nad KLIMA

MADE IN CANADA

VAL

Ceiling diffuser

catalog 1.1.2

Table of content

The information contained in this catologue is subject to change.
Refer to the digital version on **www. nadklima.com**

Version 2019

VAL

Presentation and benefits

The VAL variable air diffuser includes an internal control dial allowing a manual or motorized adjustment, to adapt to diverse situations.

The airflow's distinctive characteristics allow an installation of the diffuser recessed into the ceiling, or suspended at heights up to 15 m with a flow feed reaching 3000 m^3/h.

Not requiring a plenum, the VAL diffuser is connected directly to the air duct or using an elbow.

Benefits

- High, adjustable depth of penetration
- Suspended or recessed installation
- Suitable for heating and cooling
- Manual or motorized adjustment
- Attractive appearance

Domaines d'application

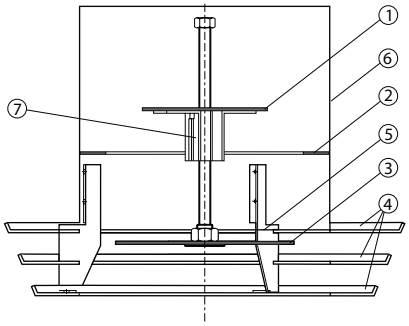
- Individual offices
- Administration areas
- Large retail stores
- Meeting rooms
- Multi-purpose rooms
- Cinemas
- Sport rooms
- Industrial halls
- Conference or convention halls

Configuration and mode of operation

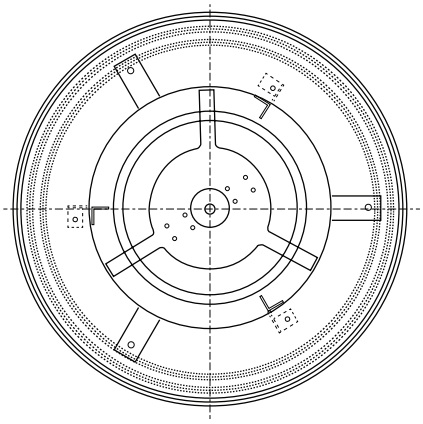
The VAL air diffuser comprises a valve (1), a throttle ring (2), a connecting frame (3) and a second control ring (4). The outer rings' design gives a conical appearance.

The different parts are attached to the diffuser's main body (6) with spacers (5), forming a perfectly symmetrical unit.

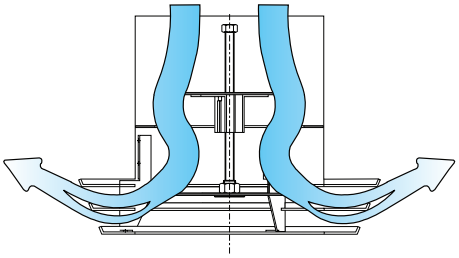
The valve is equipped with a regulating mechanism (7), enabling a manual vertical movement of the connecting frame (3).



As an option, the diffuser can be motorized.

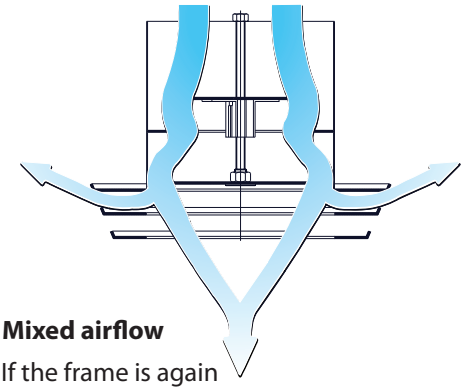


Mode of operation



Radial airflow

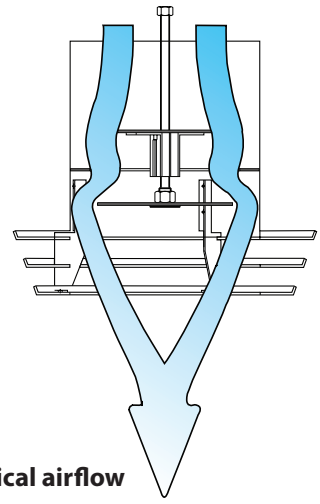
When the connection plate is in a lower position, the pipe airflow is stopped by the valve and subsequent ring and is gently deflected upwards by the frame.



Mixed airflow

If the frame is again adjusted to a vertical position, the horizontal air is reduced and deviated upwards, in favour of a vertical airflow.

The ratio between the two can be modified to meet the user's needs, allowing an adaptation of the horizontal or vertical air flows.



