Dear Sir or Madam!

Thanks for your interest in our company and our products. On this first pages of our catalogue we intend to give you a short view on venttek and its fans.

Since more than 20 years we have been producing welded fans for nearly all industrial applications. Specialized in order-related single- and small lot production we transform your demands in a finished product - from construction to production.

All clients appreciate our flexibility and capability, which make quick and specialized solutions of your tasks possible.

The main field of our program is formed by radial fans with a variable performance in air flow volume from 5.000 m3/h to 600.000 m3/h in the low, average and high pressure area. If you are not able to find the needed version in this catalogue, you can ask us for further information of course.

If it is necessary for you, we are also able to produce axial fans in two versions up to a nominal size of 2000 either including a guiding contrivance or not.

A further top product of our company are portable fans, that is the MWM model as radial version and the VL respectively the VM model as axial version. They are used for suction of poisonous or explosive gases and fumes from rooms, canals or tanks by use of connectable, flexible tubes. Deliverable with three phase current-, alternating current-, or petrol driven motor in different sizes they provide a great variety of application. Explosion protected versions are also available of course.

Venttek-High efficiency fans for the most different demands:

The spectrum of our fans reaches from extremely abrasion proof versions for transport of dust-laden mediums by use of flame spraying armored blades to pressure-proof and comparative fans.

Therefore the following models were developed:

- **Hot gas fans up to 1000°C,**
  either with or without spiral housing

- **Double inlet fans**

- **Deadeninged fans with**
  an about 10 to 15 dB reduced sound pressure level

- **Fans made of special metal types,**
  like hastelloy and titanium.

Of course we also supply you with attachment, that optimizes the use of your fan.

If your are interested now, call us. Our sales department will always be willing to help you.

We would be pleased, if we could show you our capability!

Fan specification

Our high-efficiency radial fans correspond to the following specification and are suitable for all ventilating and industrial applications. .

- ❑ Single inlet radial fan, shaft made of S355J0 or special material with feather key and stud for impeller, hub and pulley, completely mounted and lubricated rolling bearings in plummer blocks or block bearing housings on welded pedestal, motor if belt-driven on concrete bed, welded support or base frame

- ❑ Fan housing in heavy, welded steel design made of S235JRG2 or special material with additional stud bracings and profiles

- ❑ Impeller with backwards bended blades statically and dynamically levered according to VDI 2056 smaller Q 6,3; dependent on size and loading steel- or casting hub with groove or Taper Lock hub

Extent of supply:

The equipment mentioned above normally is completed by:

