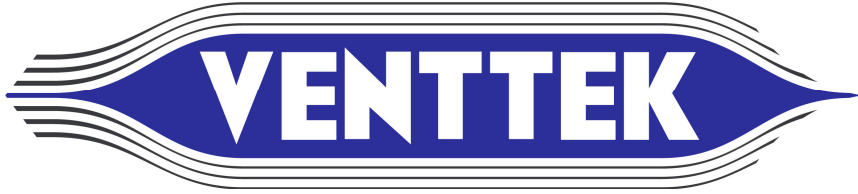


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# High Efficiency Axial Fans

Series VL



Vantilatör İmalat Sanayi  
ve Ticaret Ltd. Şti.

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## Foreword

Venttek-high-efficiency axial fans are manufactured to a solid industrial design with welded steel impellers. Different drive types can be accommodated as well as complete fabrication in stainless steel. Where prevention of explosion is required it is possible to install a brass ring within the fan casing around the impeller. The included dimension table shows only a segment of the possibilities. Most special requirements can be accommodated through addition of appropriate components and specific construction measures, for example in aggressive mediums and flue gases, to provide a satisfactory solution. In such specific applications, please contact us with your special requirements. In all applications, horizontal as well as vertical installation is possible.

Two different series axial fans are produced. Namely the VL and NL series, the difference is in impeller design. By application of upstream guide vanes (VL) or downstream guide vanes (NL) we are able to satisfy a wide operating range. Changing the number of blades allows the adaptation to the desired operating parameter even where the motor speed is constant. This permits considerable flexibility in the fan casings.

This literature only documents characteristic curves of the VL6.L types; where the desired operating parameters can not be satisfied with the presented data, please contact us with your requirements.

The following table permits insight in to our specification terminology:

Examples:

10 blades, with guide vanes:	VL	6	0	L	/ AU 400 M
6 blades, without guide vanes:	VL	6	6		/ AU 400 M

Hub ratio D1/D2:	0,6 (6)
Number of blades:	10 (0)
Upstream guide vanes:	yes (L)
Connection:	Ducted (AU); alternatively: free inlet (AE)
Nominal size:	400
Drive:	Direct (M); alternatively: Belt-drive (R)

## Fixtures & Attachments

- Motor construction type B3 or B5, 50Hz, 380V (Motor supply by customers is also possible)
- Externally mounted terminal boxes
- Frequency converters
- Rectifiers to stabilize the air flow on the suction or pressure side
- Diffusers
- Compensators with or without guarding
- Bearing and vibration control
- Protective gratings for both sides
- Encased and transverse ventilated belt drive
- Cleaning doors and/or flaps
- Additional base frame
- Vibration dampening
- Outriggers
- Feet
- Installation and Commissioning
- Maintenance contracts

## Special Modifications

- Different drives: (V-belt drive, flat-belt drive, direct drive)
- Sound insulated fan casing
- Hot-dip galvanizing,, spraying alitation, or special painting
- Impellers with hollow blades, or special construction materials
- Abrasion resistant coated impeller blades
- Impeller statically and dynamically levered according to VDI 2056 smaller Q 2.5
- Slew able impeller-/ drive unit
- Multiple divided fan casing
- Carriers for relative wind fans
- Special motors
- Special constructions

## Driving Arrangements

The following motor drives can be delivered for venttek high-efficiency axial fans (airflow across motor/bearing)

MF:	Direct	(impeller on motor shaft, construction type B5)
M:	Direct	(impeller on motor shaft, construction type B3)
R:	Belt Drive	(motor construction type B3 on base frame or motor plate)

Different drives and insulating materials of motors make operating temperatures in excess 40 °C possible.

## Bearing

Depending on the application and the medium to be transported venttek employ in cases of a belt drives roller bearings in plummer blocks or block bearing housings. Lubrication points protrude beyond the fan casing, this makes maintenance lubrication simpler.

## Specific fan curves

In most applications there is no diffuser in action. Therefore the specific fan curves also display the installation efficiency that results in instances, of a fan casing of the same diameter, in the absence of a diffuser and take into consideration any conversion loss. The indicated efficiencies refer to fans with the nominal size 1000. With regard to other diameters there is a deviation from the above due to slit influence etc. Where necessary corrections have already incorporated the specific fan curve sheet, removing the necessity of attending to any interfering influences during the installation.

A further advantage of venttek high-efficiency axial-fans in particular those with guiding vanes, is the high pressure ratio while the specific number of revolutions remains relatively low. This effect leads to a low circumferential tip speed, which keeps the noise level low.

Additionally it is necessary to consider nominal pressure differences of both VL and NL series fans. Information about the limit of the permissible total pressure difference (at  $\rho = 1,2 \text{ kg/m}^3$ ) is required, which influences construction. According to VDMA 24164 the nominal pressure difference will be equal to the total pressure difference, if the fan runs with  $\eta_{\max}$  and highest permissible number of rotations.

## Nominal Pressure Difference

Nominal size	VL 60	NL 60
315 to 710	160	100 (daPa)
800 to 2240	100	63 (daPa)

These nominal pressure differences and the following characteristic curves refer to the maximal number of blades.

With reference to fans with higher nominal pressure differences please contact us with your requirements.

It is important to note, where drive type M is necessary the motor terminal box should not disturb air flow for reasons of turbulence. Therefore aside from an easier installation it would be preferred to install motors with divided terminal box.

## Application of characteristic curve sheets

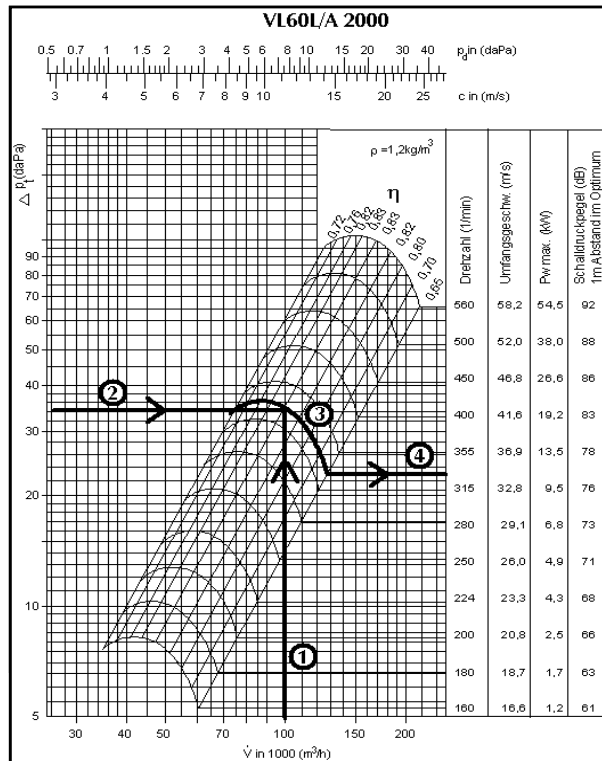
The appropriate characteristic fan curve sheets must be used in all determinations according to the following description for the appropriate nominal size:

1. After the desired nominal size NG ( $\emptyset$ ) is selected, the operating manual must be consulted for the appropriate basic characteristic curve sheet. In addition it is necessary to take into account, that the lower horizontal ladder (step 1) shows the air flow V (in m<sup>3</sup>/h) for the whole cross sectional area and the left vertical ladder shows the total pressure difference Dpt (step 2). In applications with an unrestricted exhaust and without any attached pipeline or diffuser, take the dynamic pressure for the annulus area ( $p_{dR} = 2,44 p_d$ ) for calculations.
2. After consulting the operating manual the number of revolutions, the circumferential tip speed, the maximum power requirements and noise generated can be read off the corresponding characteristic curve.
3. Follow the characteristic curve to the right along the horizontal axis (step 4). On the corresponding line of this horizontal axis the appropriate values can be read off. If the operating parameters are located between two characteristic curves an additional curve has to be created by parallel displacing (step 3). If a suitable characteristic curve cannot be found when the number of rotations is given, another nominal size has to be chosen.
4. On this characteristic curve the corresponding efficiency ( $\eta$ ) can be read off. With this value the shaft performance can be determined according to the following formula:

$$P_w \text{ (kW)} = \frac{\dot{V} \text{ (m}^3\text{/h)} \cdot \Delta p_t \text{ (daPa)}}{3600 \cdot \eta \text{ (\%)}}$$

**Determination Example:**

Operating manual:  $V=100.000 \text{ m}^3/\text{h}$   
 $p_t = 34 \text{ daPa}$   
 Chosen:  $NG=2000,$   
 $n=335 \text{ 1 / min.}$   
 Result: Type VL60L/A.2000  
 $\eta = 0,83$   
 $P_w=11,4 \text{ kW}$



The driving motors performance should be approximately 10% higher than the shaft performance of the fan if it is directly driven, similarly for motors attached with a coupling and about 15% higher than the shaft performance if it is belt driven. In case where an unknown operating manual exists, the maximum shaft performance has to be estimated. This value is determined by approximation for that point on the corresponding characteristic curve that can be found on the right end of the characteristic curve on the above sheet.

