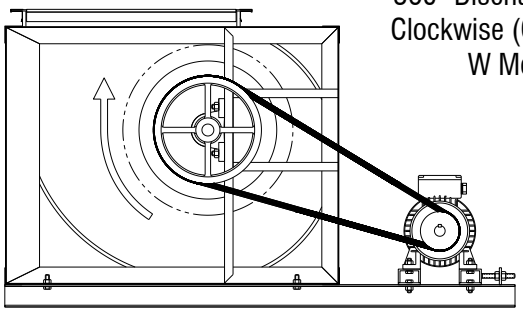
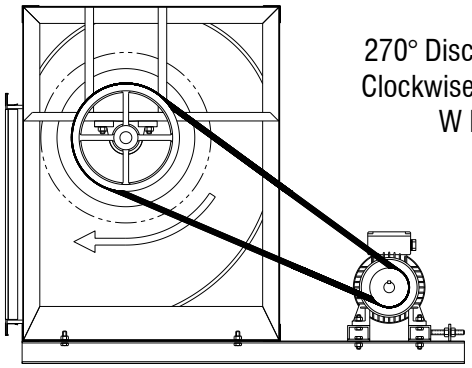
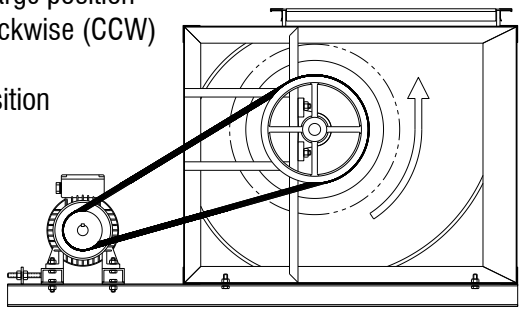
■ Performance Curves