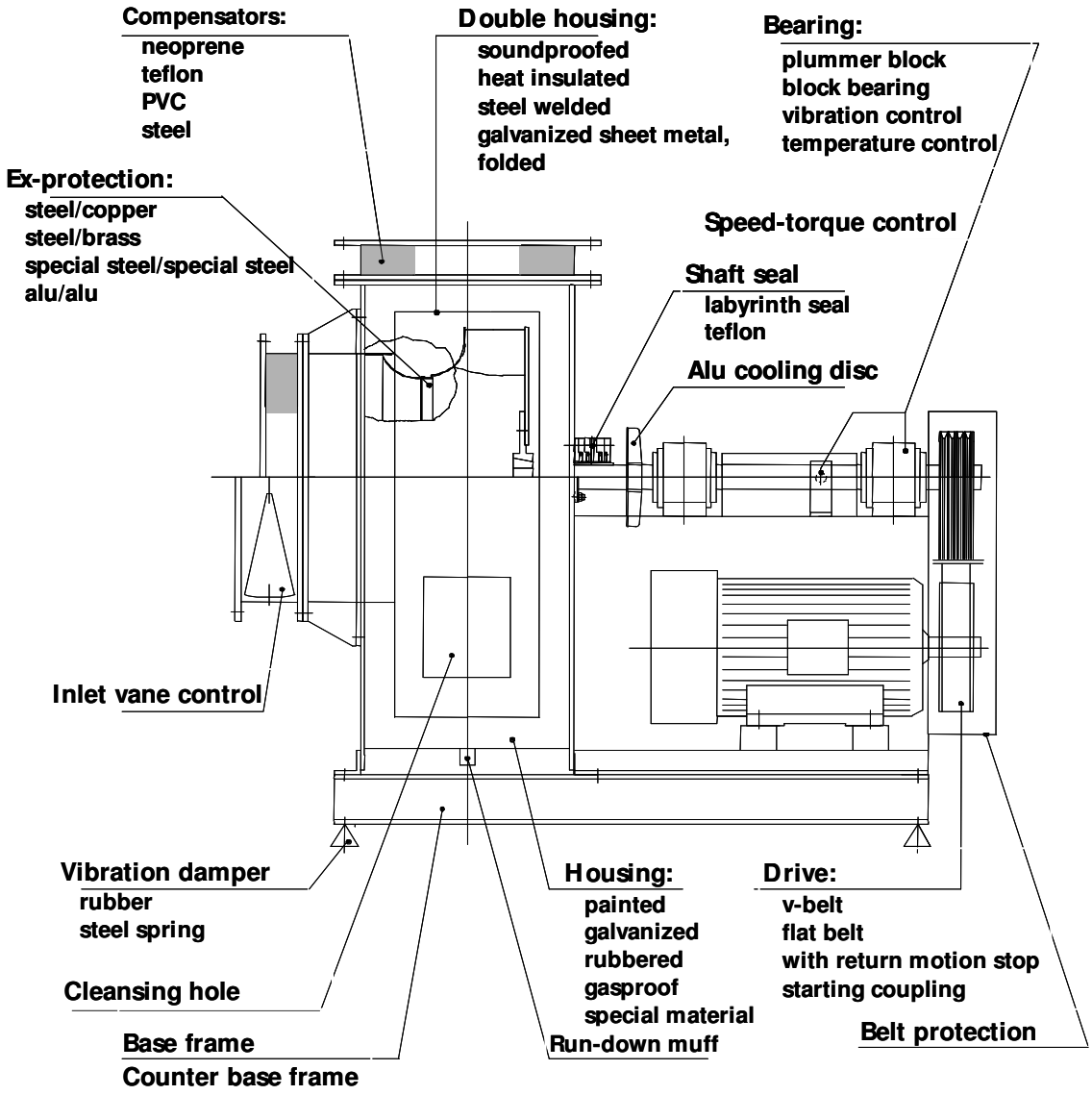
- ❑ Slide rails, if belt-driven
- ❑ Belt drive with belt guard divided 1/3 to 2/3t
- ❑ Protective grating on suction side, if connection type is E

Attachment:

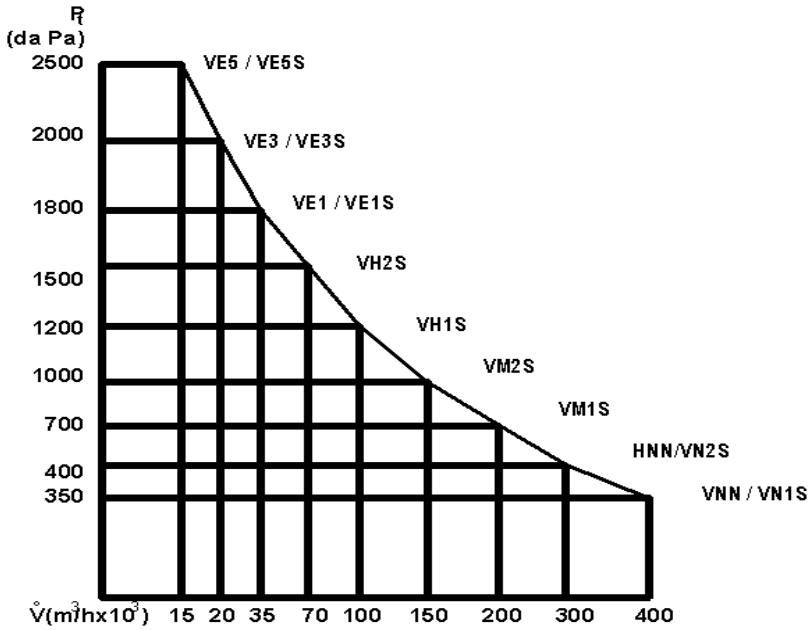
On the following page a big number of attachment is presented. Furthermore the following special versions and efforts are deliverable:

- Double inlet low pressure version for higher air flow rates
- Rectifier to stabilize the air flow on suction side
- Compensators with or without guarding sheets
- Protective gratings for both sides
- Multiple divided housing
- Galvanization or spraying alitation, special painting
- Impeller with hollow blades, interdisc or skeleton blades made of special materials
- Abrasion proof coated impeller blades
- Impeller statically and dynamically levered according to VDI 2056 smaller Q 2,5
- Different drives: V-belt-drive, flat-belt-drive, gear transmission with or without cardan, link-motion, direct drive with elastic coupling
- Cooling air tubes to cool the bearings
- Lubricating conductions
- Special motors
- Maintenance contract
- Frequency converter
- Return motion stop
- Mounting and start-up
- Motor-addition by the customer

Versions and attachment



Pre-choice for a quick determination of the optimal series



With the following schedule you can realize the great variety of our radial fans:

	Areas of Application				
Type Series	**Pure Gas**	**Medium with dust**	**Circulating Air**	**Metarial Transpor**	**Fibre Transpor**
Low Pressure	VNN HNN	VN1S VN2S	U-VNN VN1S U-HNN U-VN2S	VNF	VNFF
Average Pressure	VM1S VM2S	VM1S VM2S	U-VM1S U-VM2S	VM1F VM2F	VM1FF VM2FF
High Pressure	VH1S VH2S VE1 VE3 VE5	VH1S VH2S VE1S VE3S VE5S	--	VH1F VH2F	VH1FF VH2FF

standards designation: z.B.: HNN a ex / R U 500 M GR360

1 2 3 4 5 6 7 8

1 = type designation (U-...: circulator without spiral housing)

2 = abnormal impeller: z.B. intermediate blades, b < normal, D2 < or > normal

3 = ex-protection

4 = construction: R = radial with single inlet, Z = radial with double inlet, A = axial

5 = connection type: U = direct tube connection, E = inlet nozzle, S = suction box

6 = rated quantities graded according to row of preferred number R20

7 = drive: MF = direct drive with flange motor

M = direct drive with B3-motor on welded support

K = direct drive by means of an elastic coupling

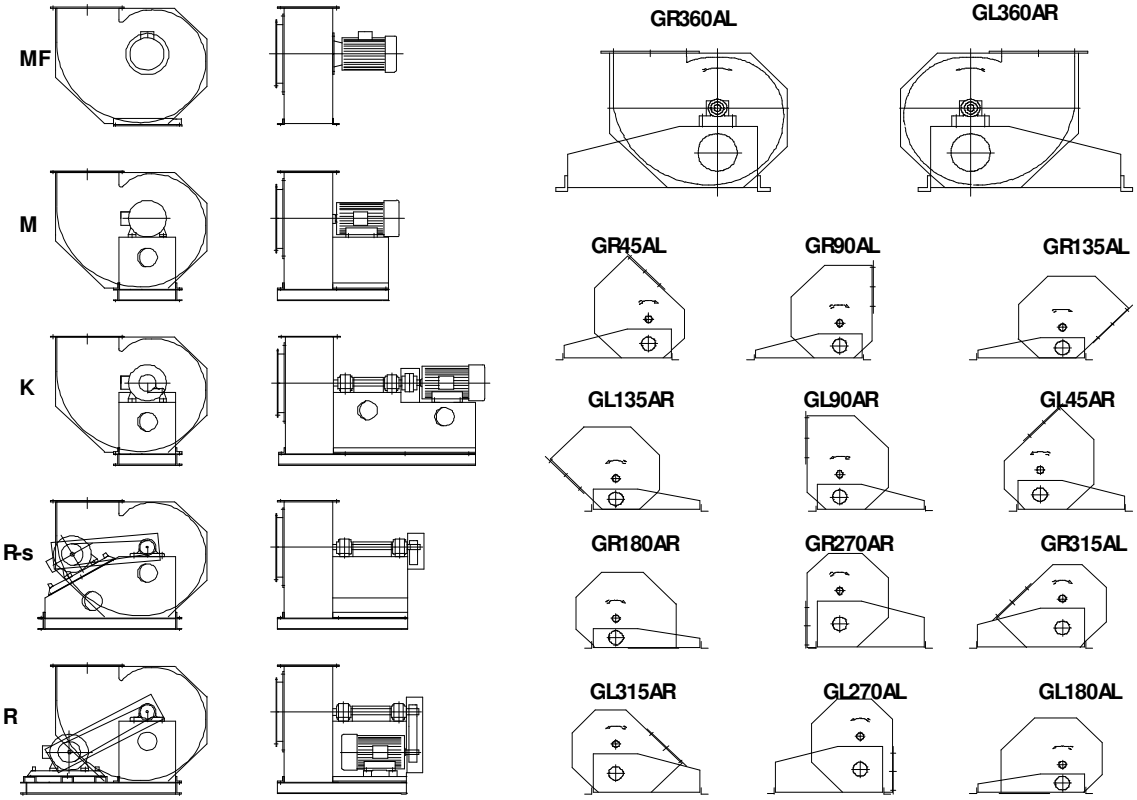
KG = direct drive by means of a coupling or gearing