**Important Notice:**

Fans must not run at operating conditions to the left of the areas given by the above sheet. A flow control throttle has to be avoided, in addition parallel operations. Please contact us if there are any doubts.

## Explosion protection according to VDMA 24169 part 1

The fans contained in this catalogue can be delivered according to the above guidelines with the type designation „ex“. However a small performance loss is incurred, which must be compensated for by increasing revolutions. An additional increase in power consumption cannot be avoided due to the bigger impeller tip clearance. Nevertheless the sheets with characteristic fan curves can be used to select the desired nominal size. To get the exact data referring to power consumption and revolutions please contact us.

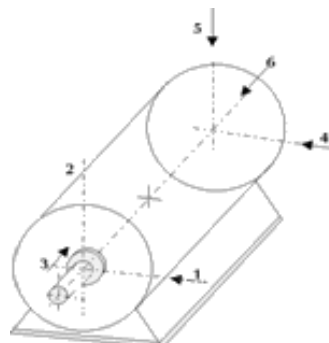
suction from zone *	2	2	1	0	0
installation within zone	$\geq 2$	1	$\geq 1$	$\geq 1\text{m}$ if possible $\geq 2$	0
construction permission	-	-	-	provided!	<b>not permitted</b>
material combination (rotating against stationary bearing)	-	on no account steel with light metal, steel with steel permitted!		Steel with bronze, brass, copper	
bearing	-	only rolling bearings, fatigue durability at least 40.000h			
impeller	-	must be protected on the shaft against torsion and displacement!			
Tip clearance (radial + axial)	-	axial fan $\geq 1\%$ of the impeller's outside diameter radial fan of the impeller's entering diameter		{however always $\geq 2\text{ mm}$	
inlet, outlet	-	protected by grating s with gaps of max 12mm in breadth and height, those must be grounded			
drive	-	conductive v-belts, 1 piece more than usual		no belt drive	
grounding resistance	-	for every metal part and electrically conductive layers $\leq 10^6\text{ Ohm}$			
*) zone 2: explosion hazard scarcely and only for a short time zone 1: explosion hazard sometimes zone 0: explosion hazard constant or for a long time					

## Vibration Technology

Vibration constitutes a change of a physical quantity, which is regularly repeated to a certain extent. In fan production the driving motor and the rotor form a system in which vibration is possible.

To be able to judge a machine's vibration behavior, the vibration strength must be determined according to the VDI-guideline 2056. For the permitted remaining unbalance of rotor the VDI-guidelines 2060 forms the basis. Venttek balances all rotors according to quality grade Q = 6,3. If it is necessary, the rotors airborne can also be balanced according to quality grade Q = 2,5.

Recommended measuring points according to VDI 2056:



## Acoustic Technology

The knowledge about the acoustic power, emitted by a machine (fan) is extremely important with respect to the linked noise pollution of people within the housing and working domain as well as to the corresponding laws. Apart from theoretical considerations – determining acoustic values from operation parameters, noise measurements are still necessary to be able to give exact information. The basis of noise measurements with fans is formed by the following guidelines:

DIN 45635 – noise measurement with machines, noise emission and in these cases the enveloping surface method for fans DIN 45635, part 1.

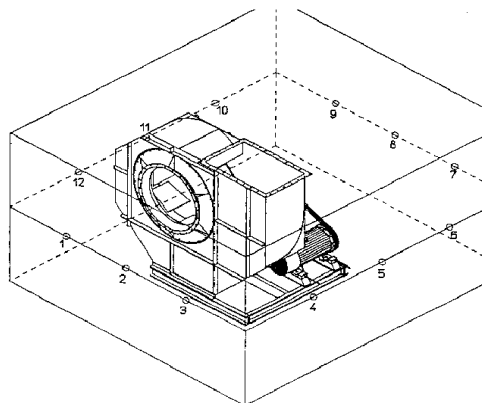
This measuring method is a noise measuring procedure in order to determine the acoustic noise, emitted by a machine into the surrounding air (airborne noise emission). Sound pressure level measurements on the enveloping surface surrounding the machine the emitted acoustic power are applied to determine the acoustic power.

This actually means, that the acoustic level is registered at single, quite few measuring points. The resulting values are employed to calculate the average, to which the measuring surface dimension, a logarithmic quantity, is added.

The human ear has the ability to feel deep frequencies much softer than high ones, that means its sensitiveness depends on frequencies. To consider this effect a defined conversion of the physical acoustic pressure level into the human ear's sensitiveness, the a-valuation, was introduced.

The A-acoustic capacity LPA can be figured out with the measuring surface's acoustic pressure level LA and the measuring surface dimension LS according to DIN 45635 sheet 1. It is held  $LPA = LA + LS$ .

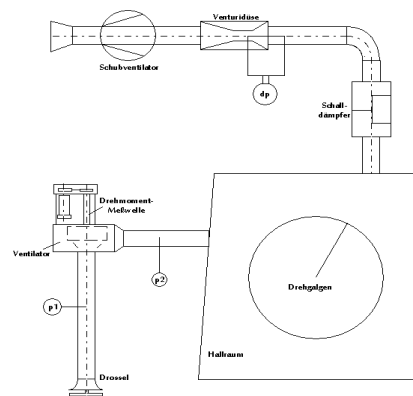
Example for enveloping surface method related to a reflecting surface plane.





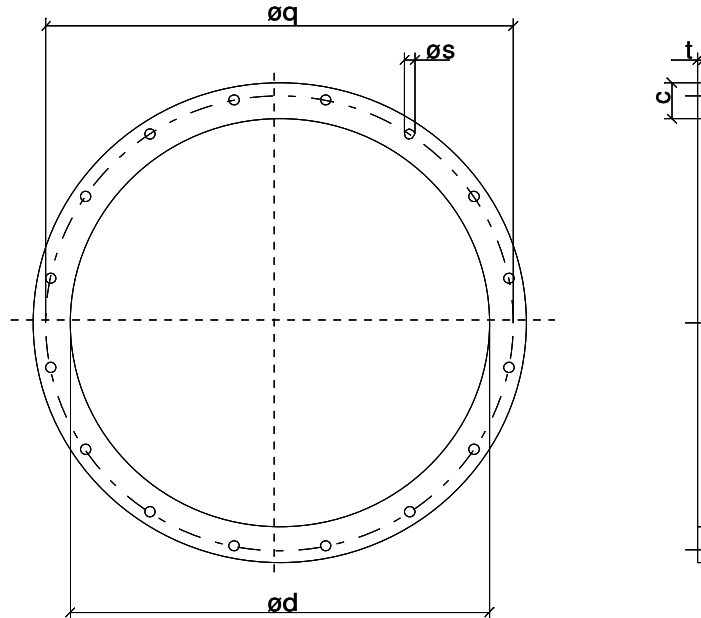
## Measuring technology

All characteristic curves contained in this catalogue were drawn up with the help of the MEISSNER + WURST test bench according to DIN 24163.  
The following illustration shows the construction of the test bench.



If you desire detailed information about the upper topics, please inquire.

