

VARIABLE PATTERN DIFFUSER



selection assistance

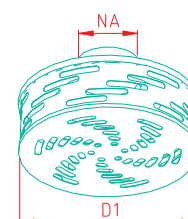
GRYFIT AIR

ADVANTAGES

- Horizontal, vertical or mixed air supply
- Manual, automatic or electric control
- Low sound power level

in the libraries

Fluid Desk
Building Engineering Solutions



parametric libraries

GRYFIT CAD

FUNCTION

VBF variable pattern diffusers with are designed for air-conditioning systems in high buildings such as shopping centres, atriums, concert halls and sports halls. They may also be used in industrial premises and storehouses etc.

DESCRIPTION

VBF diffuser in a standard version is made of stell painted RAL 9010 colour. At request it is possible to paint the diffuser with any other RAL colour. The diffuser construction consists of two perforated plates which rotate around each other. Distributing system inside the diffuser provides air distribution on the whole effective surface of the diffuser.

The diffusers can be used both for cooling and heating. Their variable air pattern allow for adjustment of the range and direction of supplied airflow to the rooms with different heights.

When the airflow is directed vertically downward while heating, airflow velocity falls quickly and it influences on decrease in quantity of air pollution. In a case of cooling vertical direction of the airflow provide with optimal conditions for its diffusion and in the process it improves comfort in occupied zone. The airflow can be adjusted manually, automatically as regards airflow temperature - cooling/heating (self-adjustable piston) or with reference to ambient temperature (electric servomotor).

ACCESORIES

Airflow adjustment:

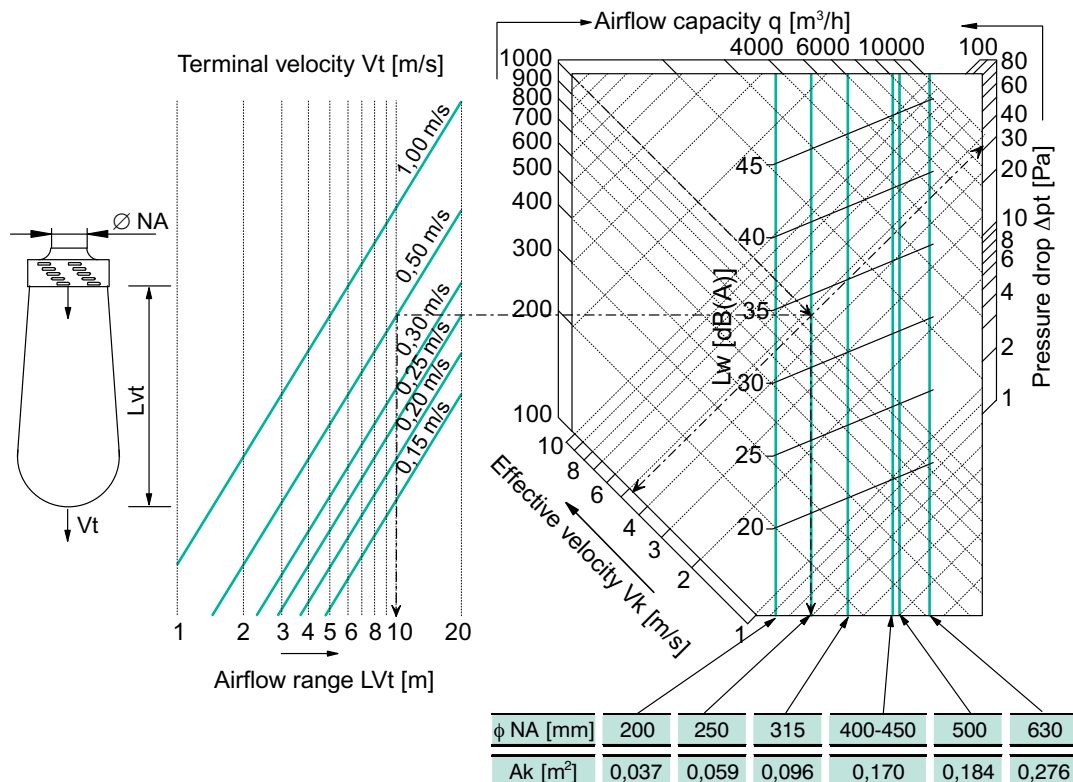
- manual
- self-actuating piston
- electric servomotor