R-s = belt drive, motor on beveled frame

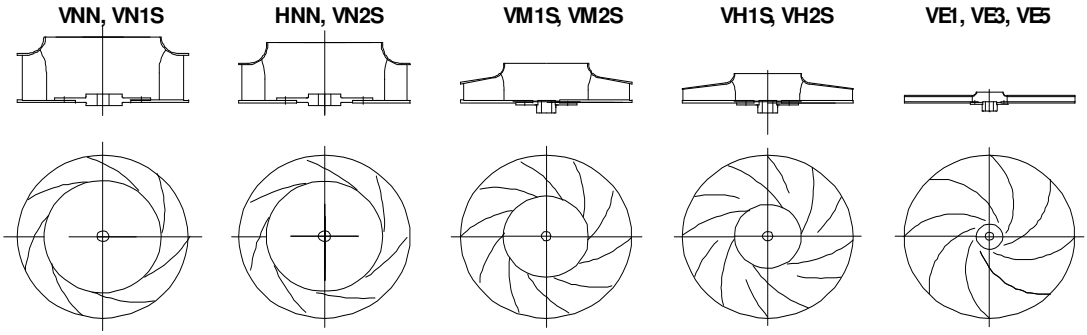
R = belt drive, motor on base frame

8 = housing position: GR = right-handed, GL = left-handed

Drives and housing positions



Impeller types



Inlet vane control

In the different areas of application of radial fans an infinitely variable performance regulation is frequently claimed. Apart from electronically controlled frequency converters the inlet vane control is possible as an economical and functional alternative.

Function:

Before entering the impeller the air flow volume streaming through the fan receives a pre-torsion caused by changeable guide blades. For this reason the air flow volume motion is covered by a rotating stream, which has the result, that the single air particles stream towards the impeller on screw-shaped lines.

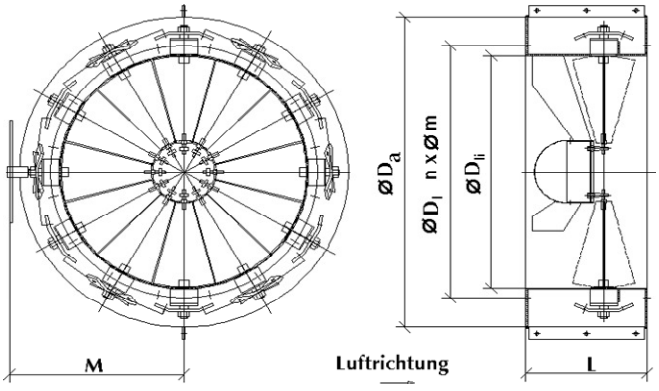
Possibilities of regulation:

The guide blades of the inlet vane control can be shifted on three different ways

1. Directly by hand
2. By an actuator and a differential pressure controller
3. By an actuator controlled by pressure transducer, temperature transducer, etc.

