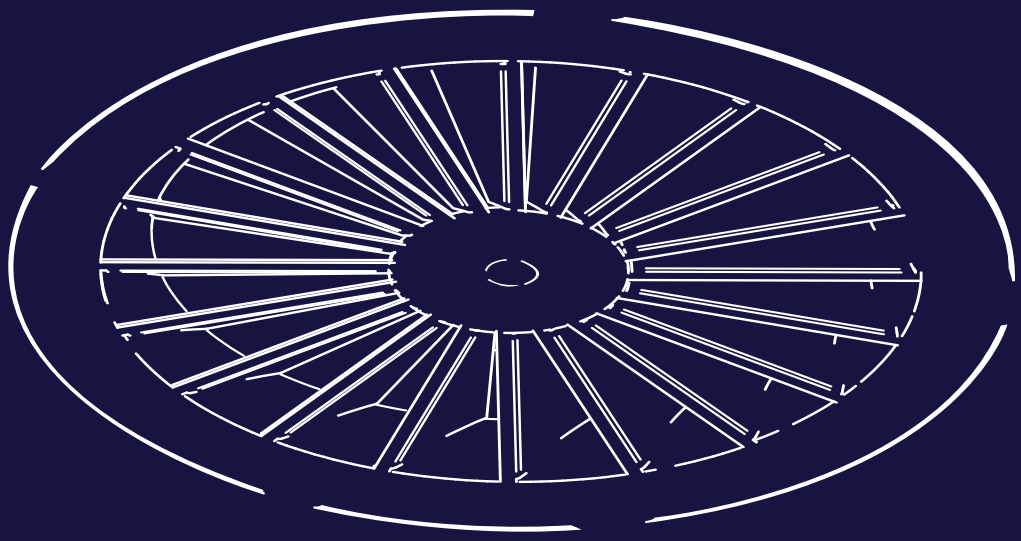


VFK type
Swirl diffuser

BARCOL-AIR

Foreword

Barcol-Air introduces the swirl diffuser
VFK diffusers where high induction
is required including for chilled ceiling system.

During the development of the swirl diffuser,
the following principles played an important role:

- Flat and central appearance, while maintaining functionality.
- Integration with all kind of chilled ceiling panels, where in the flange of the diffuser is positioned in the same level as the ceiling panel itself.
- Small diameter and low mounting height.

For special applications or diffuser selections please contact our technical staff.

Table of content

Air distribution & application

In general

The VFK swirl diffusers are designed to allow ventilation air to be supplyed from the ceiling with high induction and high comfort levels.

The swirl diffuser has been especially designed for application in climate ceilings, whereas the emphasis during development has been put on finding the balance between aesthetics and functionality.

The aesthetics are expressed in the shape; the diffuser is flat and is hardly noticeable when installed in the ceiling. The functionality of the diffuser is simple: achieving a good comfort in the occupied zone,with comfortable air velocities and temperatures

Air distribution

Next to the air velocity in the occupied zone, it is as important to realise optimal air distribution. Generally a larger number of diffuser creates a better distribution. When multiple swirl diffusers are used in a space, one diffuser can effect the performance of another. This has been taken into account in the selection process.

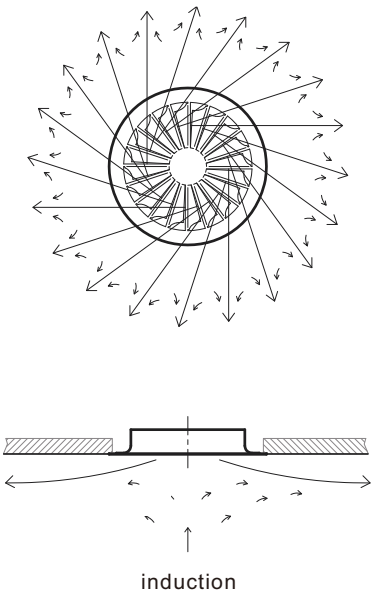
Swirl diffuser type VFK intergrated in ceiling.

