nad KLIMA

MADE IN CANADA

SAL 50

Linear diffuser

catalog 1.1.3

Terrebonne, Canada

Table of content

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Refer to the digital version on **www. nadklima.com**

Version 2019

Carrefour de l'Estrie, Sherbrooke, Canada

SAL 50

Presentation and benefits

The SAL 50 diffuser is a linear diffuser composed of eccentric rollers, which are inserted in 50 mm wide extruded aluminum profiles. Each diffuser is supplied with a stabilising chamber, allowing for a uniform and silent airflow.

The SAL 50 is available with one or multiple slots, depending on the application and required amount of air. Diffusers may be mounted in series, one behind the other, creating a continuous effect to the ceiling.

The SAL 50 enables an optimal configuration of the ventilation system to meet a room's requirements. Due to the eccentric rollers, a variety of airstream configurations can be achieved, even after the unit has been installed.
The SAL 50's technology provides high speed discharge of air with low acoustic power.

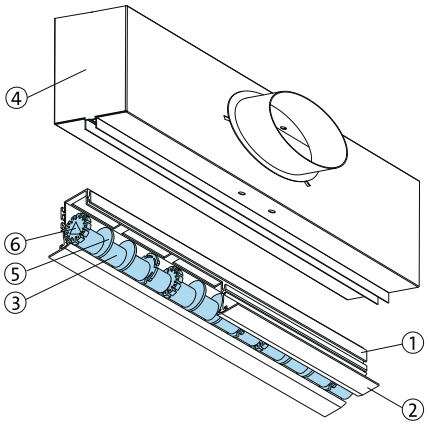
The laminar flow, stability and high induction generated from the very start of the outlet vent make the SAL 50 the linear diffuser of choice for high air flow rates and variable air volumes.

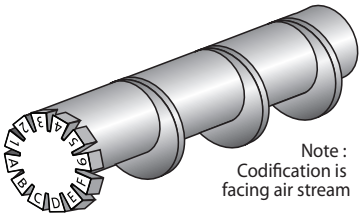
Benefits

- Influence on the method of induction (diffuse mode), extension of jets (divergent mode) and a very long vertical stream in heating mode
- Rapid reduction of flow speed and temperature variations caused by high induction
- Low acoustic power for high airflow rates
- Stable laminar airflow and a variety of airflow directions available
- Eccentric rollers allowing 180° airflow adjustment
- Possibility of adjusting airflows, even after installation
- Possibility of reducing total airflow rate as much as 25% in VAV
- Approximately 3 times more induction than a conventional linear diffuser
- Approximately 3 times less temperature variation in occupied area than a traditionnal diffuser
- Possibility of eliminating external heating sources due to the diffuser's heating abilities
- Adaptable to systems requiring constant or variable airflows
- Areas with high air movement and low air velocity in the occupied zone

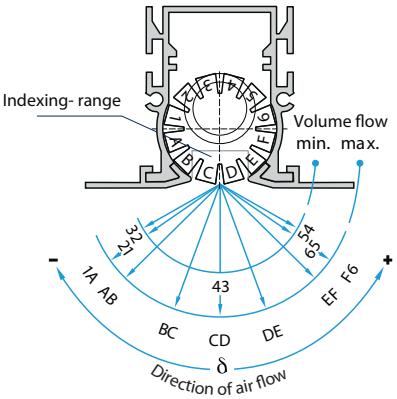
Areas of application
- Rooms with average ceiling heights
- Situations where the diffuser must adapt to the contours and colors of the room
- Offices with partitioned workspaces
- Clean rooms
- Call centres
- Closed offices
- Computer (server) rooms
- Meeting rooms
- Multi-purpose rooms
- Systems with constant or variable airflow rates
- Entrance halls (vertical air streams)
- Fenestrated walls
- Theaters

Configurations and mode of operation





Eccentric roller



①Extruded aluminum profile
②Wide or narrow finishing profile
③Eccentric rollers
④Plenum
⑤Air guiding blades
⑥Display and adjustment dial

Configuration

The SAL linear diffuser slots are composed of extruded aluminum (1) with additional wide or narrow finishing profiles (2), eccentric rollers (3), which can rotate on 360 degrees, and a plenum (4).

The 150 mm (6 in) long eccentric rollers (3) offer a low acoustic level and optimal aerodynamics. They possess on their axis multiple air guiding planes (5). They also have a display and adjustment dial (6), on which are alphanumeric characters, allowing the user to define and reproduce the roller's settings.