Vertical airflow

When it is set to an upper position, the connection plate pushes the air in a vertical direction, causing a high penetration rate.

Radial stream - Cooling operation

Axial stream - Heating operation

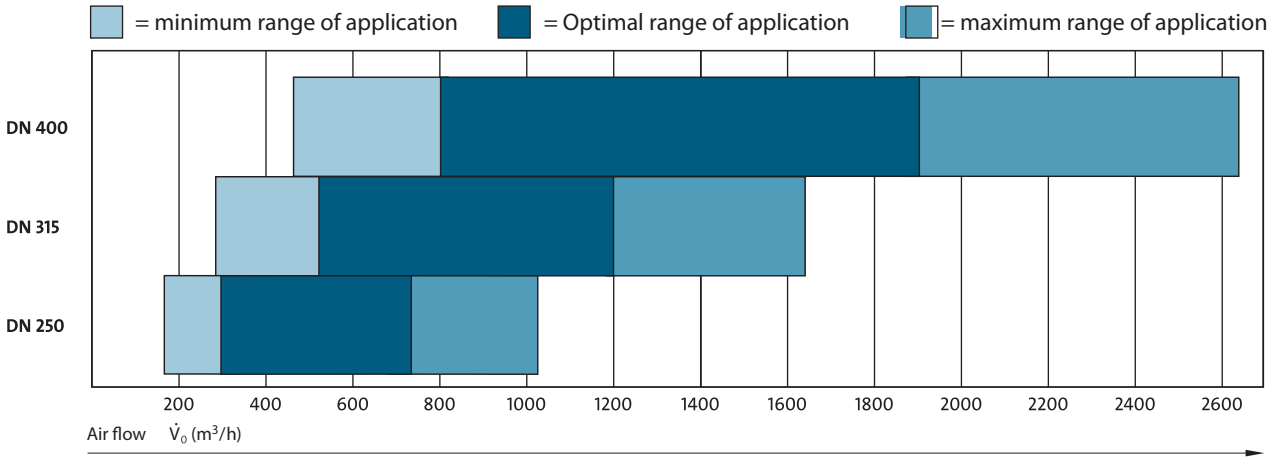
Aerodynamic data and range of application

Aerodynamic data

	L_{WA}* dB	$\dot{V}_0$ m^3/h	ΔP Pa	Minimal space (m)	x_{crit} m	$\dot{V}_H$ m^3/h	y m
DN 250	30 35 40	390 470 550	32 46 62	5,4 7,0 8,6	4,4 5,3 6,1	280 340 400	4,0 5,0 5,8
DN 315	30 35 40	540 650 770	21 31 43	6,4 8,2 10,0	3,0 4,1 5,1	380 450 540	4,4 5,2 6,2
DN 400	30 35 40	900 1090 1300	24 36 55	9,5 >10,0 >10,0	3,8 4,5 5,4	660 800 930	5,8 7,0 8,3

Specifications: Minimum ceiling height of 3 m so that the airflow does not exceed 0.20 m/s in the occupied zone.
The depth of penetration in heating mode y is ΔT = 10 K (raised plate).
Critical airflow trajectory ΔT = -8 K (plate not raised)
* The values L_{WA} apply to the cooling and heating functions.