Function

The functioning of the diffuser is based on achieving a Coanda-effect with a radial air discharge pattern. Due to the velocity of the discharged air, room air is induced and mixes with the supply air. The differences between the velocity and temperature of discharged air and romm air are required in order to ensure the comfort level in the occupied zone.

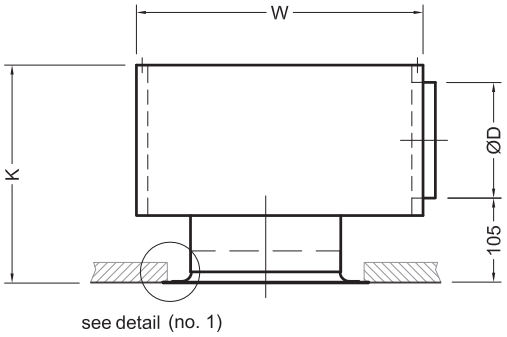
Applications

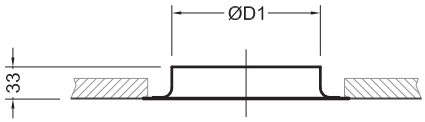
The VFK swirl diffuser can be applied with air quantities from 20 to 240 m^3/h and a temperature difference up to 10 K, with high comfort level.

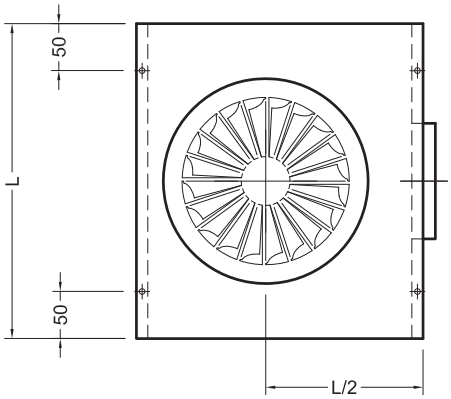


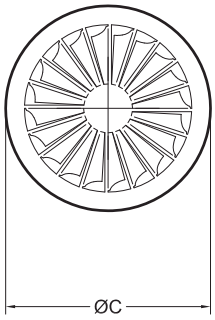
∗There are separate brochures available of the Linear Jet Flo,type CSV.

Measuring

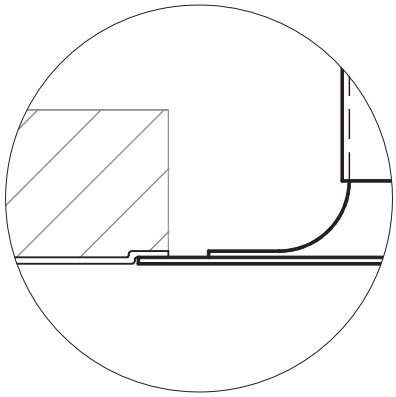








Detail no. 1:



Measurements

Model	C	ØD	ØD1	K	L	W
125	193	98	123	220	305	265
160	228	123	158	245	335	280
200	268	158	198	280	335	315
250	318	198	248	320	335	365

Note: all dimensions in mm.