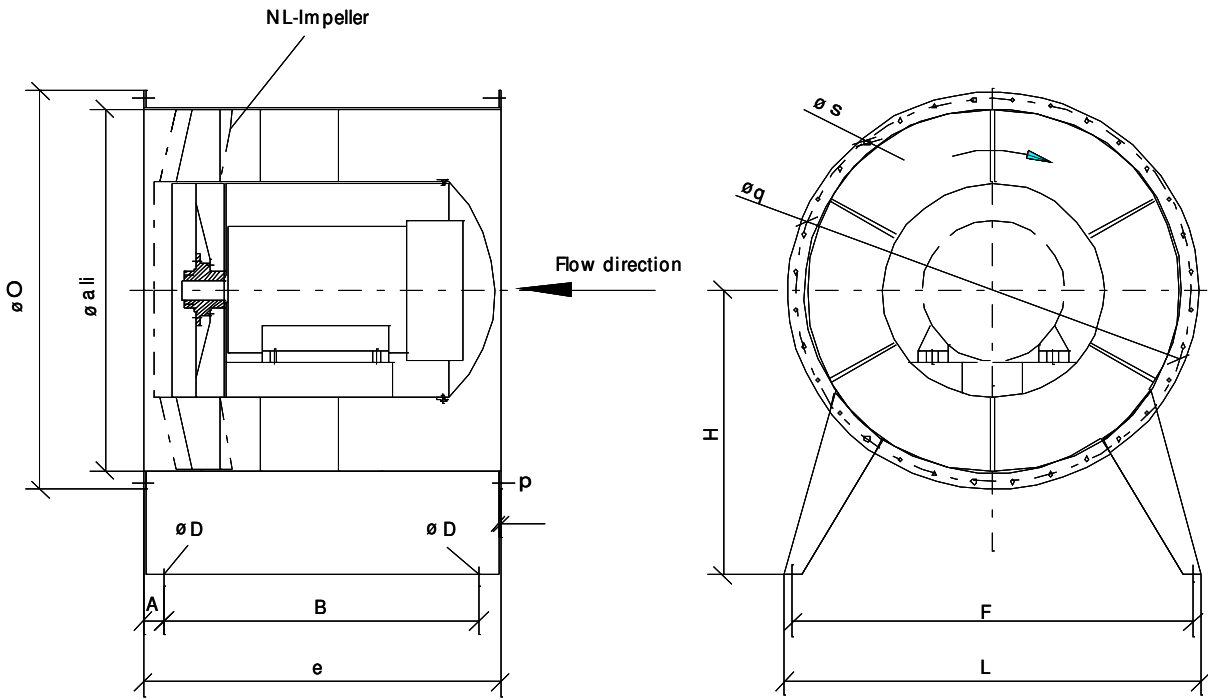
## Flanges for axial fans



nominal size	outside ØO	inside Ø d		breadth x thickness c x t	hole circle Ø q + 0,5	hole-Ø s + 0,5	number of holes	screw s	
			maximum deviation						
315	402	322	1,5 0	40 x 6	366	12	8	M10	
355	442	362			405				
400	488	408			448				
450	538	458			497				
500	588	508			551				
560	668	568	2 0	50 x 6	629	14	16	M12	
630	738	638			698				
710	818	718			775				
800	908	808			861				
900	1028	908		60 x 6	958		24		
1000	1128	1008			1067				
1120	1250	1130		60 x 8	1200	18	32		M16
1250	1387	1267			1337				
1400	1541	1421			1491				
1600	1713	1593			1663				
1800	1905	1785	1856						
2000	2123	2003	2073						
2240	2404	2244	80 x 8		2334		40		

All information in mm.

VL(NL)6\_/AU 315 - 2240 M (MF)  
with and without foot

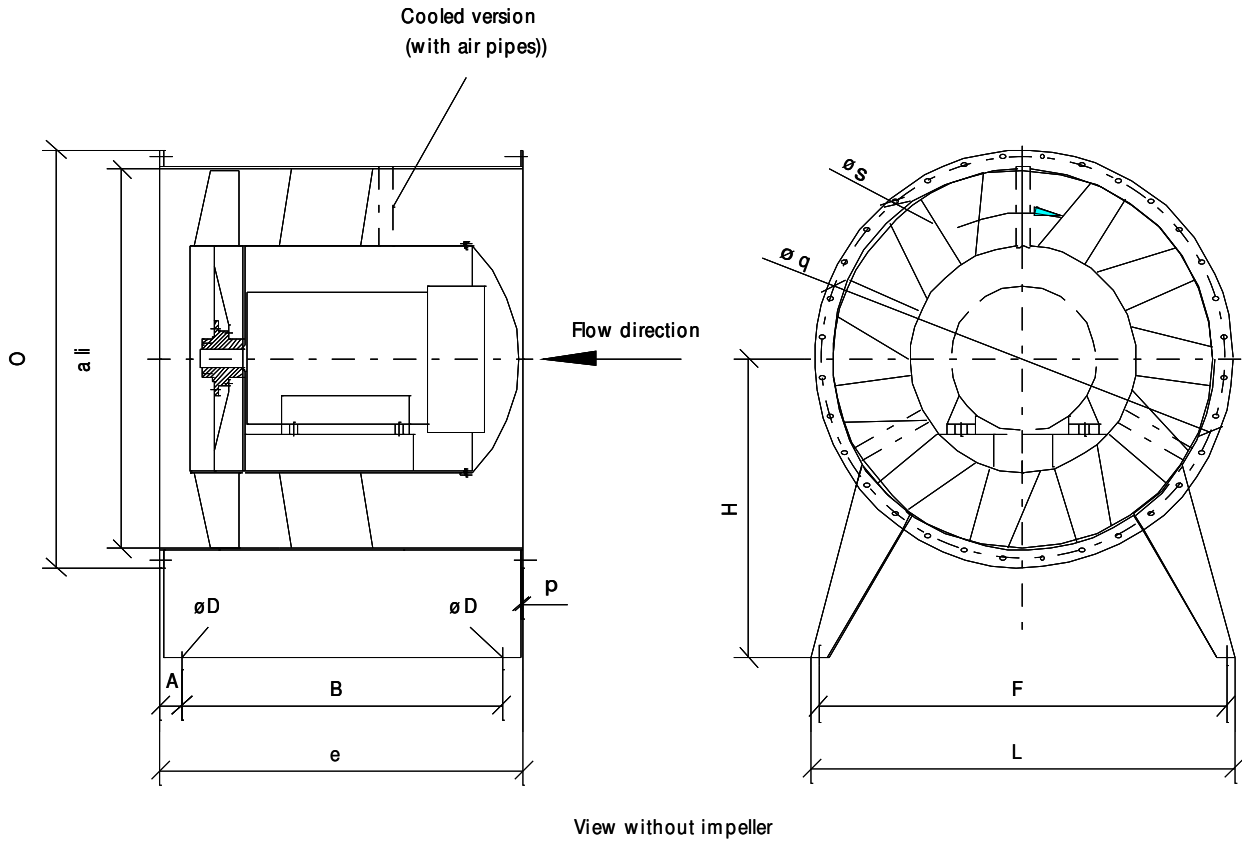


View without impeller

NG	$a^{\varnothing}$	e	$O^{\varnothing}$	p	$q^{\varnothing}$	s		A	B	$D^{\varnothing}$	F	L	H	article no. with foot	article no. without foot
315	315	390	402	6	366	12	8	40	310	12	354	390	270	500681	500699
355	354	410	442	6	405	12	8	40	330	12	404	440	300	500682	500700
400	397	450	488	6	448	12	12	40	370	12	444	480	330	500683	500701
450	446	480	538	6	497	12	12	40	400	12	494	530	375	500684	500702
500	500	520	588	6	551	12	12	50	420	14	544	580	415	500685	500703
560	562	580	668	6	629	14	16	50	480	14	610	650	460	500686	500704
630	631	640	738	6	698	14	16	50	540	14	700	740	520	500687	500705
710	708	720	818	6	775	14	16	50	620	14	770	810	570	500688	500706
800	794	800	908	6	861	14	24	50	700	14	860	900	630	500689	500707
900	890	890	1028	6	958	14	24	60	770	18	960	1010	710	500690	500708
1000	999	980	1128	6	1067	14	24	60	860	18	1070	1120	790	500691	500709
1120	1122	1100	1250	8	1200	18	32	70	960	18	1200	1250	870	500692	500710
1250	1257	1200	1387	8	1337	18	32	70	1060	18	1350	1400	990	500693	500711
1400	1411	1320	1541	8	1491	18	32	70	1180	18	1490	1560	1090	500694	500712
1600	1583	1500	1713	8	1663	18	40	70	1360	18	1660	1730	1220	500695	500713
1800	1776	1650	1905	8	1856	18	40	70	1510	18	1880	1950	1350	500696	500714
2000	1993	1800	2123	8	2073	18	40	75	1650	18	2080	2150	1520	500697	500715
2240	2236	2000	2404	8	2334	18	40	75	1850	18	2320	2390	1960	500698	500716