INSTALLATION

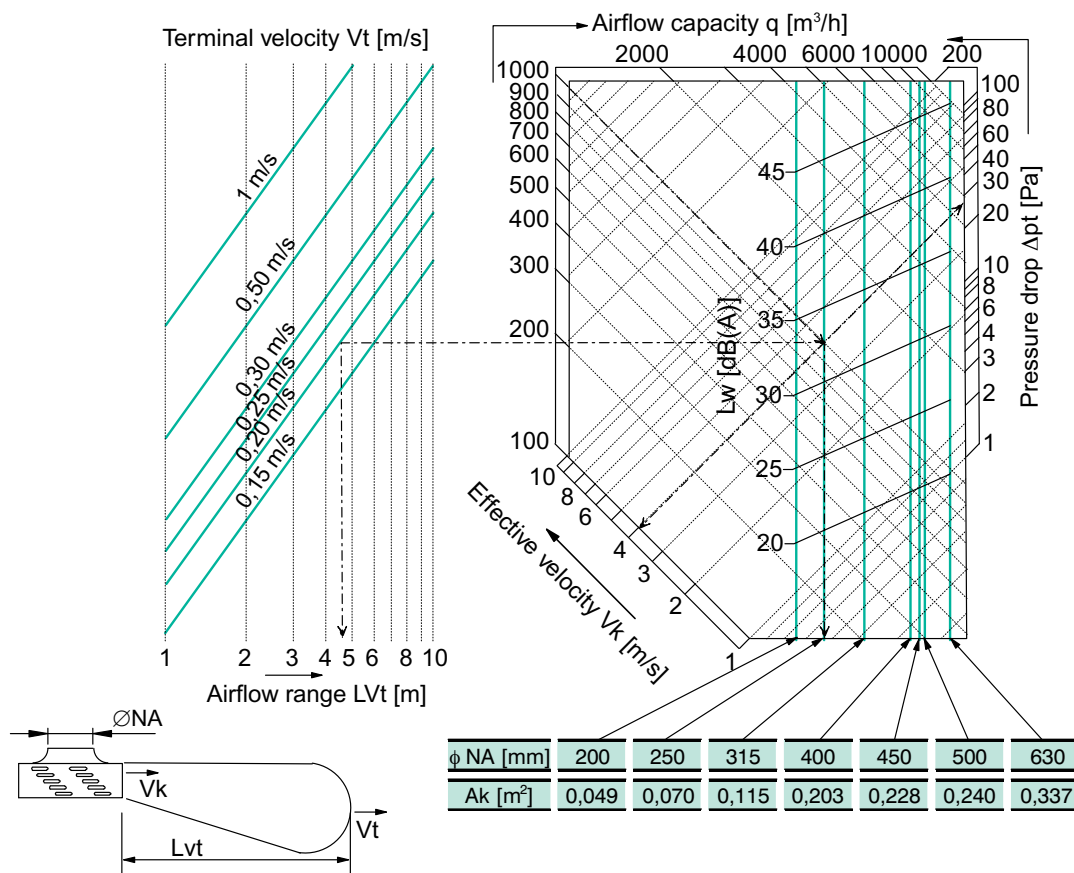
VBF diffuser can be installed directly at the end of the ventilation duct with circular sections or on the ceiling with the use of slings.