The profiles are attached to the plenum with screws for applications in suspended ceilings and with central screws for gypsum ceilings.

The diffuser will be powder coated with a polyester TGIC-free paint, providing a smooth, easy-to-clean, chip and fade resistant finish. Colours are available from the RAL colour chart.

Mode of operation

The eccentric rollers form, with the aluminum air guiding slots, an optimal air flow.

A drop in pressure occurs when approching the roller's surface. As air leaves the slot, it is stable and generates a low level of acoustic power. The flow maintains a powerful induction of ambient air.

The eccentric rollers' positioning allows an adjustment of the air jet's direction, with or without reduction in the exit area.

The rollers have small plates to guide the air. This plates support a dense air flow and maintain the air flow's direction perpendicular to the rollers' axis.

Adjustment of air jet direction

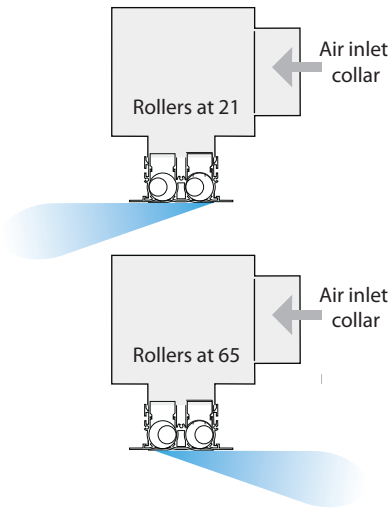
Thanks to the shape of the eccentric rollers and adjustment dial with alphanumeric characters, the air jet's direction at the outlet of the diffuser can vary up to 180°. For each direction, there are two (2) roller positions ("reduced" or "not reduced"), as illustrated in figure B.

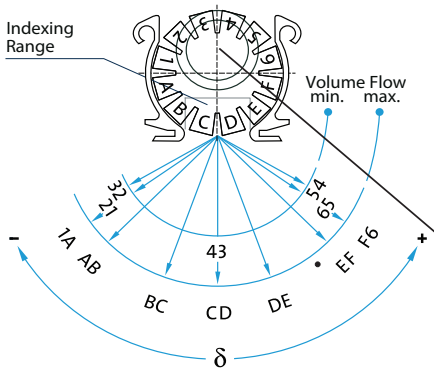
For a ceiling installation, a horizontal airflow is generated by the Coanda effect with the rollers in positions EF, F6, 1A, AB and 21, 32, 54 and 65.

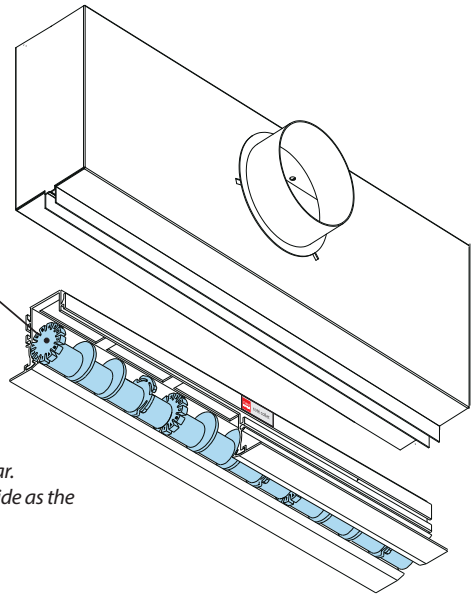
As a result, airflow combinations are almost infinite. During manufacturing, rollers are normally set alternately in positions 21 and 65 (diffusion mode). This setting produces a strong induction flow, which is effective even in high cooling needs and mixed air rates.