# VL6\_L/AU 315 - 2240 M (MF)

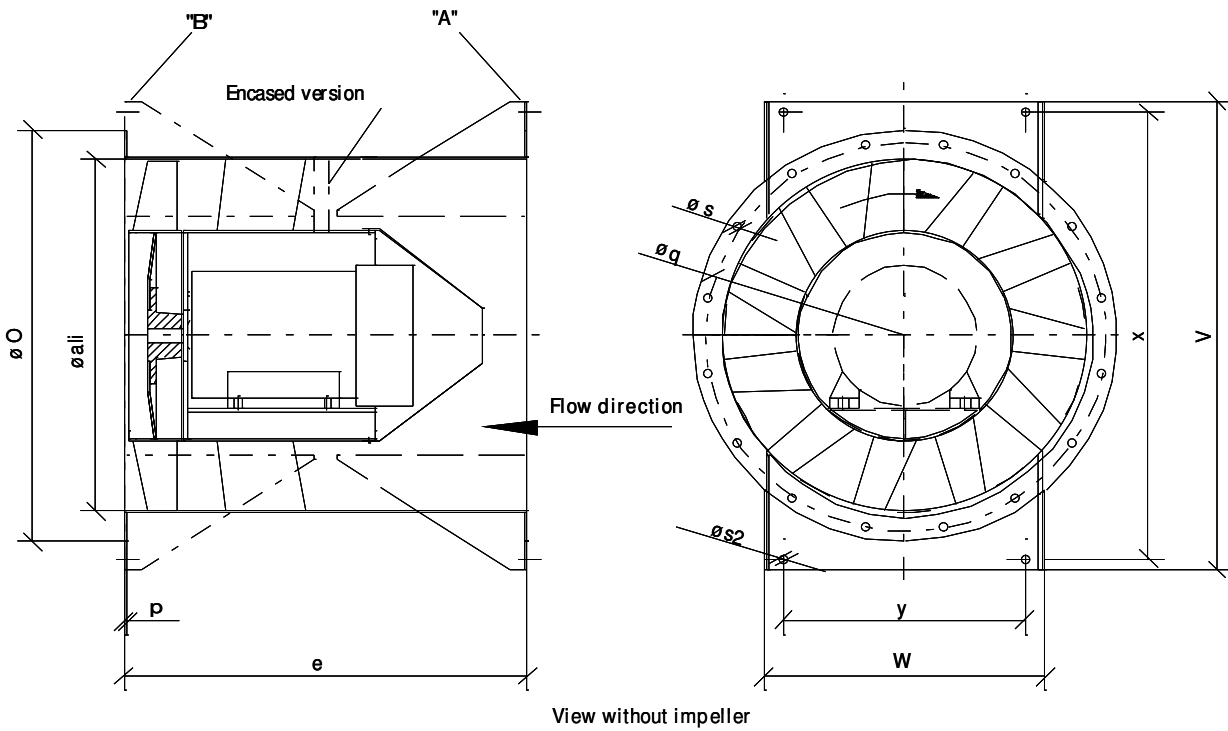
with and without foot



NG	a $\varnothing$	e	O $\varnothing$	p	q $\varnothing$	s	A	B	D $\varnothing$	F	L	H	article no. with foot	article no. without foot	
315	315	390	402	6	366	12	8	40	310	12	354	390	270	500717	500735
355	354	410	442	6	405	12	8	40	330	12	404	440	300	500718	500736
400	397	450	488	6	448	12	12	40	370	12	444	480	330	500719	500737
450	446	480	538	6	497	12	12	40	400	12	494	530	375	500720	500738
500	500	520	588	6	551	12	12	50	420	14	544	580	415	500721	500739
560	562	580	668	6	629	14	16	50	480	14	610	650	460	500722	500740
630	631	640	738	6	698	14	16	50	540	14	700	740	520	500723	500741
710	708	720	818	6	775	14	16	50	620	14	770	810	570	500724	500742
800	794	800	908	6	861	14	24	50	700	14	860	900	630	500725	500743
900	890	890	1028	6	958	14	24	60	770	18	960	1010	710	500726	500744
1000	999	980	1128	6	1067	14	24	60	860	18	1070	1120	790	500727	500745
1120	1122	1100	1250	8	1200	18	32	70	960	18	1200	1250	870	500728	500746
1250	1257	1200	1387	8	1337	18	32	70	1060	18	1350	1400	990	500729	500747
1400	1411	1320	1541	8	1491	18	32	70	1180	18	1490	1560	1090	500730	500748
1600	1583	1500	1713	8	1663	18	40	70	1360	18	1660	1730	1220	500731	500749
1800	1776	1650	1905	8	1856	18	40	70	1510	18	1880	1950	1350	500732	500750
2000	1993	1800	2123	8	2073	18	40	75	1650	18	2080	2150	1520	500733	500751
2240	2236	2000	2404	8	2334	18	40	75	1850	18	2320	2390	1960	500734	500752

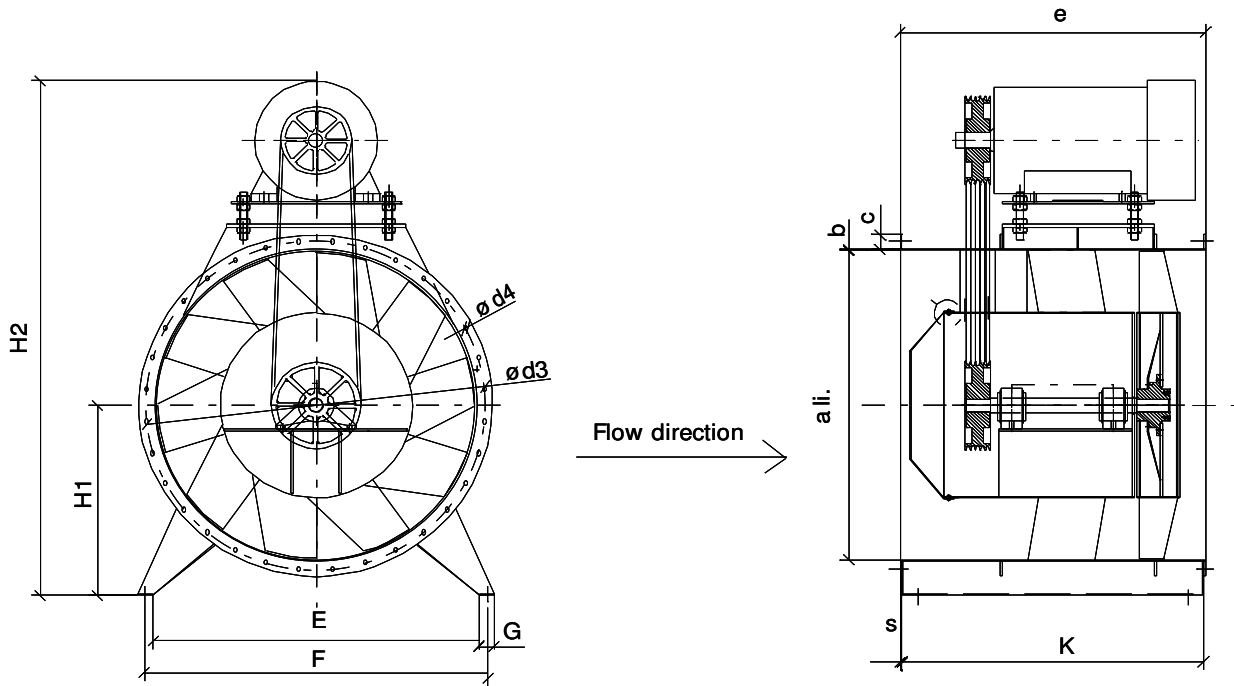
# VL6\_L/AU 315 - 2240 M (MF)