Advantages:

- By the changeable guide blades of the inlet vane control the fan's performance can be regulated in a broad area, if the fan's revolutions are constant.
- For this reason we are able to apply robust three phase current motors.
- Radial fans with inlet vane control offer in opposite to throttle regulation remarkable performance savings.



nominal size	Ø D_{li}	Ø D_a	L	M	Ø D_L	n	Ø m
355	358	600	250	315	405	8	12
400	404	650	250	340	448	12	12
450	454	700	250	365	497	12	12
500	504	760	300	400	551	12	12
560	564	780	300	410	629	16	14
630	534	860	300	450	698	16	14
710	714	950	350	500	775	16	14
800	804	1100	350	575	861	24	14
900	904	1200	400	620	958	24	14
1000	1005	1325	400	680	1067	24	14
1120	1125	1450	450	750	1200	32	18
1250	1255	1600	500	820	1337	32	18
1400	1405	1750	550	900	1457	32	18
1600	1605	2000	650	1000	1675	40	18
1800	1805	2200	700	1125	1875	40	18

Explosion protection according to VDMA 24169 part 1

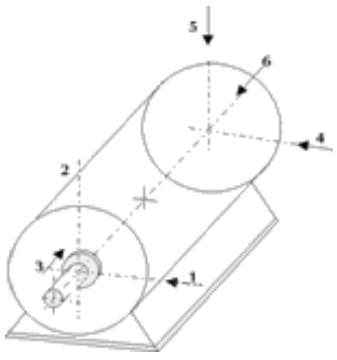
The fans contained in this catalogue can be delivered corresponding to that recommendations with the type designation „ex“. However a small power loss, which must be compensated with a bit more revolutions and so a little increased power consumption, can’t be avoided because of the provided bigger impeller tip clearance. Nevertheless the sheets with characteristic curves can be used to choose the desired nominal size. To get the exact data referring to power consumption and revolutions please ask us.

<table>
<tr><td>suction from zone *
installation within zone</td><td>2
>= 2</td><td>2
1</td><td>1
>=1</td><td>0
>= 1m if possible >= 2</td><td rowspan="9">0
0

not permitted</td></tr>
<tr><td>construction permission</td><td>-</td><td>-</td><td></td><td>provided!</td></tr>
<tr><td>material combination (rotating against stationary</td><td>-</td><td colspan="2">on no account steel with light metal,
steel with steel permitted!</td><td>Steel with bronce, brass, copper</td></tr>
<tr><td>bearing</td><td>-</td><td colspan="3">only rolling bearings, fatigue durability at least 40.000h</td></tr>
<tr><td>impeller</td><td>-</td><td colspan="3">must be protected on the shaft against torsion and displacement!</td></tr>
<tr><td>Tip clearance
(radial + axial)</td><td>-</td><td colspan="3">axial fan from the impeller’s outside diameter
>=1% }however always >=2
mmradial fan from the impeller’s entering diameter</td></tr>
<tr><td>inlet, outlet</td><td>-</td><td colspan="3">protected by grating s with gaps of max 12mm in breadth and height, those must be grounded</td></tr>
<tr><td>drive</td><td>-</td><td colspan="2">conductive v-belts, 1 piece more than usual</td><td>no belt drive</td></tr>
<tr><td>grounding resistance</td><td>-</td><td colspan="3">for every metal part and electrically conductive layers<= 10^6 Ohm</td></tr>
<tr><td colspan="6">*) 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</td></tr>
</table>