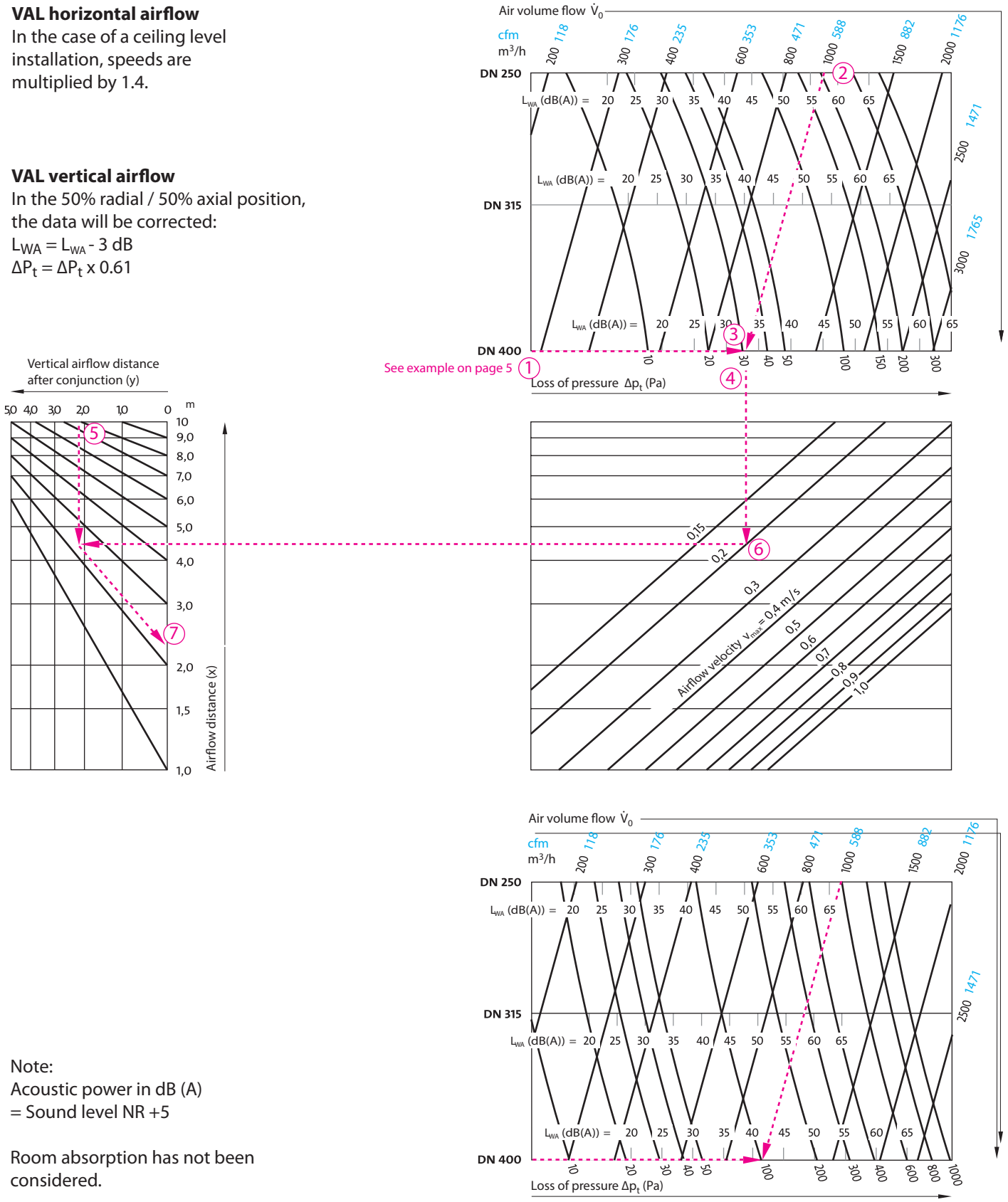
Ranges of application



Diagrams

VAL horizontal airflow
In the case of a ceiling level installation, speeds are multiplied by 1.4.

VAL vertical airflow
In the 50% radial / 50% axial position, the data will be corrected:
$L_{WA} = L_{WA} - 3$ dB
$\Delta P_t = \Delta P_t \times 0.61$

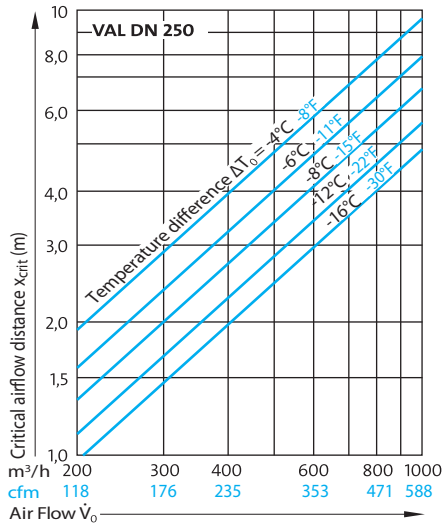


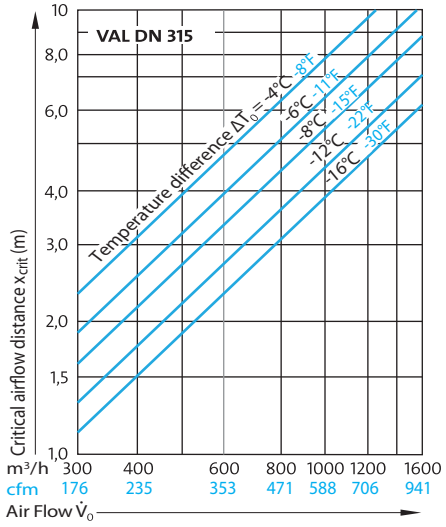
Note:
Acoustic power in dB (A)
= Sound level NR +5