With outriggers



NG	a $\varnothing$	e	O $\varnothing$	p	q $\varnothing$	s		V	W	x	y	s2 $\varnothing$	article no.
315	315	390	402	6	366	12	8	500	290	460	220	12	500758
355	354	410	442	6	405	12	8	540	310	500	240	12	500759
400	397	450	488	6	448	12	12	580	390	540	320	12	500760
450	446	480	538	6	497	12	12	640	430	600	360	12	500761
500	500	520	588	6	551	12	12	700	470	660	400	12	500762
560	562	580	668	6	629	14	16	780	450	740	380	14	500763
630	631	640	738	6	698	14	16	840	490	800	420	14	500764
710	708	720	818	6	775	14	16	920	570	880	500	14	500765
800	794	800	908	6	861	14	24	1020	630	980	560	14	500766
900	890	890	1028	6	958	14	24	1120	830	1080	760	14	500767
1000	999	980	1128	6	1067	14	24	1240	930	1190	860	14	500768
1120	1122	1100	1250	8	1200	18	32	1390	1010	1330	900	18	500769
1250	1257	1200	1387	8	1337	18	32	1570	1130	1500	1000	18	500770
1400	1411	1320	1541	8	1491	18	32	1740	1260	1680	1120	18	500771
1600	1583	1500	1713	8	1663	18	40	1950	1440	1760	1280	18	500772
1800	1776	1650	1905	8	1856	18	40	2230	1620	1980	1440	18	500773
2000	1993	1800	2123	8	2073	18	40	2480	1800	2200	1600	18	500774
2240	2236	2000	2404	8	2334	18	40	2780	2020	2470	1800	18	500775

VL6\_L/AU 315 - 2240 R  
overhead drive

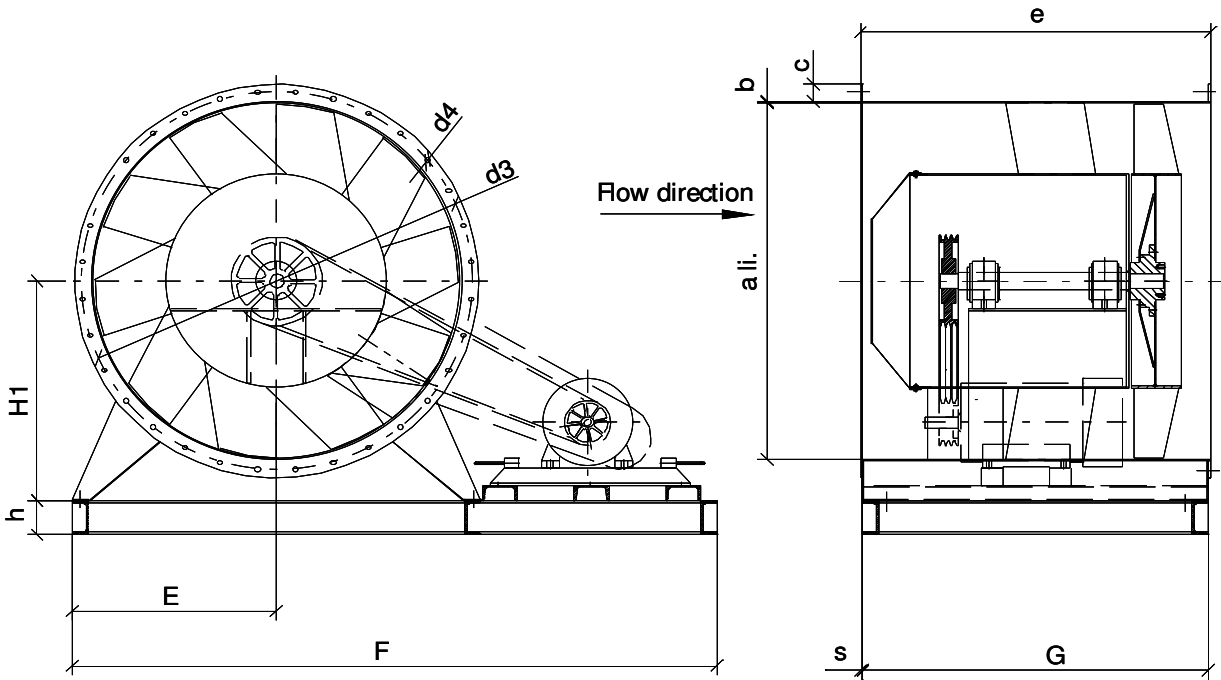


NG	a $\varnothing$	b	c	d3 $\varnothing$	d4 $\varnothing$	e <sup>1)</sup>	F <sup>2)</sup>	G	H1	H2	K	E	article no.
315	315	2	40	366	12	390	354	18	270	770	378	310	500776
355	354	2	40	405	12	410	404	18	300	880	398	360	500777
400	397	3	40	448	12	450	444	18	330	900	438	400	500778
450	446	3	40	497	12	480	494	18	375	920	468	450	500779
500	500	3	40	551	14	520	544	18	415	1100	508	500	500780
560	562	3	50	629	14	580	610	20	460	1180	568	550	500781
630	631	3	50	698	14	640	700	20	520	1340	628	640	500782
710	708	3	50	775	14	720	770	20	570	1450	708	710	500783
800	794	4	50	861	14	800	860	20	630	1570	788	800	500784
900	890	4	60	958	18	890	960	25	710	1800	878	890	500785
1000	999	4	60	1067	18	980	1070	25	790	1950	968	1000	500786
1120	1122	4	60	1200	18	1100	1200	25	870	2120	1084	1130	500787
1250	1257	4	60	1337	18	1200	1350	25	990	2390	1184	1280	500788
1400	1411	4	60	1491	18	1320	1490	35	1090	2600	1304	1420	500789
1600	1583	4	60	1663	18	1500	1660	35	1220	2870	1484	1590	500790
1800	1776	4	60	1856	18	1650	1880	35	1350	3290	1634	1800	500791
2000	1993	4	60	2073	18	1800	2080	35	1520	3660	1784	2010	500792
2240	2236	4	60	2334	18	2000	2320	35	1960	4270	1984	2250	500793

- 1) Dimensions dependent on motor size, tolerances up to +150mm possible  
 2) Dimensions dependent on motor size, tolerances up to +/- 100mm possible