SELECTION - ISOTHERMAL AIR SUPPLY

VERTICAL AIR SUPPLY



HORIZONTAL AIR SUPPLY

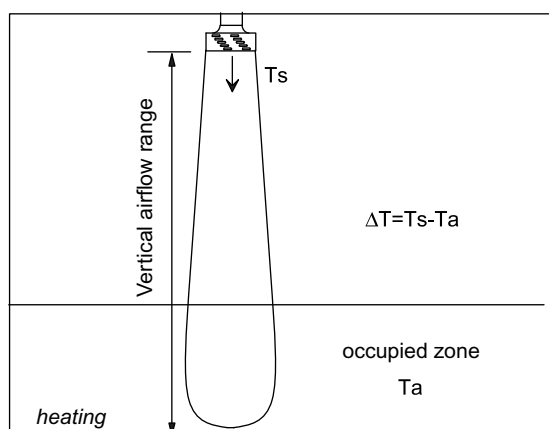
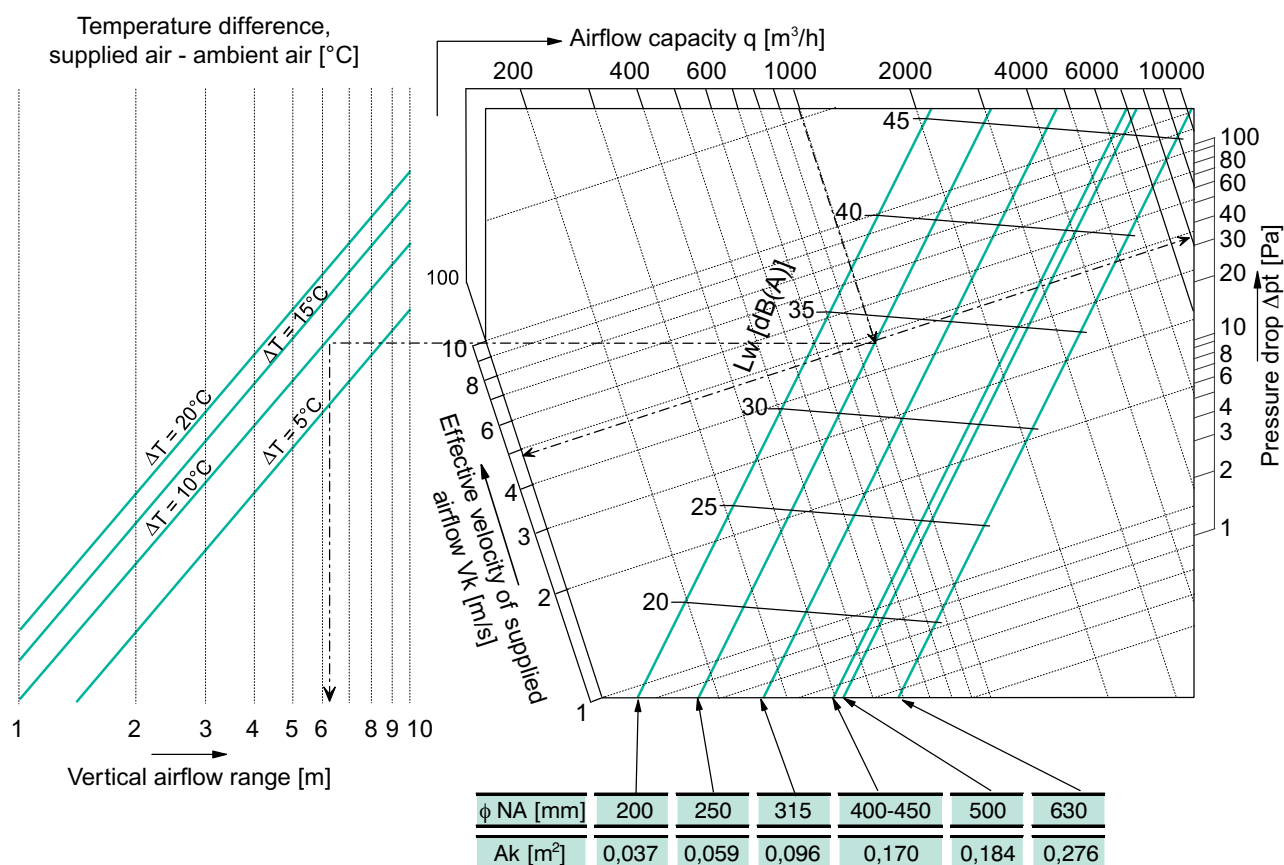