Controlling the direction of air flow

Air jet on one side



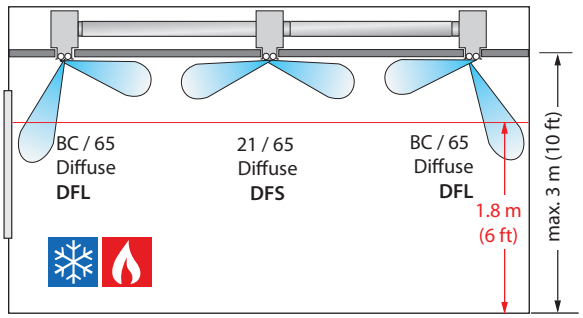


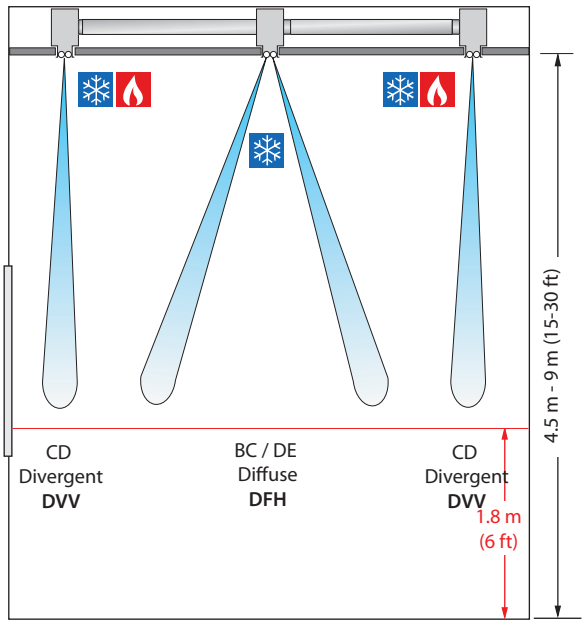


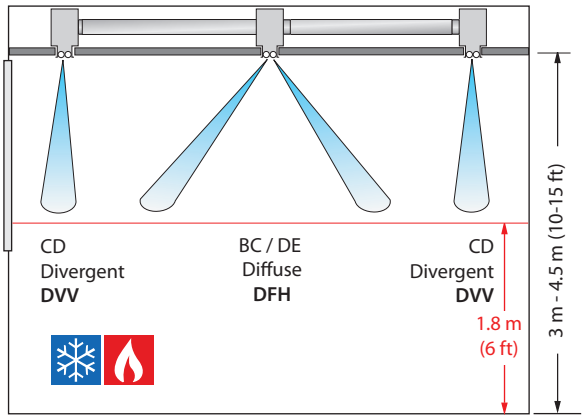
Notes :
The roller's adjustable side must be to the left of the collar.
During assembly, the NAD label is placed on the same side as the collar of the plenum.
When the air inlet is on the top or for a wall installation, follow the directions on the workshop design.

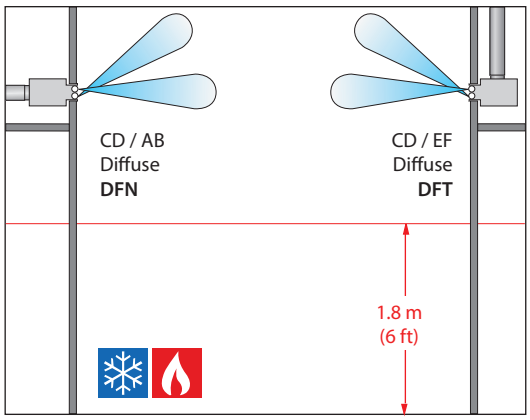
Examples of application

The diagrams below illustrate the different relationships between eccentric roller position and air jet direction at a roller's outlet.