Selection table

Table1

VFK Performance									
3-Feb-16					Air velocities cm/s				
					Diffuser distance(m)				
Model	Air Flow		Plenum Pressure (with insulated plenum)	Lpa	1.2	1.5	1.8	2.4	Point 2
	m3/h	l/s	pa	db(A)					
125	20	5.6	3						4
125	25	6.9	6						5
125	30	8.3	9						6
125	35	9.7	11		13	12			7
125	40	11.1	14		15	14	13		7
125	45	12.5	19		17	16	15	13	8
125	50	13.9	23	20	19	18	16	14	9
160	50	13.9	4		13	12			6
160	60	16.7	7		16	15	13		8
160	70	19.4	9		19	17	16	14	9
160	80	22.2	11		21	20	18	16	10
160	90	25	16		24	22	20	17	12
160	100	27.8	19		27	24	22	19	13
160	110	30.6	23	21	29	27	25	21	14
160	120	33.3	29	24	32	29	27	23	16
160	130	36.1	33	26	35	32	29	25	17
160	140	38.9	36	28	37	34	31	27	18
200	60	16.7	4		13	12	11		6
200	80	22.2	6		17	16	14		8
200	100	27.8	10		21	20	18	16	10
200	120	33.3	14		26	23	21	19	12
200	140	38.9	20	21	30	27	25	22	14
200	160	44.4	26	25	34	31	29	25	17
200	180	50	33	29	38	35	32	28	19
250	100	27.8	5		17	16	14	12	8
250	120	33.3	7		20	19	17	15	10
250	140	38.9	9		24	22	20	17	12
250	160	44.4	12	20	27	25	23	20	13
250	180	50	15	22	31	28	26	22	15
250	200	55.6	19	25	34	31	29	25	17
250	220	61.1	22	28	38	34	32	27	18
250	240	66.7	27	32	41	37	34	30	20

1. Selection table is based on the supply of cooled air with ΔT - 10 K in relation to the room temperature, at a room height of 2.70 - 3.00 m and mounting of a diffuser in a plane ceiling.
2. The given air velicities are average air velocities measured on 2 points:
   see page 5 section M-M
   point 1 = between the diffuser at **1.7 m** (above the flow)
   point 2 = **0.5** m from the wall and **0.1 m** above the floor.
3. Plenum pressure and Lpa data apply to diffuser with insulated plenum.
4. LpA-values, a reduction of 10 dB due to space is
5. Sound pressure level lower than 20dB(A) are indicated by '–'
6. Air velocities lower then 12 cm/s are indicated by '--'
7. The recommended minimum distance Z, between the diffuser and the facade should be 1.8 m.
8. The recommended minimum distance between the diffuser and the wall will be X/2.
9. The values for “nsertion loss insulated plenum box” do not include end reflection.
10. For non standard selections and/or applications, please contact our technical staff.

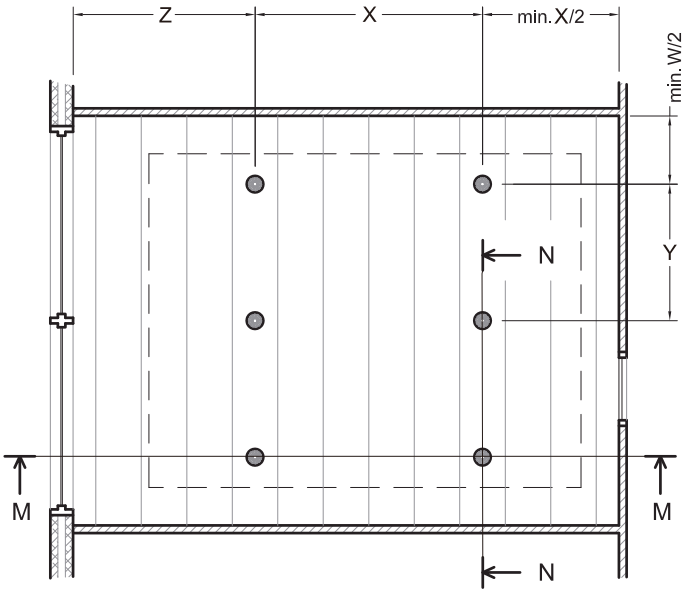
Table 2 - Correctiontabel room heights

Room height in meters	Air velocity in cm/s
2.6	x 1.10
2.7	x 1.00
3.0	x 0.80

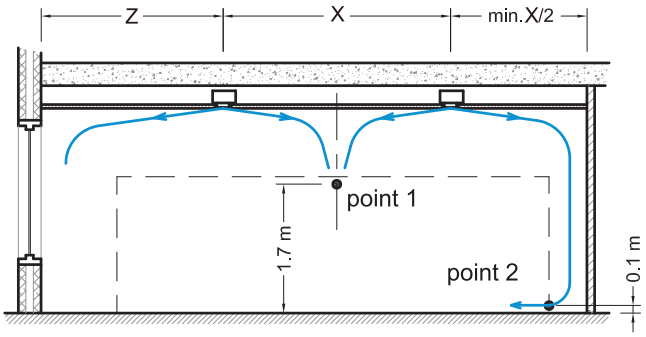
Principles selection table(mounting diffuser)