SELECTION - HEATING

While heating supplied hot air rises up, because its density is lower than the air density in the room. Therefore it is necessary to direct the airflow vertically down that it can get the occupied zone. A distance from the diffuser where supplied air velocity is down to zero is called vertical range.

SELECTION EXAMPLE

Airflow capacity q	1000 m ³ /h
Diameter NA	250 mm
Effective surface of supplied airflow A_k	0,059 m ²
Effective velocity of supplied airflow V_k	4,7 m/s
Temperature difference ΔT	10 °C
Vertical airflow range	6,1 m
Pressure drop Δp_t	32 Pa
Sound power level L_w	34 dB(A)



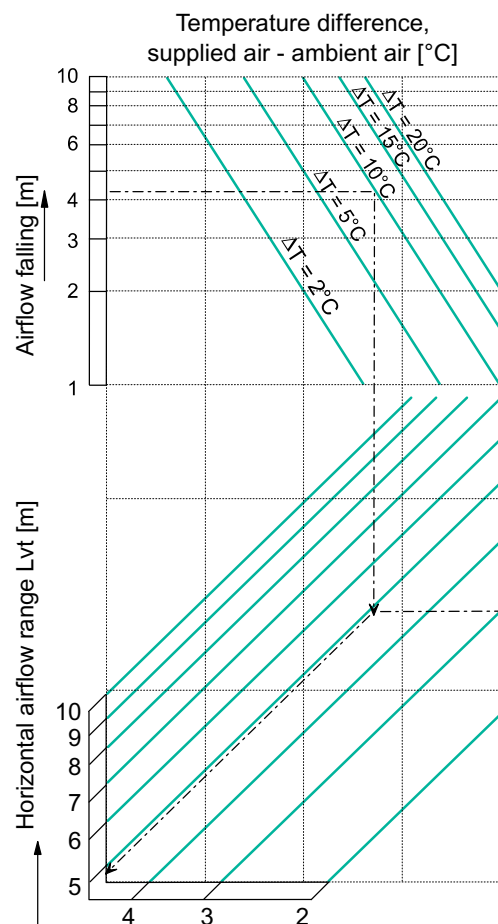
SELECTION METHOD - HEATING

- 1° Vertical airflow range = distance of the diffuser from the floor.
- 2° ΔT = Temperature difference between supplied and ambient air.
- 3° q = Airflow capacity of one diffuser.
- 4° Selection of NA diameter of VBF diffuser.
- 5° Control determined L_w and Δp_t compliance with intended requirements.