# VL6\_L/AU 315 - 2240 R

lateral drive

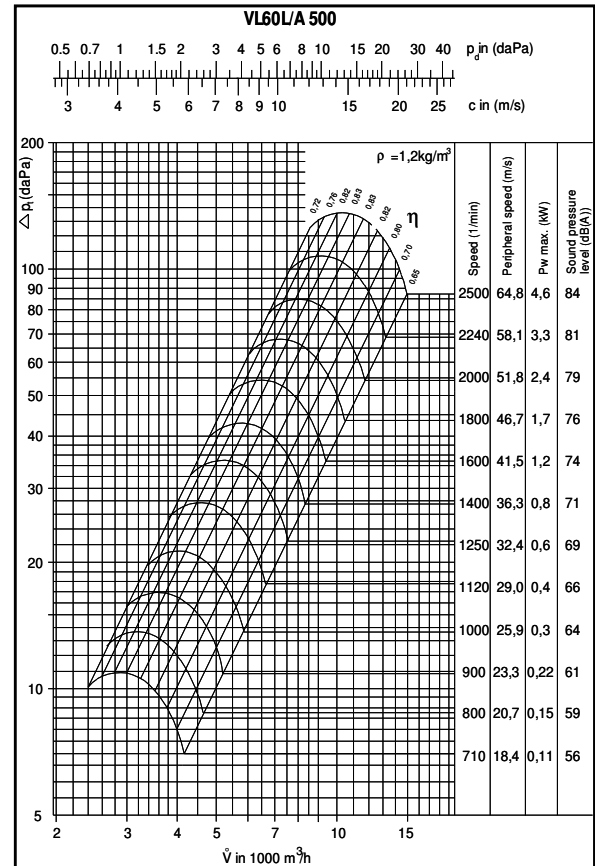
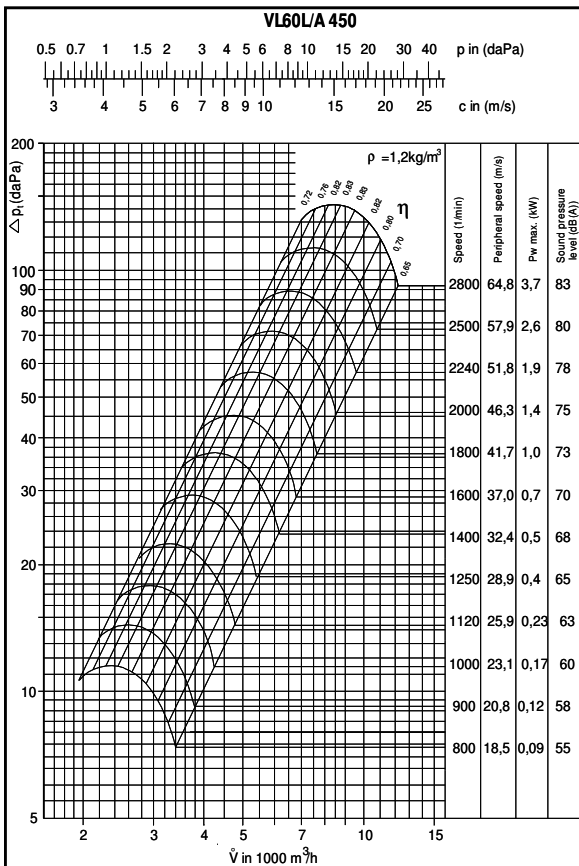
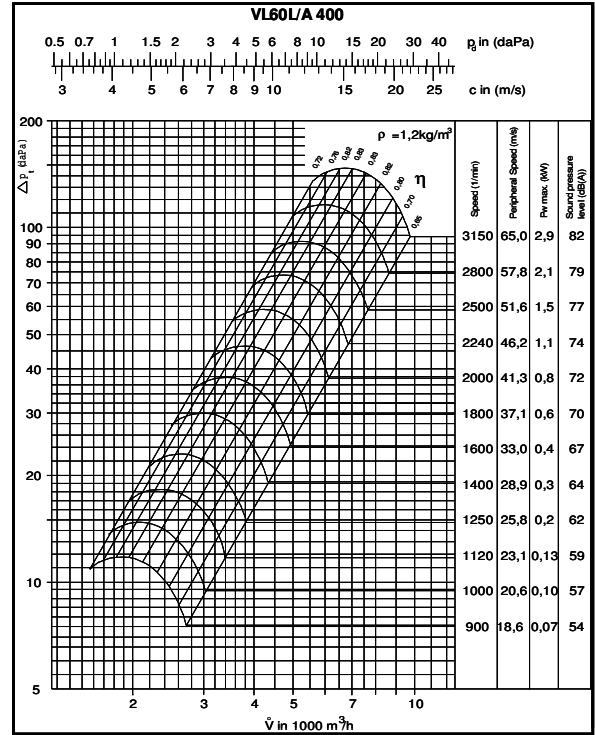
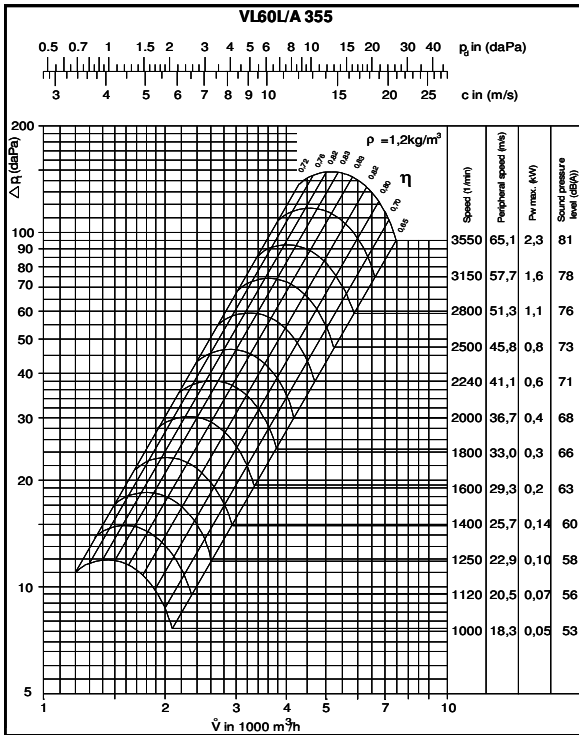


NG	a <sup>∅</sup>	b	c	d3 <sup>∅</sup>	d4 <sup>∅</sup>	e <sup>1)</sup>	h	s	F <sup>2)</sup>	G	H1	E	article no.
315	315	2	40	366	12	390	80	6	1090	378	270	195	500794
355	354	2	40	405	12	410	80	6	1140	398	300	220	500795
400	397	3	40	448	12	450	80	6	1200	438	330	240	500796
450	446	3	40	497	12	480	80	6	1270	468	375	265	500797
500	500	3	40	551	14	520	80	6	1320	508	415	270	500798
560	562	3	50	629	14	580	120	6	1410	568	460	325	500799
630	631	3	50	698	14	640	120	6	1520	628	520	370	500800
710	708	3	50	775	14	720	120	6	1590	708	570	405	500801
800	794	4	50	861	14	800	120	6	1680	788	630	450	500802
900	890	4	60	958	18	890	160	6	1870	878	710	505	500803
1000	999	4	60	1067	18	980	160	6	1980	968	790	560	500804
1120	1122	4	60	1200	18	1100	160	8	2110	1084	870	625	500805
1250	1257	4	60	1337	18	1200	160	8	2450	1184	990	700	500806
1400	1411	4	60	1491	18	1320	160	8	2610	1304	1090	780	500807
1600	1583	4	60	1663	18	1500	160	8	2780	1484	1220	865	500808
1800	1776	4	60	1856	18	1650	160	8	3200	1634	1350	975	500809
2000	1993	4	60	2073	18	1800	160	8	2420	1784	1520	1075	500810
2240	2236	4	60	2334	18	2000	160	8	3680	1984	1960	1195	500811