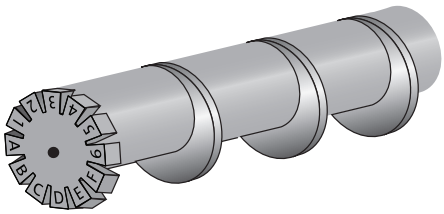


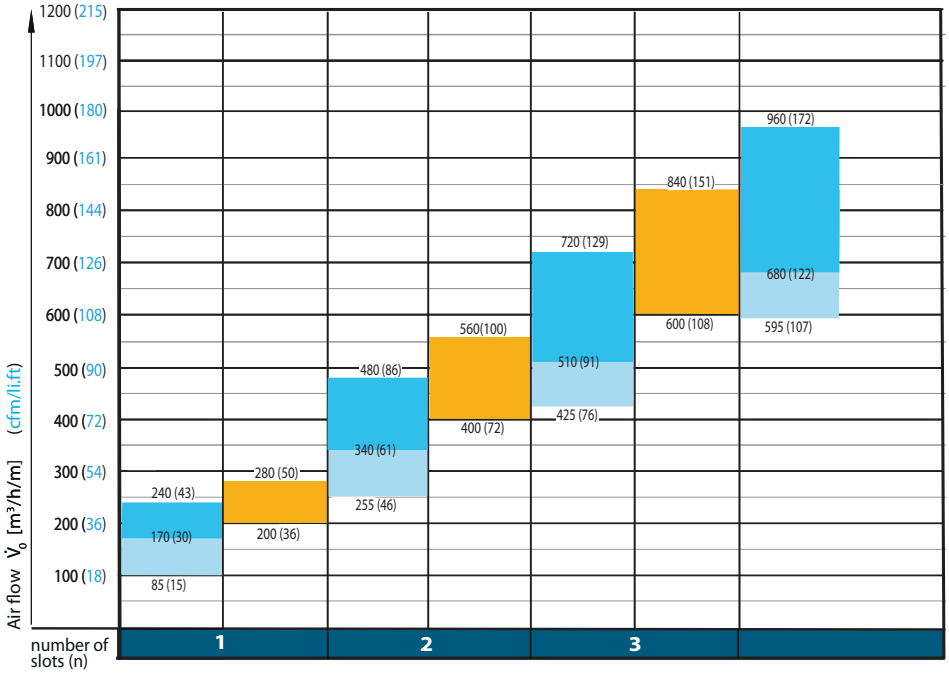






Selection of the number of slots



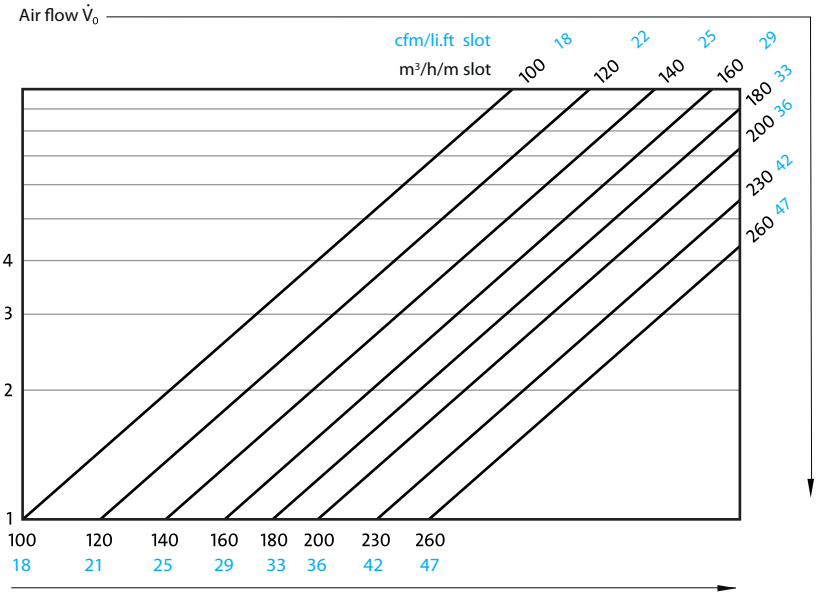


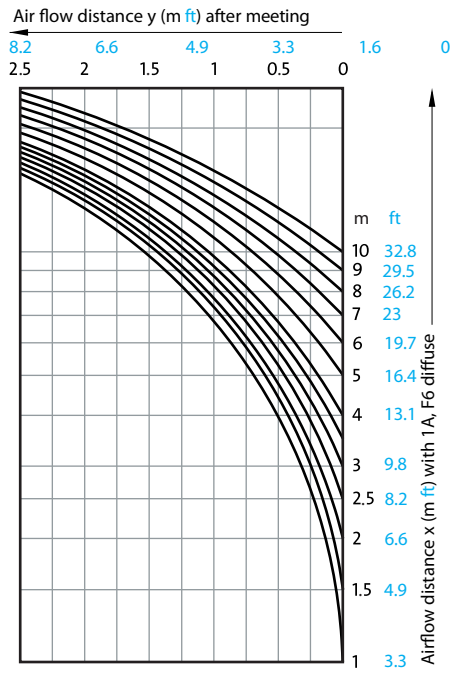
Air Flow by meter of slot of SAL 50 $\dot{V}_0$	m³/h/m / slot (cfm/ li.ft / slot)
Cooling only for all ceiling heights Heating and cooling for ceiling heights ≤ 3 m (10 ft)	85 - 240 (15-43)
Heating and cooling or heating only for heights of 3 m (10 ft) - 4.3 m (14 ft)	200 - 280 (36-50)