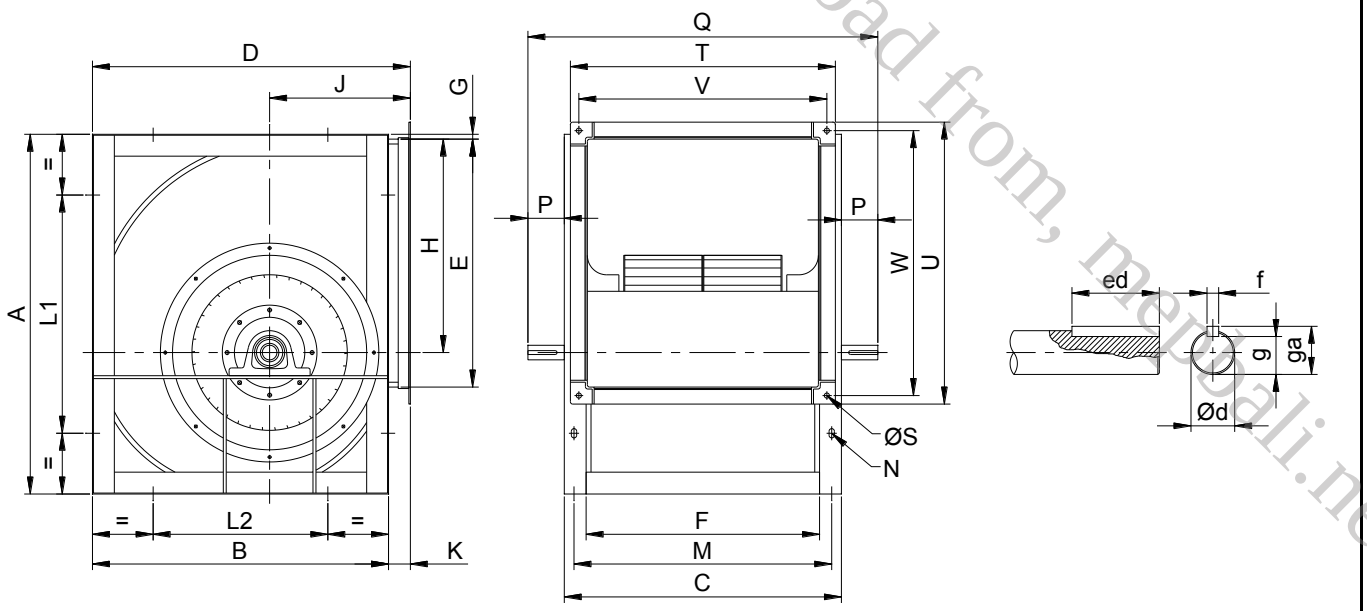
■ Performance Curves

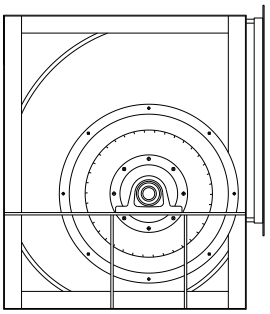


■ VANCO Common Arrangement Code

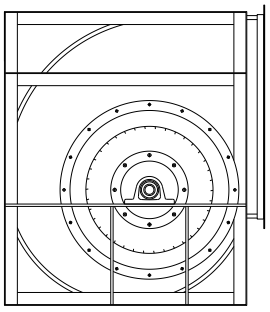
Horizontal Discharge Arrangement	*Vertical Discharge Arrangement*
HA-1 90° Discharge position Clockwise (CW) rotation Z Motor Position 	**V-1** 360° Discharge position Clockwise (CW) rotation Z Motor Position 
HA-2 90° Discharge position Counter-clockwise (CCW) rotation W Motor Position 	**V-2** 360° Discharge position Counter-clockwise (CCW) rotation W Motor Position 
HB-1 270° Discharge position Counter-clockwise (CCW) rotation Z Motor Position 	**V-3** 360° Discharge position Clockwise (CW) rotation W Motor Position 
HB-2 270° Discharge position Clockwise (CW) rotation W Motor Position 	**V-4** 360° Discharge position Counter-clockwise (CCW) rotation Z Motor Position 

■ Dimensions [mm]