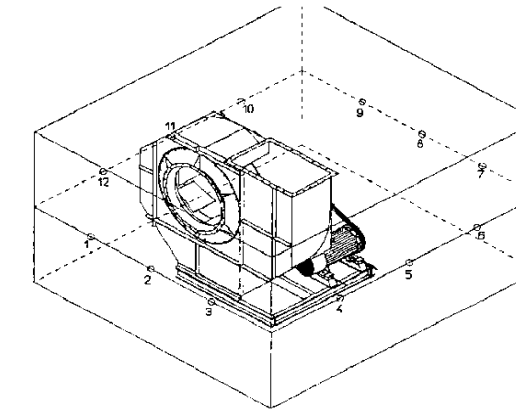
Vibration technology

Vibration designates the change of a physical quantity, which is regularly repeated to a certain extent. In ventilator production the driving motor as well as the rotor form a system in which vibration is possible.
To be able to judge a machine’s vibration reaction, the vibration severity must be determined according to the VDI-recommendation 2056. For the permitted remaining unbalanced mass of rotors the VDI-recommendations 2060 are taken as the basis. Venttek balances all rotors according to the quality grade Q = 6,3. If it is needed, the rotors can also balanced according to the 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) has particular importance with respect to the linked noise pollution of people within the housing and working domain and the connected laws.
Apart from theoretical reflections - to determine acoustic values with operation parameter as a basis - noise menstruations are necessary to be able to give exact information. The basis of noise menstruations with fans is the control system:
DIN 45635 - noise menstruation with machines , airborne noise emission and in this case the enveloping surface method particularly for fans DIN 45635, part 1
This measuring method is a noise measuring procedure in order to determine the acoustic power, emitted by a machine into the surrounding air (airborne noise emission), with the help of acoustic pressure level menstruations on the enveloping surface, which surrounds the machine and which is penetrated by the emitted acoustic power. This actually means, that the acoustic level is registered at single, quite few measuring points. The resulting values are used to calculate the average, to which the measuring surface dimension, a logarithmic quantity, is added. With the help of this procedure the acoustic capacity can be determined. The human ear feels deep frequencies much softer than high ones, that means its sensitiveness depends on the 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 acoustic pressure level LA and the measuring surface



dimension LS according to DIN 45635 sheet 1. It is held LPA LA + LS.

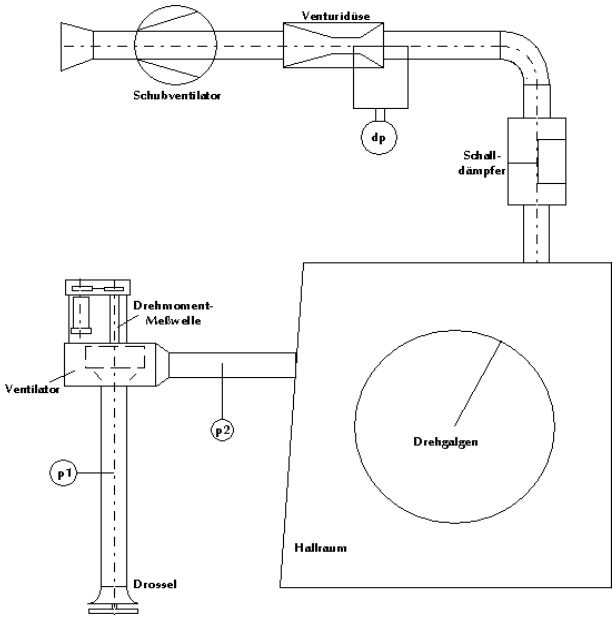
Example for enveloping surface method related to a reflecting surface plane

measuring points (1-12)
measuring path
reference right parallelepiped (fan)
reflecting surface plane

Measuring technology

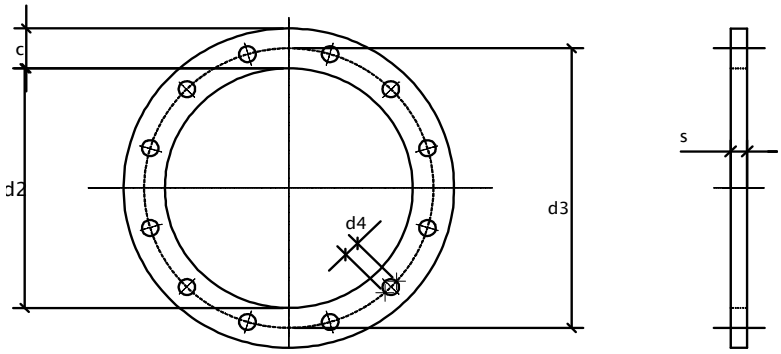
All characteristic curves contained in this catalogue were drawn up with the help of the MEISSNER + WURST test bench according to DIN 24163.

The following illustration shows the construction of the test bench.