1) Dimensions dependent on motor size, tolerances up to +150mm possible

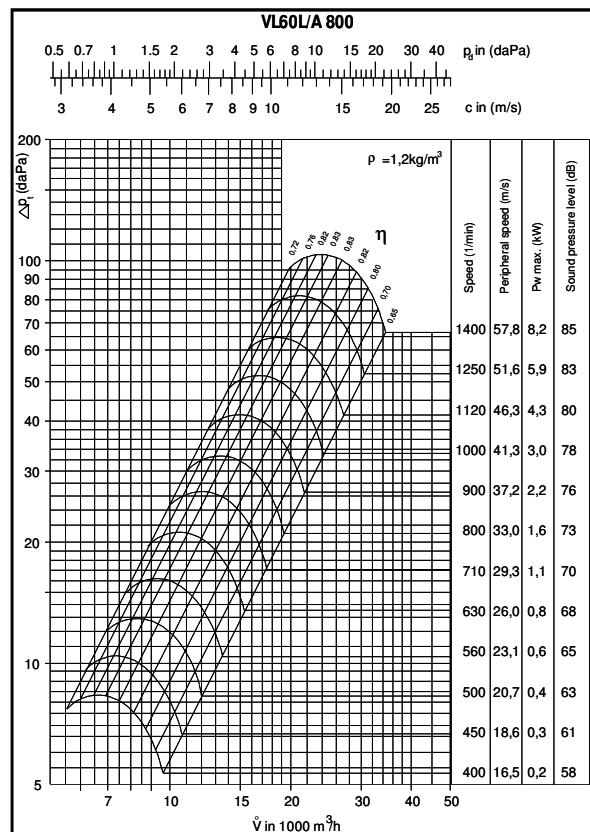
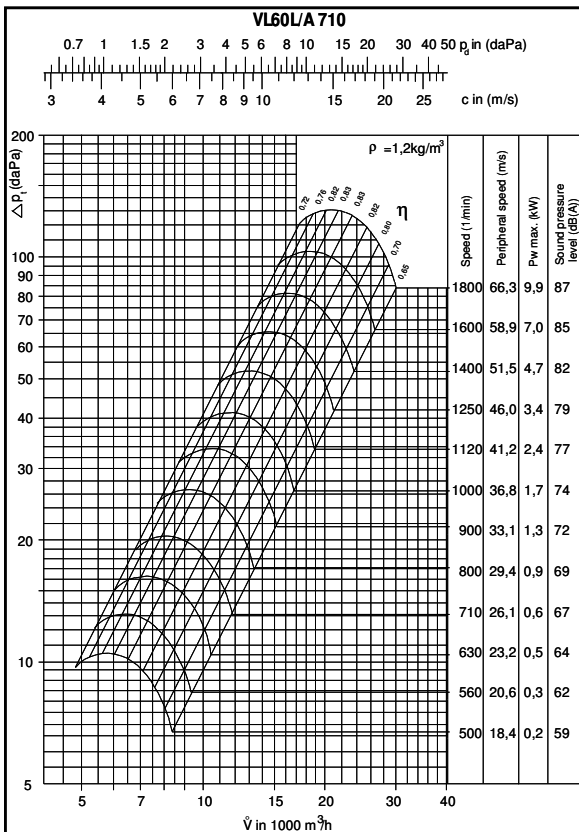
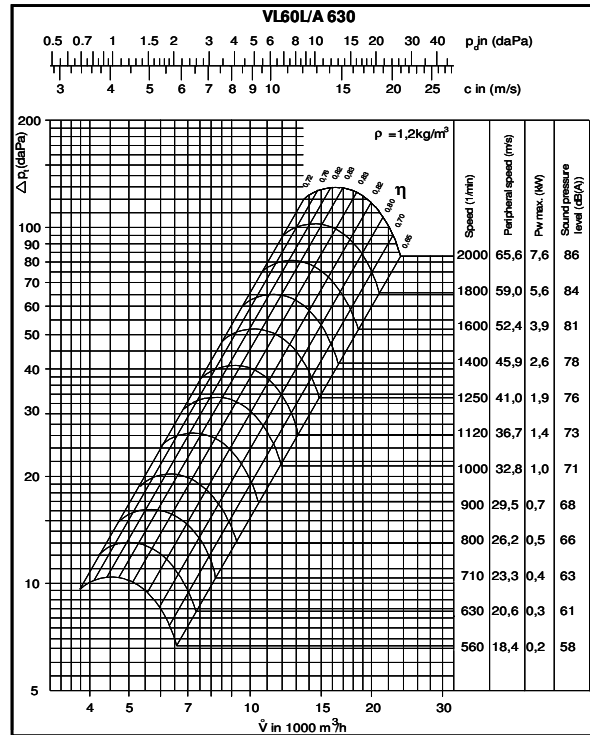
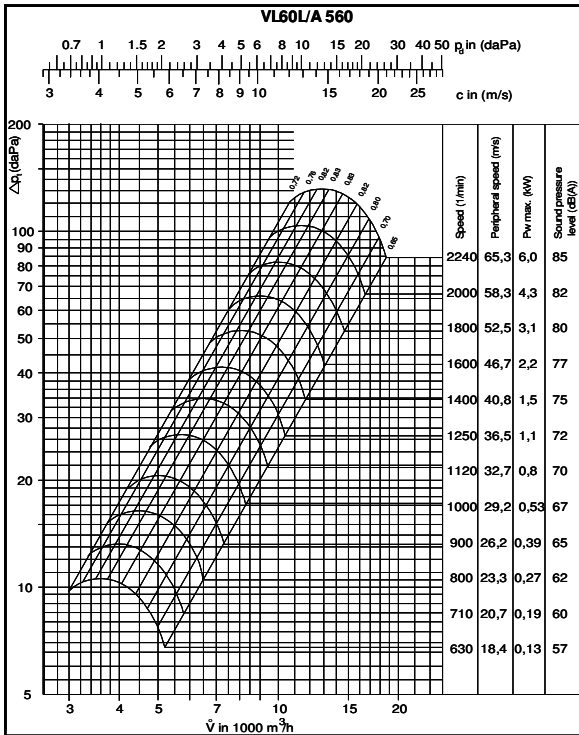
2) Dimensions dependent on motor size, tolerances up to +/- 150mm possible

# Characteristic curves nominal size 355 - 500

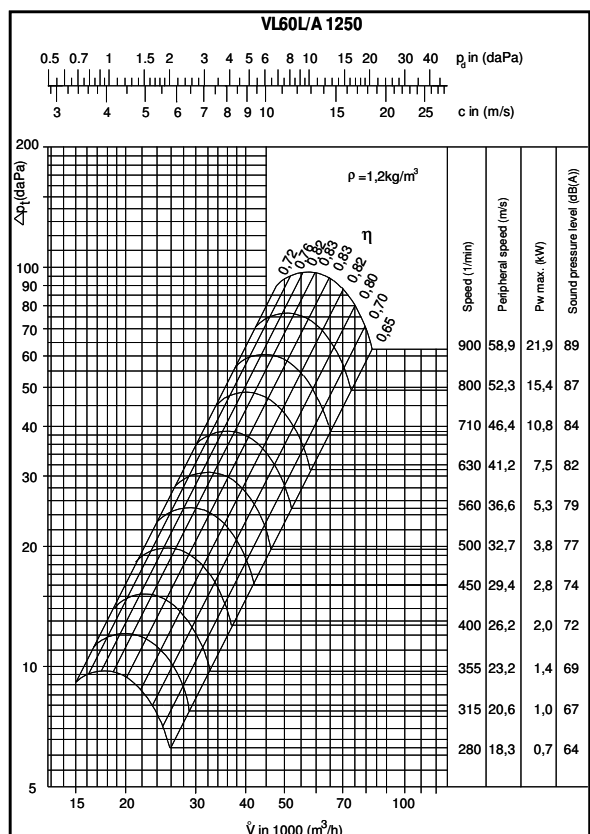
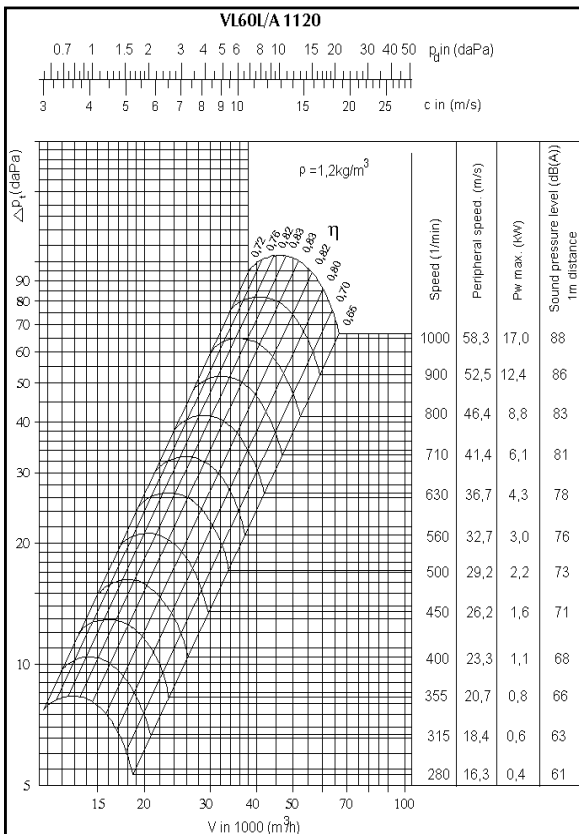
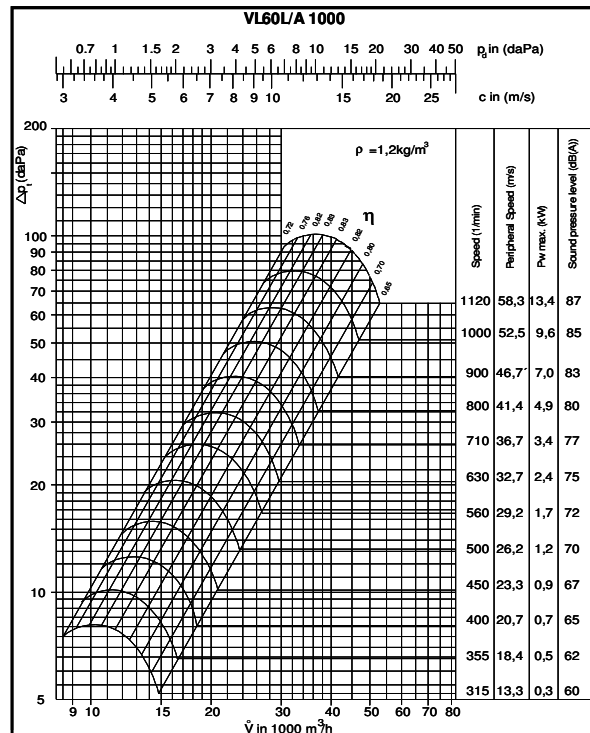
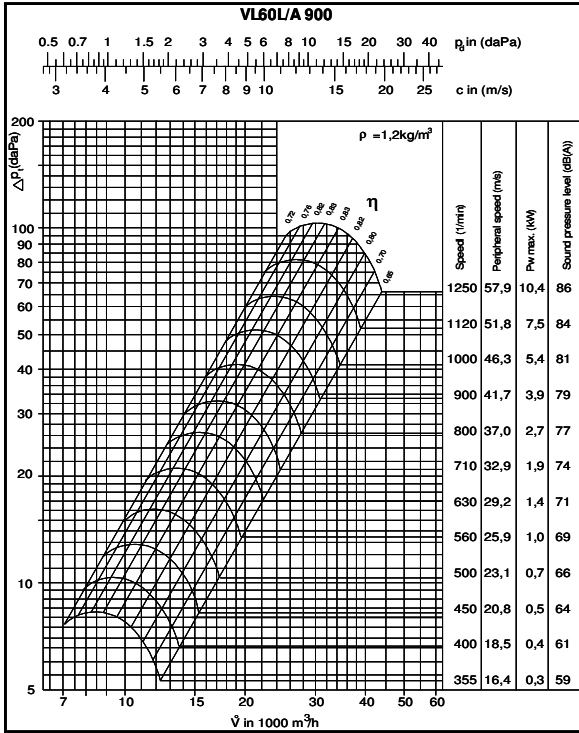