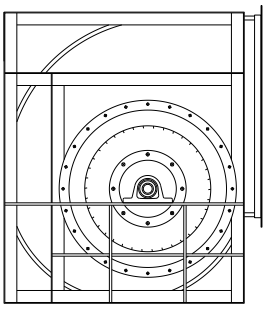




VFD 200 - 400



VFD 450 - 1000



VFD 1120 - 1400

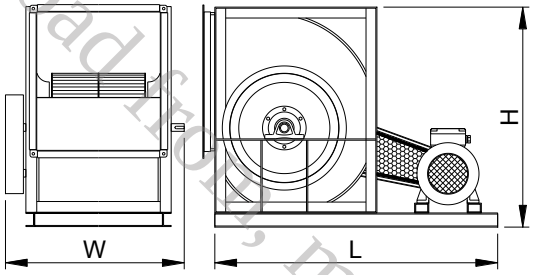
Models	A	B	C	D	E	F	G	H	J	K	L1	L2	M	N	P	Q	ØS	T	U	V	W	Ød	ed	f	g	ga
VFD-200	370	315	295	345	255	250	5	215	164	30	230	175	275	11x19	70	435	10.5	315	320	280	285	20	40	6	16.5	22.5
VFD-225	415	350	320	380	290	275	5	244	182	30	275	210	300	11x19	70	460	10.5	340	355	305	320	20	40	6	16.5	22.5
VFD-250	465	385	345	420	315	300	10	270	198	35	325	245	325	11x19	75	495	10.5	365	380	330	345	20	50	6	16.5	22.5
VFD-280	525	430	435	465	360	350	10	304	215	35	385	290	405	11x19	75	585	10.5	415	425	380	390	25	50	8	21	28
VFD-315	585	490	475	520	405	390	10	346	237	35	445	350	445	11x19	75	625	10.5	455	470	420	435	25	50	8	21	28
VFD-355	640	540	515	575	445	430	10	385	262	35	500	400	485	11x19	75	665	10.5	495	510	460	475	30	60	8	26	33
VFD-400	740	610	570	655	510	475	10	439	290	45	490	360	540	11x19	85	740	10.5	540	575	505	540	30	60	8	26	33
VFD-450	835	680	635	730	575	540	10	493	324	50	585	430	605	11x19	92.5	820	10.5	605	640	570	605	35	60	10	30	38
VFD-500	980	755	715	805	640	610	50	545	353	50	730	505	685	11x19	92.5	900	10.5	675	705	640	670	35	60	10	30	38
VFD-560	1065	840	775	890	720	670	50	606	390	50	815	590	745	11x19	95	965	10.5	735	785	700	750	40	65	12	35	43
VFD-630	1210	970	905	1020	805	795	55	685	425	50	960	720	875	11x19	100	1105	10.5	860	870	825	835	40	65	12	35	43
VFD-710	1360	1065	1000	1120	900	890	55	772	485	55	1110	815	970	11x19	120	1240	10.5	955	965	920	930	50	80	14	44.5	53.5
VFD-800	1440	1140	1110	1195	1010	1000	55	825	510	55	1190	890	1080	11x19	125	1360	10.5	1065	1075	1030	1040	50	80	14	44.5	53.5
VFD-900	1660	1310	1260	1410	1130	1120	10	978	604	100	1410	1060	1220	11x19	120	1500	10.5	1185	1195	1150	1160	60	90	18	53	64
VFD-1000	1820	1415	1300	1515	1265	1160	10	1070	658	100	1570	1165	1260	11x19	115	1530	10.5	1225	1330	1190	1295	60	90	18	53	64
VFD-1120	2080	1640	1540	1740	1400	1400	50	1200	748	100	1830	1390	1500	11x19	120	1780	10.5	1465	1465	1430	1430	60	90	18	53	64
VFD-1250	2320	1840	1610	1940	1500	1460	50	1355	830	100	2070	1590	1570	11x19	140	1890	10.5	1525	1565	1490	1530	65	110	18	58	69
VFD-1400	2550	2120	1940	2180	1780	1780	10	1500	960	100	2300	1870	1900	11x19	160	2260	10.5	1886	1886	1850	1850	75	110	20	67.5	79.5

■ Overall Dimensions [mm]

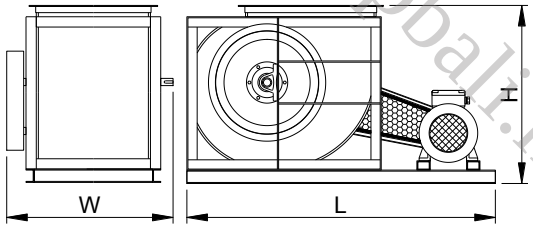
Models	Horizontal Discharge				Vertical Discharge			
	L	W	H	Weight [Kg]	L	W	H	Weight [Kg]
VFD-200	700	465	420	15.6	750	465	395	15.9
VFD-225	740	490	465	17.5	800	490	320	17.9
VFD-250	820	520	515	27.6	900	520	470	27.8
VFD-280	850	610	575	34.1	950	610	515	34.3
VFD-315	900	650	635	38	1000	650	575	38.3
VFD-355	950	690	690	53.6	1050	690	625	54
VFD-400	1000	755	790	64.3	1130	755	705	64.6
VFD-450	1200	850	900	71	1350	850	795	71.4
VFD-500	1300	930	1045	98.7	1500	930	870	99.6
VFD-560	1400	990	1130	129.1	1600	990	955	130.2
VFD-630	1500	1125	1275	160.5	1750	1125	1085	162
VFD-710	1600	1270	1440	226.9	1900	1270	1200	228.8
VFD-800	1700	1385	1520	275.1	2000	1385	1275	278.7
VFD-900	1950	1530	1760	332.4	2300	1530	1510	336.9
VFD-1000	2100	1565	1920	383.2	2500	1565	1615	388.1
VFD-1120	2300	1810	2180	754	2750	1810	1840	762
VFD-1250	2500	1920	2420	1076	3000	1920	2040	1086
VFD-1400	3000	2290	2650	1433	3500	2290	2320	1446

The above weight does not include motor and drive unit as it varies with supplier.

Horizontal Discharge :



Vertical Discharge :



BELT DRIVE CENTRIFUGAL FANS

Forward Curved Blades, Double Inlet — VFD Series