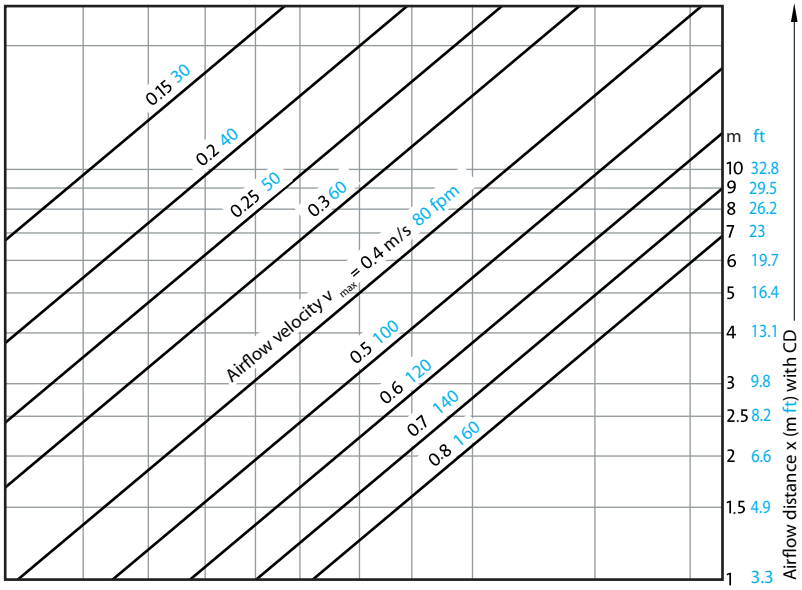
- In the case where heating mode can not be selected with the initial air flow, reduce slot length L_S in accordance with the recommended air flow per meter of slot.
- In a critical acoustic environment, increase the number of slots.

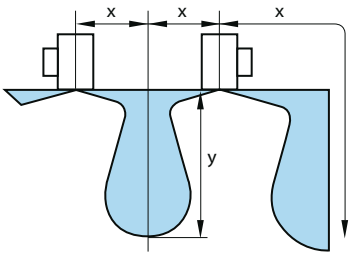
Diagrams of air flow velocity

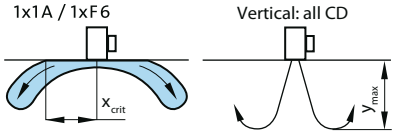
Roller position	V_{max} = V_{max} Diagram x k
1x1A / 1xF6 Standard	k=1,0
All 1A or All F6	k=2,0
All CD	k=1,6