Positioning diffuser

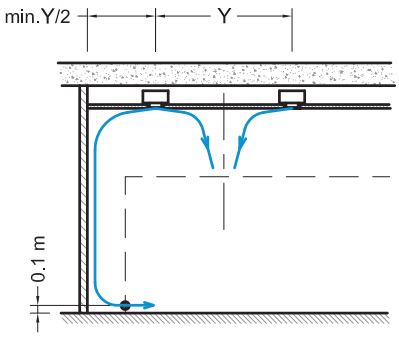
Due to the radial discharge of the diffuser,the correct positioning of the diffuser in relation to the facade, wall and another diffuser is important. In table 1 and in the drawings, the distances are indicated which should be maintained to achieve an acceptable air velocity in the comfort zone.



= comfort zone



section M-M



section N-N

Sounddata

Table 3 - Correction table for diffuser with or without insulated plenum

Model	With uninsulated plenum		Without plenum	
	Pa x	dB(A) +	Pa x	dB(A) +
125	1.0	3	0.7	+11
160	1.0	4	0.6	+9
200	1.0	4	0.6	+8
250	1.0	4	0.6	+8

Table 4 - Insection loss of insulated plenum

Model	Insertion loss in dB/oct.					
	125	250	500	1000	2000	4000
125	5	1	0	9	4	10
160	4	1	3	7	5	9
200	4	1	3	6	5	8
250	4	1	3	6	5	7

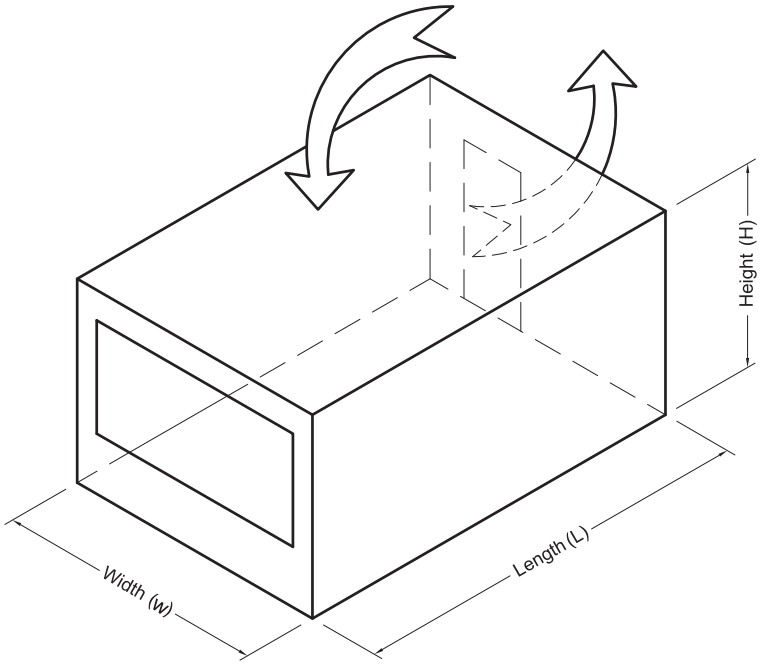
Air supply calculations

To determine the air supply per diffuser, the room dimensions must be defined.