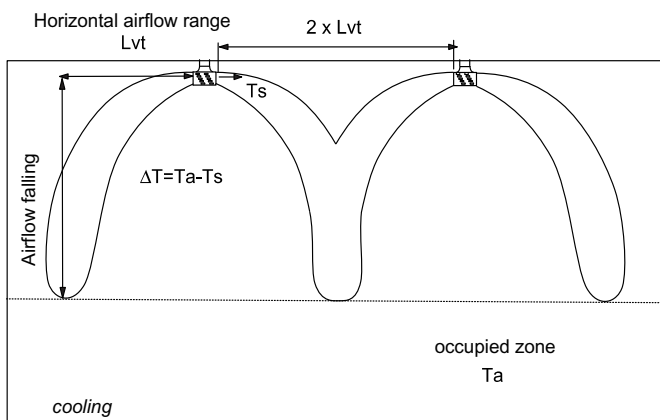
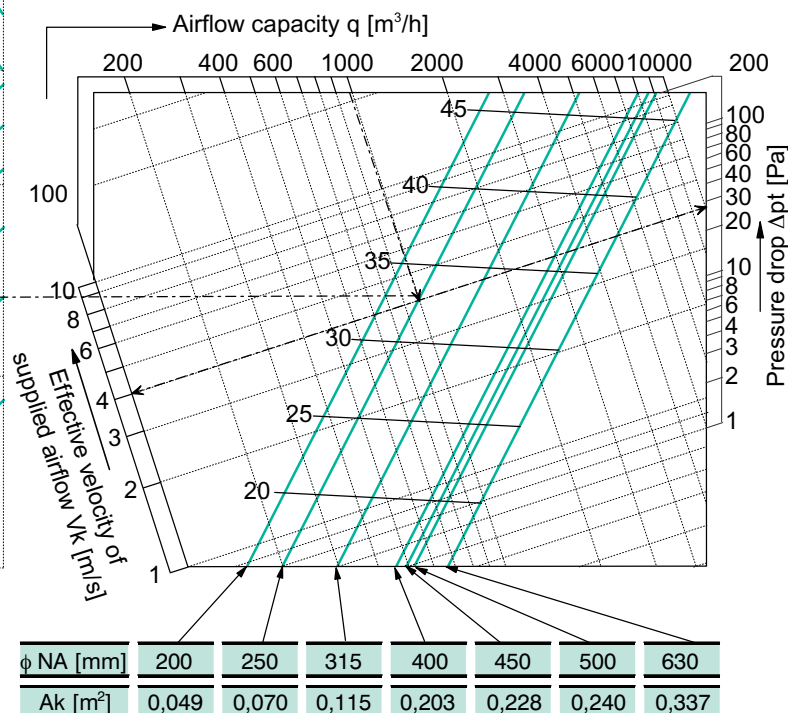
SELECTION - COOLING

While cooling supplied air has a tendency to go down, because its density is higher than air density in the room. Therefore it is necessary to direct the airflow horizontally that it, before reaching the occupied zone, decreases its velocity up to required value and covers the area of the room as large as possible at the same time. A horizontal distance between the diffuser and a point where the airflow enters the occupied zone is called horizontal range. The same distance when measured vertically, is called airflow falling.

EXAMPLE OF SELECTION



Airflow capacity q	1000 m³/h
Diameter NA	250 mm
Effective surface of supplied airflow Ak	0,07 m²
Effective velocity of supplied airflow V _k	4 m/s
Temperature difference ΔT	10 °C
Airflow falling	4,3 m
Horizontal range Lvt	4,8 m
Pressure drop Δpt	27 Pa
Sound power level L _w	32 dB(A)
Terminal velocity V _t	(see nomogram for isothermal air supply)
	0,2 m/s



SELECTION METHOD - COOLING

- 1°) Airflow falling = vertical distance between the diffuser and the occupied zone boundary.
- 2°) Temperature difference between ambient and supplied air.
- 3°) Horizontal airflow range = horizontal distance between the diffuser and a point where the airflow enters the occupied zone.
- 4°) Minimum distance between two diffusers = $2 \times Lvt$.
- 5°) q = Airflow capacity of one diffuser.
- 6°) Selection of NA diameter of VBF diffuser.
- 7°) Control determined L_w and Δp_t compliance with intended requirements.
- 8°) Control acceptability of determined terminal velocity.