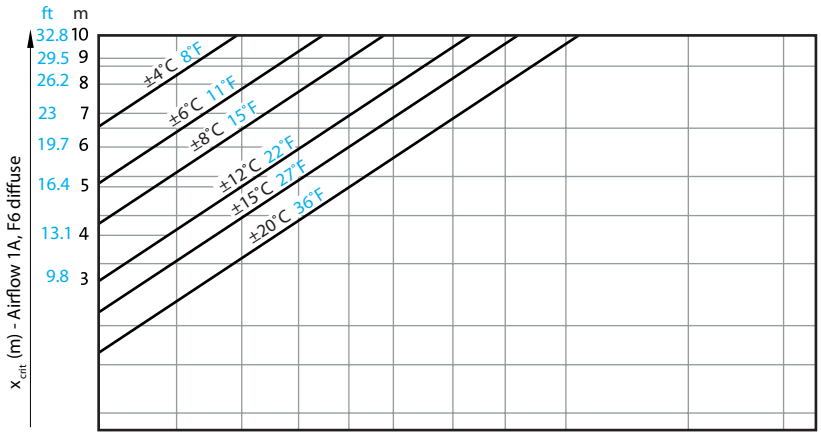




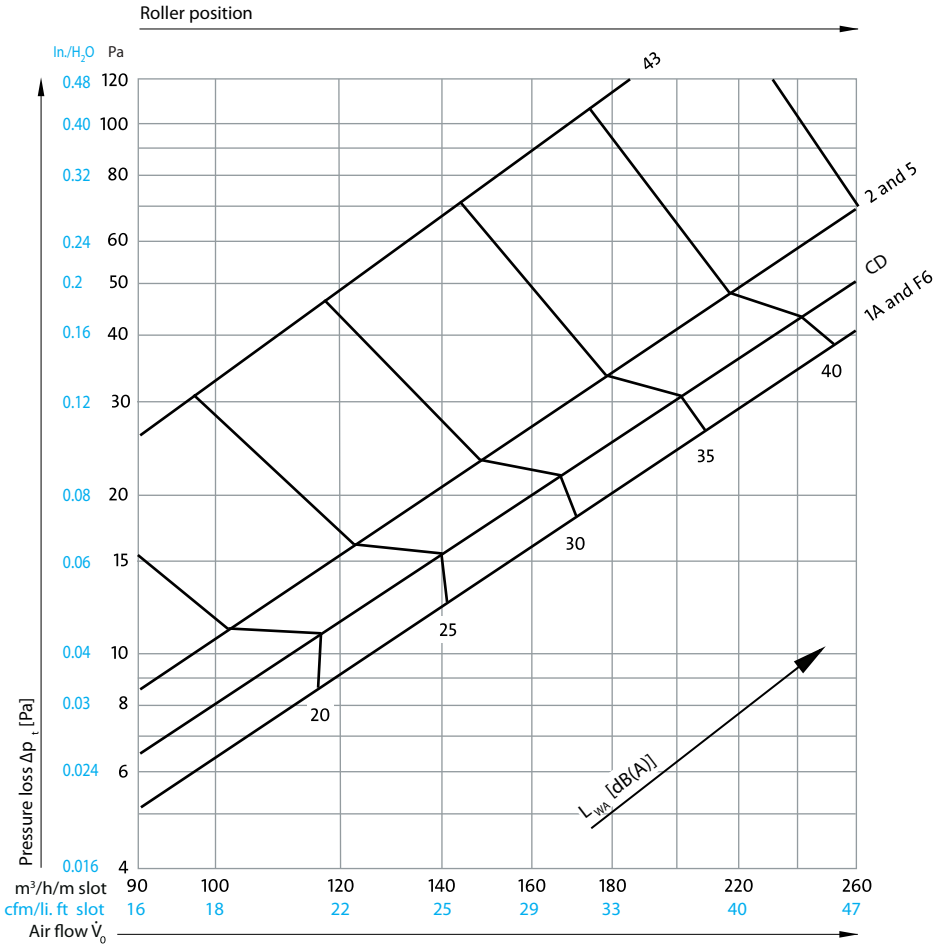








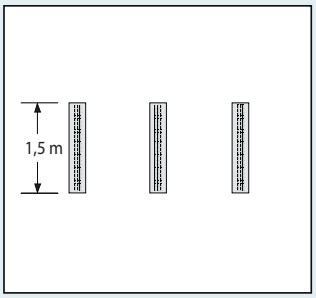
Loss of pressure and level of acoustic power



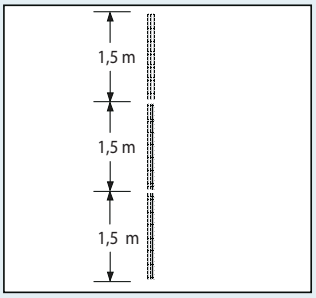
Number of slots	1	2	3	4
k (dB)	0.0	3.0	4.7	6.0

How to determine the diffusion length

Diffusers installed in parallel
Diffusion length: 1.5 m (5 ft)



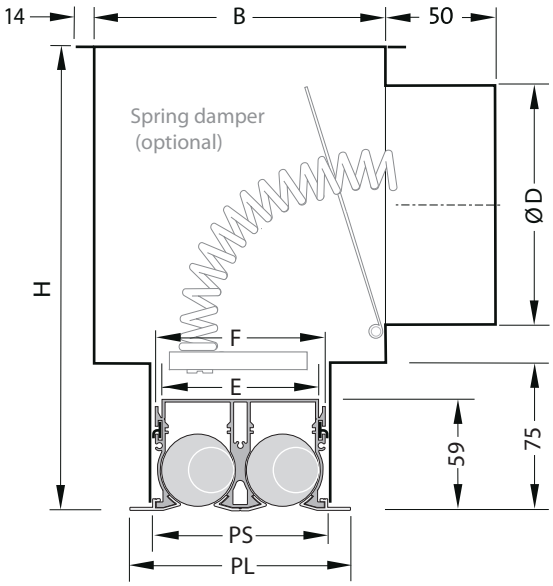
Diffusers installed in series
Diffusion length: 4.5 m (15 ft)



Important:
The absorption of the room is not accounted for.
For a comparison with North American values, reduce the acoustic power by 10 dB.