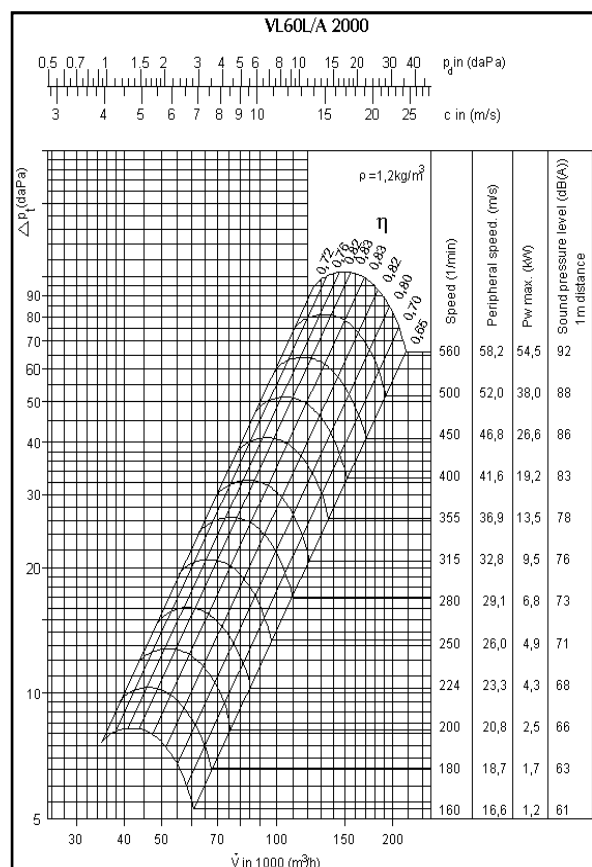
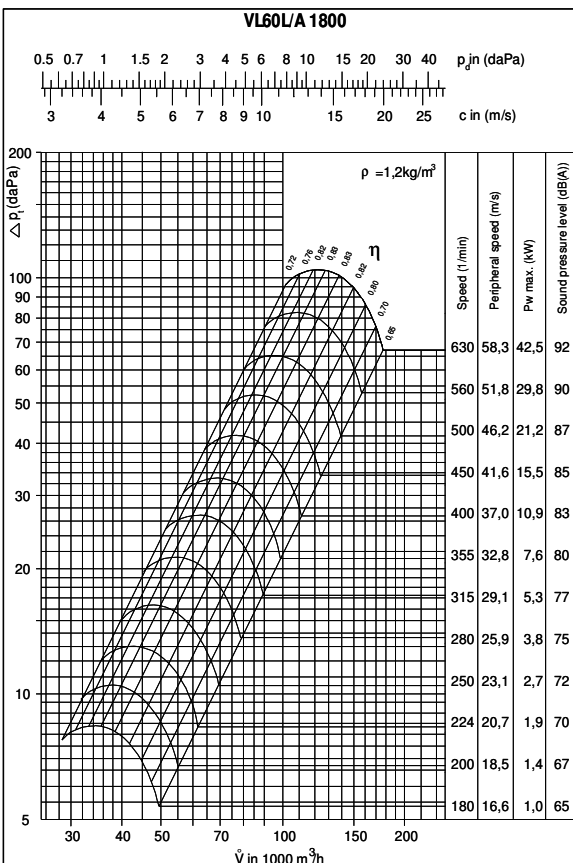
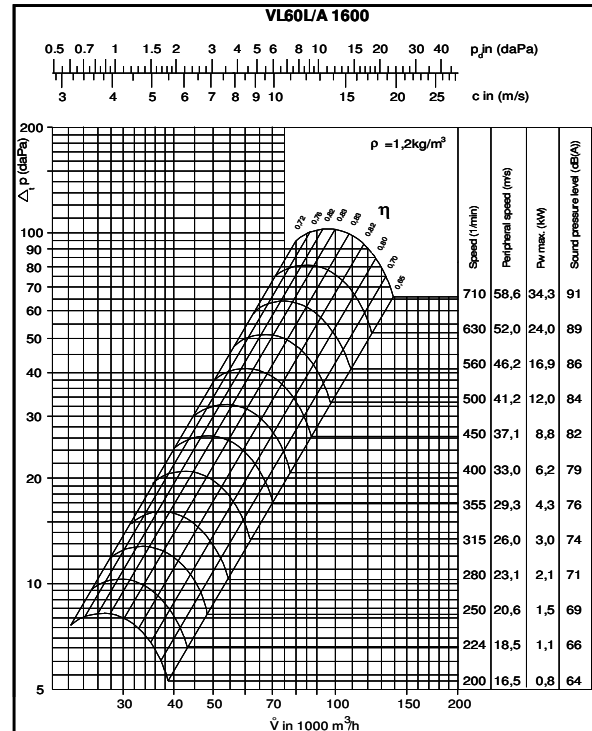
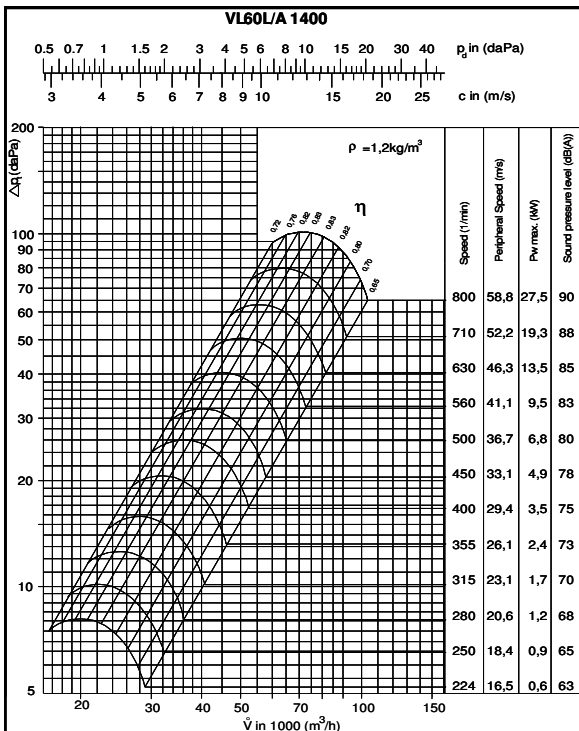
# Characteristic curves nominal size 560 - 800



# Characteristic curves nominal size 900 - 1250



# Characteristic curves nominal size 1400 - 2000



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The Venttek-High-Efficiency-Fan Program furthermore contains:

- Industrial fans in radial construction
- Smoke gas fans
- Multiple stage fans
- Pressure and shock resistant fans
- High pressure fans
- Hot gas fans
- Built-in fans without casing
- Portable fans in radial and axial design in explosion proof construction for zone I and II

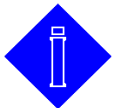
We would be pleased to give you further information.



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