Flanges

All suction-sided flanges correspond to DIN 24154, part 2, row 2 and are made according to the dimensions comprised in the following schedule. If a series also has a round outlet on the pressure side, the following dimensions can be taken for the pressure-sided flanges, too. If there is a rectangular outlet, you will find the corresponding flange dimensions under the respective series within the sheets with dimensions and characteristic curves.



nominal size	inside Ø d2	maximal deviation	breadth x thickness c x s	hole circle-Ø d3 + 0,5	hole-Ø d4 + 0,5	number of holes	screws
71	73	+ 1 0	30x6	110	10	4	M8
80	82			118			
90	92			128			
100	102			139			
112	114			151			
125	127			165			
140	142	+ 1,5 0	35x6	182	12	8	M10
160	162			200			
180	182			219			
200	203			241			
224	227			265			
250	253			292			
280	283		40x6	332			
315	318			366			
355	358			405			
400	404			448		12	
450	454			497			
500	504			551			
560	564	+ 2 0	50x8	629	14	16	M12
630	634			698			
710	714			775			
800	804			861		24	
900	904			958			
1000	1005			1067			
1120	1125		60x10	1200	18,5	32	M16
1250	1255			1337			
1400	1405			1457			
1600	1605			1675		40	
1800	1805			1875			
2000	2005			2037			

s and d4 deviate from DIN.

All information in mm!

Application of sheets with characteristic curves

The sheets with characteristic curves contain the fan characteristic curves for standard revolutions, from which the engines' really existing revolutions can be taken out coincidently. If it is necessary, intermediate values can be interpolated.
The sheets with characteristic curves show the following data:

In the diagram section at the bottom
on the left ordinate the air flow volume V in m3/s
on the absciss the air speed c within the inlet and outlet
on the right ordinate the fan's nominal size

In the left upper diagram section
on the left ordinate the total pressure difference in Dpt in daPa
on the isodynamic lines the efficiency η in %.

In the right upper diagram section
on the right ordinate the peripheral speed u2 in m/s
on the absciss below the fan's number of revolutions n in 1/s
on the absciss above A-estimation correction value db(korr) = (L(w) - L(wa) in dB(A).

the unevaluated acoustic capacity L(w) in dB(A) is directly put down on the characteristic curves

if total pressure difference is given and air flow volume is known, the revolutions, acoustic values etc. can be determined by the following procedure (the example shows it for a fan with a nominal size of 500)

1. Starting from the ordinate in the diagram section at the bottom a horizontal line from the air flow volume value to the isodynamic line for the nominal size of 500 must be drawn

2. From this point a vertical line has to be drawn to the upper diagram section now

3. After that pace an also horizontal line from the total pressure difference value must be put down. The point of intersection with the line from 2. marks the operation point for the fan. The corresponding efficiency can be read along the isodynamic line on the upper absciss. If you follow the interrupted line in left direction, you can determine the uncorrected acoustic capacity at the line's end.

4. Afterwards you follow the fan characteristic curve in right direction down to the last isodynamic line. From this point of intersection a horizontal line to the isodynamic line of nominal size 500 has to be drawn. This isodynamic line finally leads to the A-estimation correction value. A vertical line to the absciss below shows at last the fan's revolutions.

5. The dynamic pressure part can be determined by the following pace: Starting from the point of intersection of the line resulting in 2. with the isodynamic line „p(dyn)", you turn horizontally to the left ordinate. By doing so you will get the value you search for.

If you intend to find out the nominal size, the corresponding procedure will be nearly identical. However, you start with 3. and draw the line to that characteristic curve section within which the optimal efficiency lies (always within the decreasing characteristic curve section). From this point you must turn vertically down and search the point of intersection between air flow volume and nominal size.