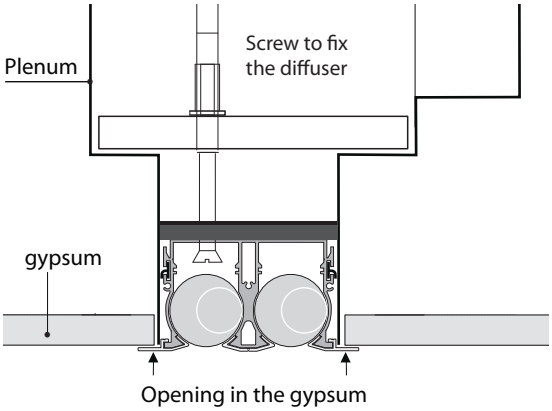
Diffusion length (m)	l (dB(A))
1	0.0
2	3.0
3	4.7
4	6.0
5	7.0
6	7.8
7	8.4
8	9.0
9	9.5
10	10.0

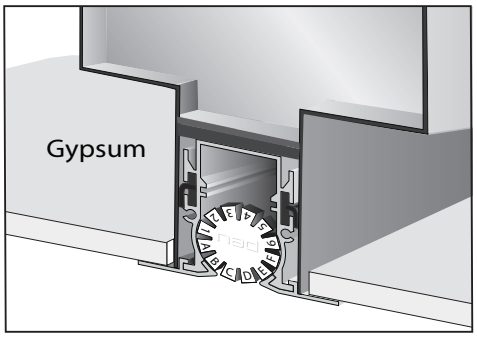
Dimensions of diffuser and plenum



Mounting and suspension for a gypsum ceiling

- Suspend the plenum with a hooks and a threaded rod (not included).
- Position and fix the plenum and ensure the diffuser's inlet opening is leveled with the ceiling.
- Place diffuser simply by pressing on the diffuser inlet.
- Attach diffuser with screws provided for this purpose.





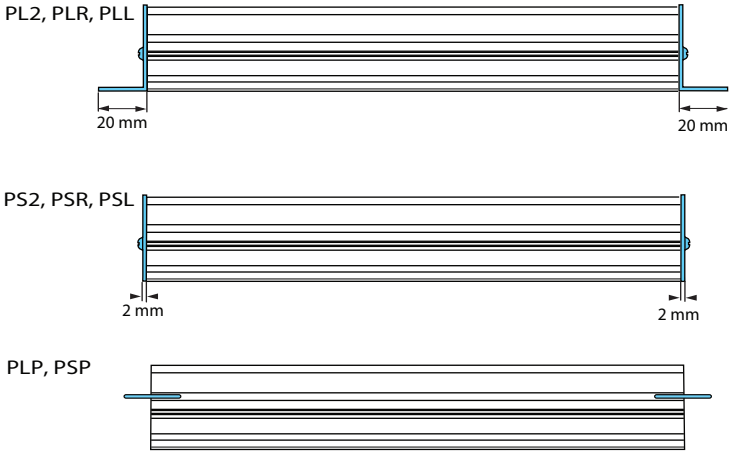
Number of slots ↓		300 to 600	750 to 900	950 to 1500	1550 to 1950
1	Size B	101	101	101	101
	Size H	327	327	327	327
	Size E	37	37	37	37
	Size F	45	45	45	45
	Size PS	49	49	49	49
	Size PL	73	73	73	73
	Size D side	125	150	200	2 X 150
	Size D top	125 (oval)*	150 (oval)*	200 (oval)*	2 X 150 (oval)*
	Air inlet (Qty)	1	1	1	2
2	Size B	145	145	145	145
	Size H	377	377	377	377
	Size E	82	82	82	82
	Size F	89	89	89	89
	Size PS	93	93	93	93
	Size PL	117	117	117	117
	Size D side	150	200	250	2 X 200
	Size D top	150 (oval)*	200 (oval)*	250 (oval)*	2 X 200 (oval)*
	Air inlet (Qty)	1	1	1	2
3	Size B	190	190	190	190
	Size H	392	392	392	392
	Size E	127	127	127	127
	Size F	134	134	134	134
	Size PS	138	138	138	138
	Size PL	162	162	162	162
	Size D side	200	250	302	2 X 250
	Size D top	200 (oval)*	250 (oval)*	302 (oval)*	2 X 250 (oval)*
	Air inlet (Qty)	1	1	1	2
4	Size B	236	236	236	236
	Size H	429	429	429	429
	Size E	171	171	171	171
	Size F	178	178	178	178
	Size PS	182	182	182	182
	Size PL	206	206	206	206
	Size D side	200	250	302	2 X 250
	Size D top	200	250 (oval)*	302 (oval)*	2 X 250 (oval)*
	Air inlet (Qty)	1	1	1	2

The optional balancing damper is adjustable through the diffuser.