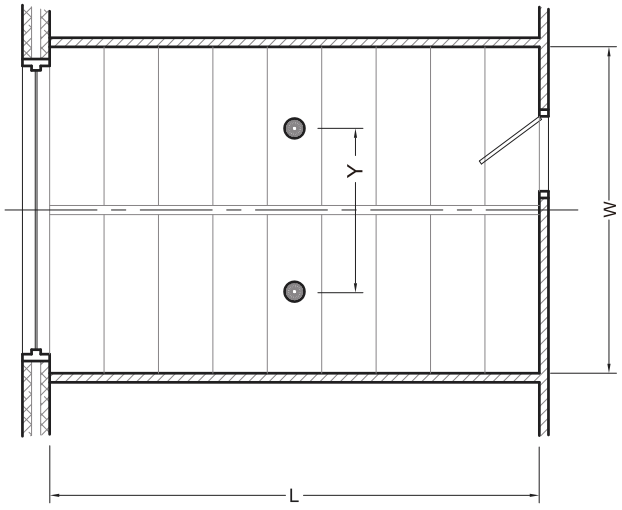
If these results are known, one can calculate the required air supply by means of the required air changes (m3/h):

Formula: Q = L x W x H x AC

Q	=	Air supply	(m^3/h)
L	=	Length	(m)
W	=	Width	(m)
H	=	Height	(m)
AC	=	Air Changes	



Air supply calculations



- Desired ventilation rate (AC): 2.5
- Room volume (in m^3): L x W x H = 5.40 x 3.60 x 2.85

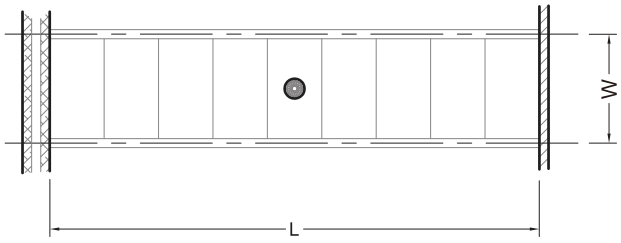
Calculation air quantity per hour:

5.40 x 3.60 x 2.85 x 2.5 = **138** m^3/h

Divided over 2 diffuser this means an air quantity of 69 m^3/h per diffuser. For good air distribution the diffuser should be divided proportionally over the space.

From the selection table it follows that the model VFK 160 is suitable for this application.
From table 1 (page 4) it follows that the air velocity with diffuser distance (Y) of 1.8 m is 16cm/s.

Example diffuser calculation



- Desired ventilation rate (AC): 2.0
- Room volume (in m^3): L x W x H = 5.40 x 1.20 x 3.00

Calculation air quantity per hour:

5.40 x 1.20 x 3.00 x 2 = 39 m^3/h

For this diffuser only model VFK 125 is suitable.

From table 1 (page 4) it follows that at a diffuser distance(Y) of 1.2 m the air velocity is 15cm/s.

Technical information & specifications

Application

The VFK swirl diffusers are high induction ceiling diffuser, especially suited for the supply of cooled or heated air with a large temperature difference in relation to the average space temperature. They are suitable for climate ceiling,but can also be applied in regular ceilings.

Technical information

Properties:
- Fixed, radial discharge pattern.
- High induction.
- Suitable for a large number of air changes.
- Suitable for application with lower ceilings.
- Suitable for climate ceilings.
- Low sound volume.

Type:
- Diffuser and discharge cone made of steel.
- Basic finnish: white RAL 9010, 20% gloss.
- Plenum box made of galvanized and with or without internal insulation.

Delivery:
- Diffuser and plenum box are delivered separately.

Mounting:
- The plenum box is equipped with suspension holes.