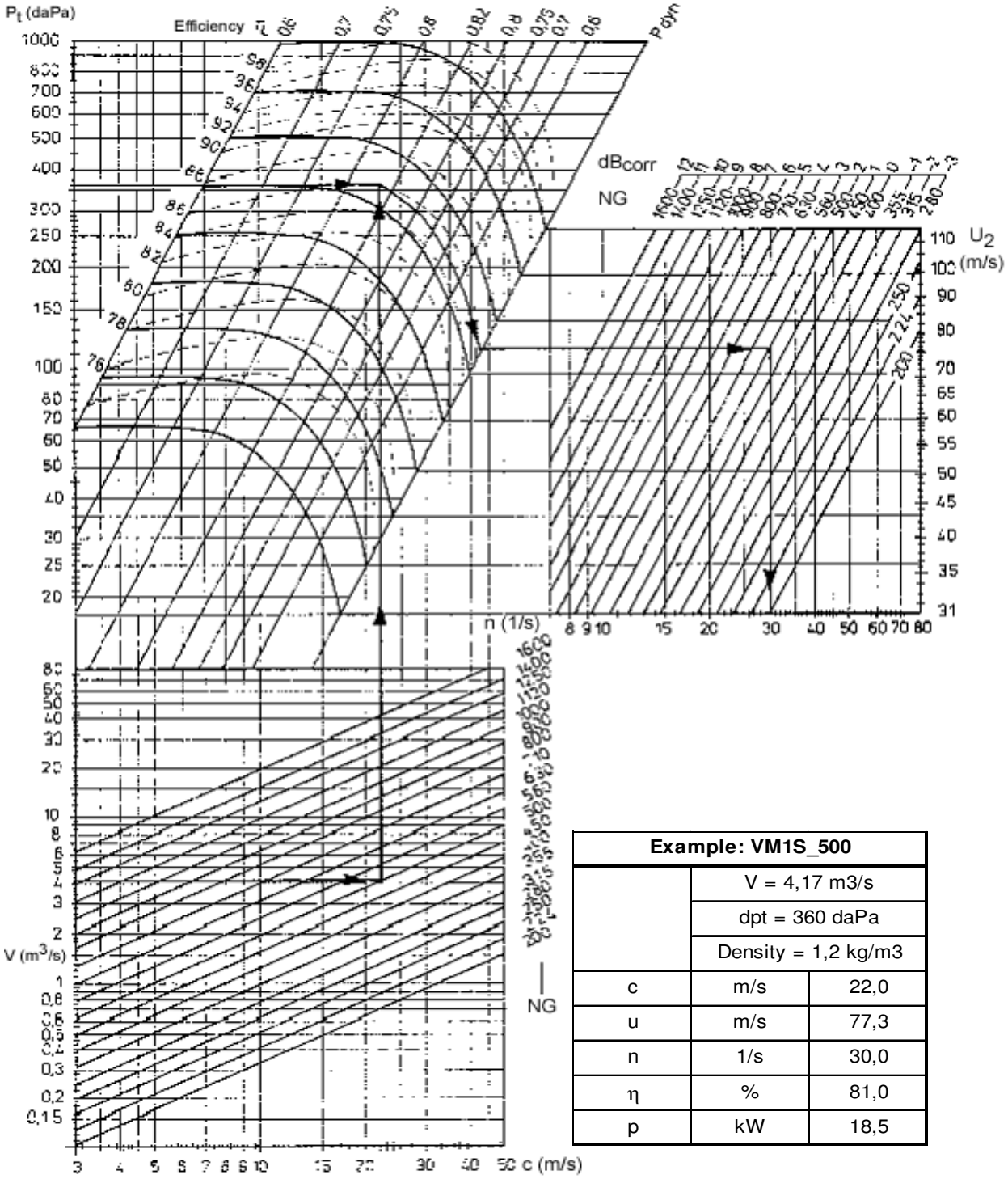
If you desire the exact need of performance for the corresponding operation point, you can use the following formula.

$$P(w)\ (kW) = \frac{V(m3/s)\ .\ \Delta p(t)\ (daPa)}{\eta\ (\%)}$$

to get it. For the choice of the drive engines the maximal need of performance is substantial. The engine's nominal performance should be with directly driven fans respectively with fans with coupling about 10% higher and with belt driven fans about 20% higher.

*) 1 daPa = 10 Pa = 0,1 mbar = 1 kp/m2 = ca. 1 mmWS

Choice example



Example: VM1S_500		
	V = 4,17 m3/s	
	dpt = 360 daPa	
	Density = 1,2 kg/m3	
c	m/s	22,0
u	m/s	77,3
n	1/s	30,0
η	%	81,0
p	kW	18,5

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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