QUICK SELECTION

Vertical airflow range [m] →			3 m								4 m								
Horizontal airflow range [m] →			1,9 m								2,8 m								
Δ T [K] →			5		10		15		20		5		10		15		20		
NA [mm]	200	q	Lw [dB(A)]	250	22	350	26	420	28	490	30	330	25	460	29	570	31	650	33
		[m³/h]	Δpt [Pa]	5	10	15	20	9	18	26	35								
	250	q	Lw [dB(A)]	350	23	490	26	610	29	700	30	470	26	660	29	810	32	930	33
		[m³/h]	Δpt [Pa]	4	8	12	16	7	14	21	28								
	315	q	Lw [dB(A)]	500	23	710	27	870	29	1000	30	670	26	950	30	1160	32	1340	33
		[m³/h]	Δpt [Pa]	3	6	9	12	5	11	16	22								
	400	q	Lw [dB(A)]	770	23	1090	27	1340	29	1540	31	1030	26	1450	30	1780	32	2060	34
[m³/h]		Δpt [Pa]	2	5	7	9	4	8	12	16									
450	q	Lw [dB(A)]	820	23	1160	27	1420	29	1640	31	1100	26	1550	30	1900	32	2190	34	
	[m³/h]	Δpt [Pa]	2	4	7	9	4	8	12	16									
500	q	Lw [dB(A)]	820	23	1160	27	1420	29	1640	31	1100	26	1550	30	1900	32	2190	34	
	[m³/h]	Δpt [Pa]	2	4	7	9	4	8	12	16									
630	q	Lw [dB(A)]	1110	24	1570	27	1920	29	2220	31	1480	27	2090	30	2560	32	2960	34	
	[m³/h]	Δpt [Pa]	2	4	5	7	3	6	10	13									

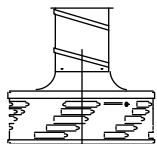
Vertical airflow range [m] →			5 m								6 m								
Horizontal airflow range [m] →			3,7 m								4,6 m								
Δ T [K] →			5		10		15		20		5		10		15		20		
NA [mm]	200	q	Lw [dB(A)]	410	28	580	32	710	34	820	35	490	30	690	34	850	36	980	37
		[m³/h]	Δpt [Pa]		14		27		41		55		20		40		59		79
	250	q	Lw [dB(A)]	580	28	820	32	1010	34	1170	36	700	30	990	34	1210	36	1400	37
		[m³/h]	Δpt [Pa]		11		22		32		43		16		31		47		62
	315	q	Lw [dB(A)]	840	28	1180	32	1450	34	1670	36	1000	30	1420	34	1740	36	2000	38
		[m³/h]	Δpt [Pa]		9		17		26		34		12		25		37		49
	400	q	Lw [dB(A)]	1290	29	1820	32	2230	35	2570	36	1540	31	2180	34	2670	37	3090	38
[m³/h]		Δpt [Pa]		6		13		19		26		9		18		28		37	
450	q	Lw [dB(A)]	1370	29	1930	32	2370	35	2740	36	1640	31	2320	34	2840	37	3280	38	
	[m³/h]	Δpt [Pa]		6		12		18		24		9		18		26		35	
500	q	Lw [dB(A)]	1850	29	2620	33	3200	35	3700	36	2220	31	3140	35	3850	37	4440	38	
	[m³/h]	Δpt [Pa]		5		10		15		20		7		14		22		29	