Model number

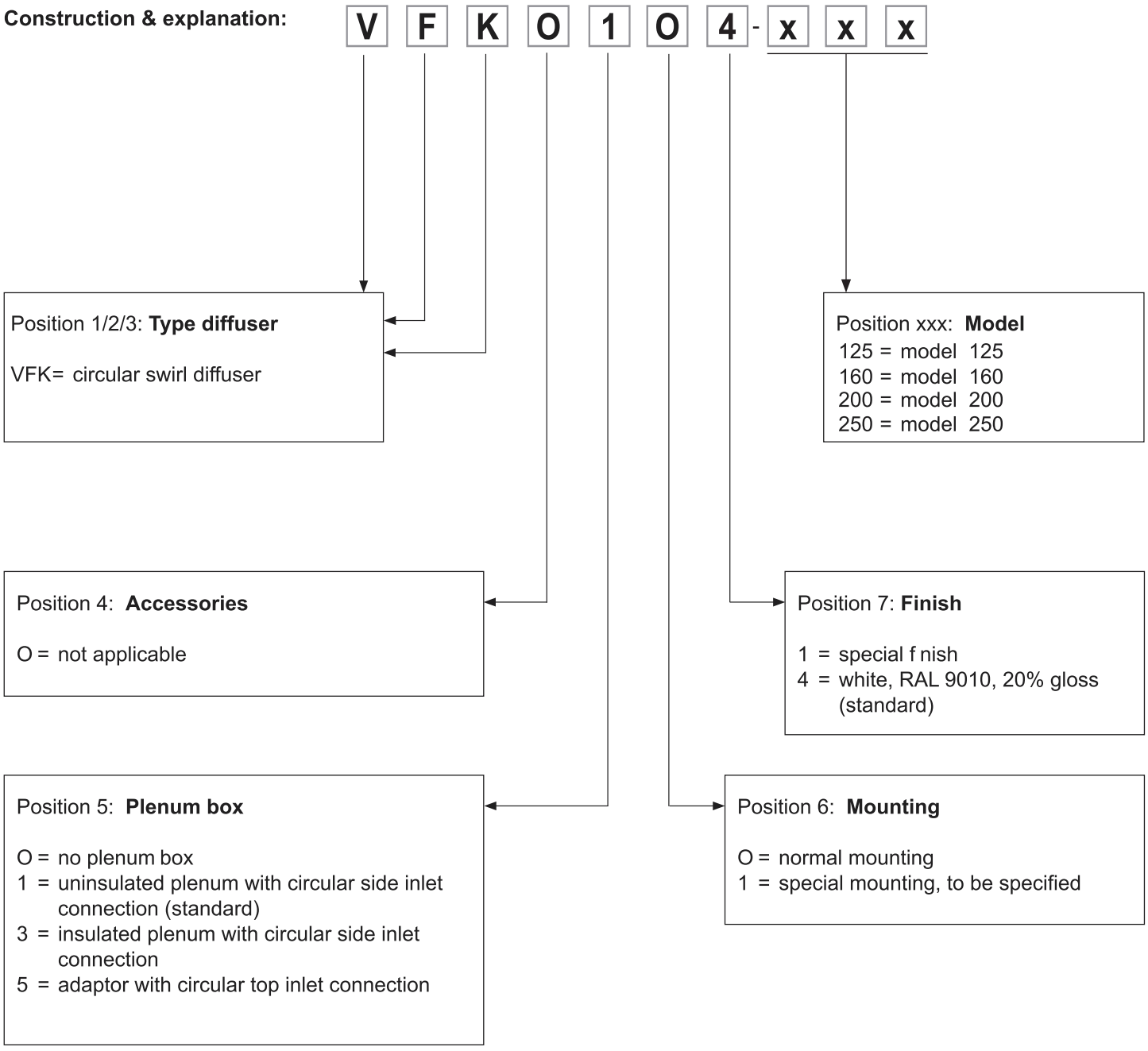
- VFKOOO4: Diffuser without accessories.
- VFKO1O4: Same, with non-insulated plenum box.
- VFKO3O4: Same, with insulated plenum box.

Specifications

Example:
Ceiling swirl diffuser, circular type, with a radial discharge pattern especially suitable for application in climate ceilings complete with galvanized steel supply air plenum without internal insulation.
Material: Plate steel.
Barcol-Air type: VFKO1O4.
Exterior: white (RAL 9010) with 20% gloss.

Productcode

Construction & explanation:



Order example:

VFKO1O4-125-0000 : standard VFK diffuser model 125.

BARCOL-AIR

Website: www.barcolair.net