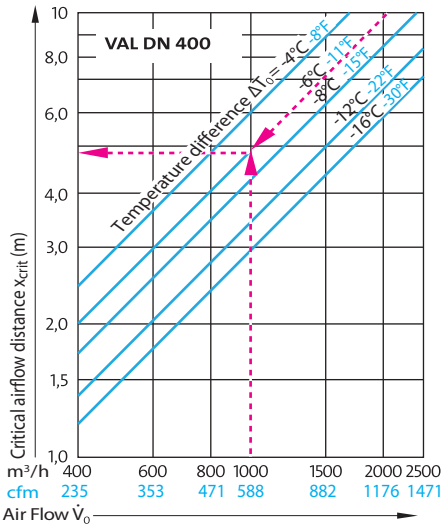
Room absorption has not been considered.

Cooling and heating mode diagrams
Examples

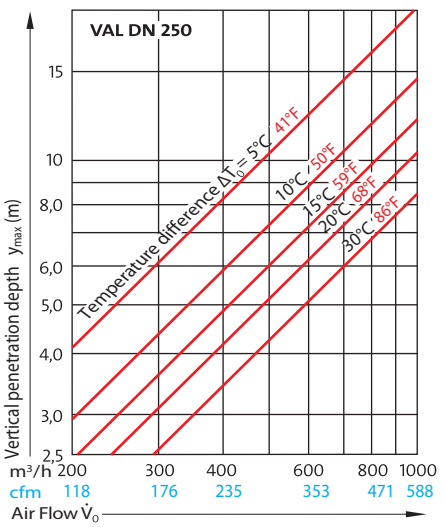
Critical airflow distance in cooling mode

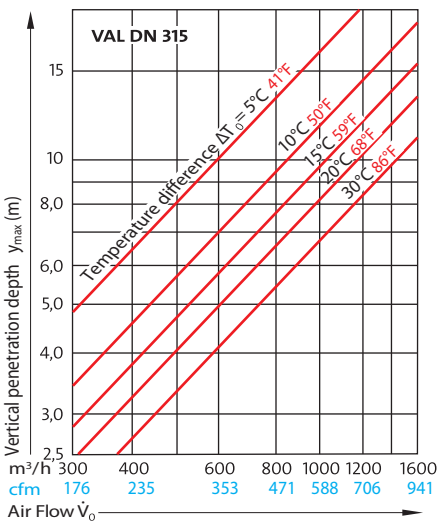


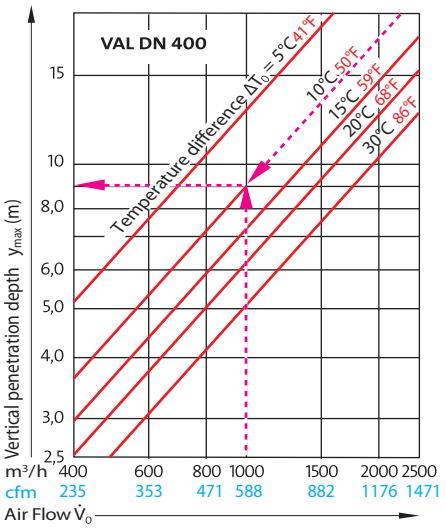




Vertical penetration depth in heating mode







Example 1 - Data:
Height of the space: 6 m
Height of installation: 4 m (freely suspended)
Speed of the airflow at head height (1.8 m): 0.2 m/s
Airflow $\dot{V}_o$: 1000 m³/h

Required:
1) Nominal dimension
2) Acoustic power L_{WA}
3) Loss of pressure
4) Minimal distance between the diffusers

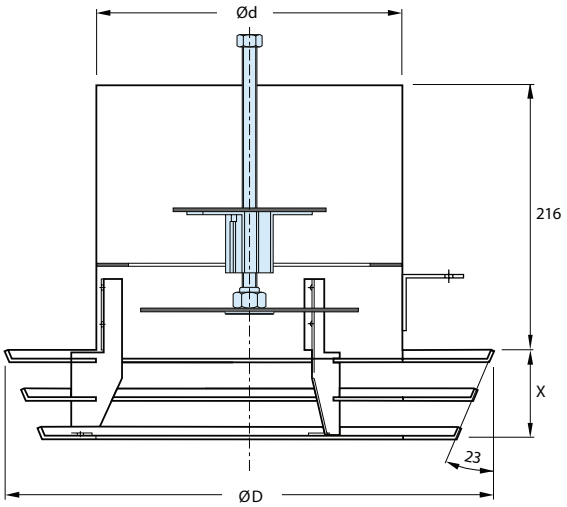
Solution:
1) The "Area of application" diagram uses the nominal dimension of DN 400.
2) The "Horizontal airflow" diagram is read for the DN 400 ① and for an airflow of 1000 m³/h: ② acoustic power: 31 dB(A) ③, total loss of pressure: 31 Pa ④ for y = h - 1.8 = 4.0 m – 1.8 m = 2.2 m ⑤ and is assumed to be v = 0.2 m/s ⑥ a distance between the diffusers of at least 2 x 2.1 m = 4.2 m ⑦