Vertical airflow range [m] →			8 m				10 m			
Horizontal airflow range [m] →			6,4 m				8,1 m			
Δ T [K] →			5	10	15	20	5	10	15	20
NA [mm]	200	q [m³/h] Lw [dB(A)] Δpt [Pa]	650 33 35	920 37 70	1130 39 105	1300 40 141	820 35 55	1150 39 110	1410 41 165	1630 43 220
	250	q [m³/h] Lw [dB(A)] Δpt [Pa]	930 33 28	1320 37 55	1610 39 83	1860 41 111	1170 36 43	1650 39 87	2020 41 130	2330 43 173
	315	q [m³/h] Lw [dB(A)] Δpt [Pa]	1340 33 22	1890 37 44	2310 39 65	2670 41 87	1670 36 34	2360 40 68	2890 42 102	3340 43 136
	400	q [m³/h] Lw [dB(A)] Δpt [Pa]	2060 34 16	2910 37 33	3560 40 49	4110 41 65	2570 36 26	3640 40 51	4450 42 77	5140 44 102
	450	q [m³/h] Lw [dB(A)] Δpt [Pa]								
	500	q [m³/h] Lw [dB(A)] Δpt [Pa]	2190 34 16	3100 37 31	3790 40 47	4380 41 63	2740 36 24	3870 40 49	4740 42 73	5470 44 98
	630	q [m³/h] Lw [dB(A)] Δpt [Pa]	2960 34 13	4190 38 26	5130 40 38	5920 41 51	3700 36 20	5230 40 40	6410 42 60	7400 44 80

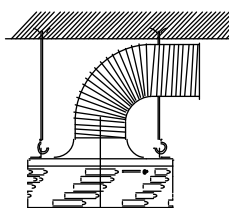
DIMENSIONS AND INSTALLATION METHOD

INSTALLATION METHODS

Installation in the ventilation duct with circular section

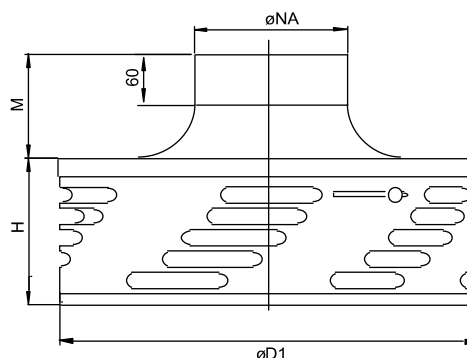


Installation on the ceiling with the use of slings

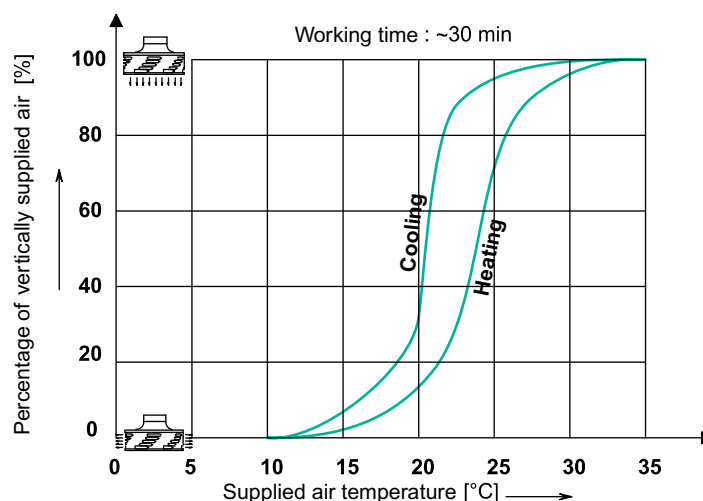


DIMENSIONS

NA [mm]	200	250	315	400	450	500	630
D1 [mm]	450	560	700	900	900	980	1200
H [mm]	170	200	230	290	320	380	440
M [mm]	130	145	165	190	200	220	250
Weight[kg]	5,9	8,5	10,3	12,4	15	17,5	21,5



THERMOSTATIC ACTUATOR CHARACTERISTICS



Electric servomotor characteristics

Voltage	24V or 230V AC/DC
Power input while working	up to 4W
Working time	~ 150 sekund
Control voltage	0(2) ÷ 10V
Input resistance	min. 100 kΩ

Servomotor control options

- local control with the use of potentiometer (manual setting),
- zonal control with the use of programmable regulator

ORDER KEY

VBF-2	24V	NA 315 /	RAL 9010
Diffuser type: VBF-1 (manual control) VBF-2 (electric control) VBF-3 (automatic control)	Supply voltage	Diameter of the diffuser	Colour of the diffuser