Example 2 - Data:
Nominal dimension: DN 400
Air flow: 1000 m³/h
Difference in temperature: - 6°C
Required:
Critical trajectory of airflow
Solution:
From the "Critical trajectory of airflow" diagram, we find: x_{crit} = 5.0 m

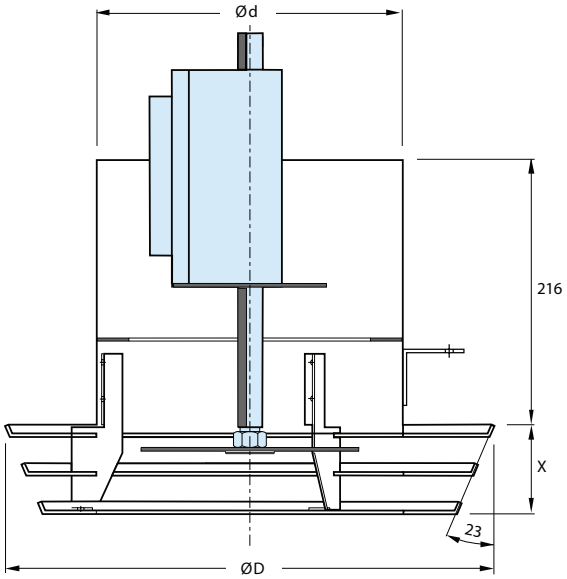
Example 3 - Data:
Nominal dimension: DN 400
Airflow: 1000 m³/h
Required:
Acoustic power and total loss of pressure for:
• 100% axial airflow
• 50% axial and 50% radial airflow
Solution:
The "Vertical airflow" diagram demonstrates that for the 100% axial airflow:
• Acoustic power = 42 dB
• Total loss of pressure = 100 Pa
and for the 50% axial and 50% radial airflow:
• Acoustic power = 42 – 3 = 39 dB
• Total loss of pressure = 100 x 0.61 = 61 Pa

Example 4 - Data:
Nominal Dimension: DN 400
Air flow: 1000 m³/h
Temperature difference: +10°C
Required:
Vertical penetration depth for an
• Airflow 100% axial
• Airflow 50% axial and 50% radial
Solution:
From the "Vertical penetration in heating mode" diagram and the corresponding factors of correction, we find for 100% axial airflow: Y_{max} = 9.0 m, and for 50% axial and 50% radial airflow: Y_{max} = 9.0 m x 0.5 = 4.5 m.

Dimensions



manual adjustment



motorized adjustment

	DN 250	DN 315	DN 400
X	69	86	110
Ø D	406	508	610
Ø d	251	302	403

Specifications and codification

1. Description and physical characteristics

1.1 The adjustable VAL diffusers shall consist of a circular duct with three (3) rings guiding the airflow, with a manual or motorized adjustment mechanism.

1.2 The adjustment mechanism shall be composed of a deflector, a reduction ring and an adjustable control dial.

1.3 The circular duct, deflector and reduction ring shall be made of galvanized steel with a black finish.

1.4 The rings and control dial shall be made of aluminum with a white (RAL 9003) finish.

2. Performance

The performance shall be guaranteed by using performance curves or simulation software for critical areas. These curves shall indicate the loss of pressure and the acoustic power generated, and show a cross-section of the critical airflow trajectory in cooling, heating and isothermal modes, with a nominal speed in the occupied zone at the request of the engineer.

3. Connection

The diffuser shall be connected directly to the air duct.

4. Balancing

The NAD Klima diffuser balancing shall be executed by a certified ventilation balancing technician, with a recognized professional certification.

5. Required quality: NAD Klima VAL model

Codification

VAL				**Product**
	250, 315, 400			**Nominal dimension**
		H = Manual adjustment M = Motorized adjustment		**Adjustment**
			9003 = White 9010 = Cream white 00SB = Solar Black (Standard matte black) 00SM = Silver Matte (Standard metallic grey) ____ = RAL color * (write the RAL color number)	**Diffuser color**
VAL	**- 250**	**- H**	**- 9003**	**Example**

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