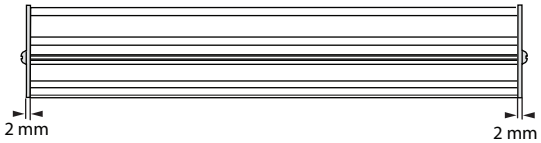
*** Note: In order to install a radial damper, the plenum will be oversized by 50 mm (2 in) in relation to the inlet.**
It will allow room on top for a round inlet instead of an oval one.

Total length with end cap

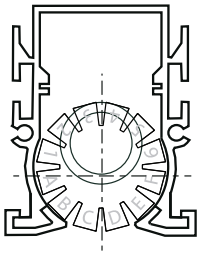
Nominal size	PLP/PSP mm	PLL/PLR mm	PL2 mm	PSR/PSL mm	PS2 mm
300	300	320	340	302	304
600	563	583	603	565	567
750	750	770	790	752	754
900	900	920	940	902	904
1050	1050	1070	1090	1052	1054
1200	1173	1193	1213	1175	1177
1350	1350	1370	1390	1352	1354
1500	1500	1520	1540	1502	1504
1650	1650	1670	1690	1652	1654
1800	1800	1820	1840	1802	1804
1950	1950	1970	1990	1952	1954

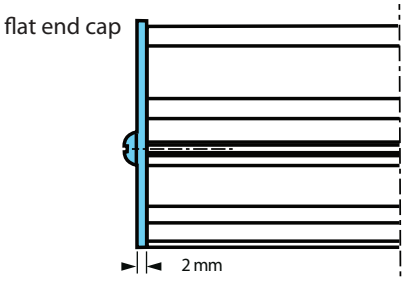


PS with narrow profile

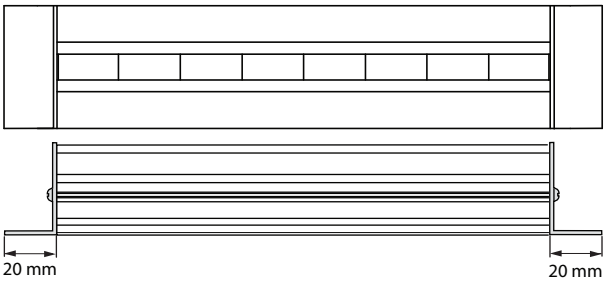


PS2: with flat end cap on both sides
PSR: with flat end cap on right side
PSL: with flat end cap on left side

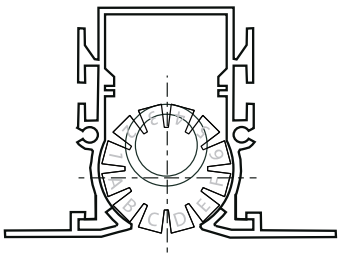


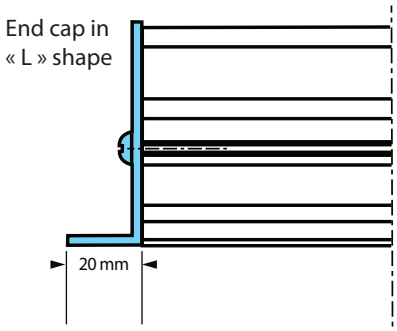


PL with wide profile (”L”)



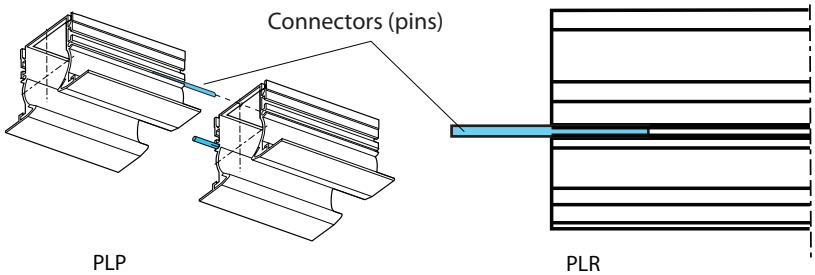
PL2: with wide end on both sides
PLR: with wide end on right side
PLL: with wide end on left side

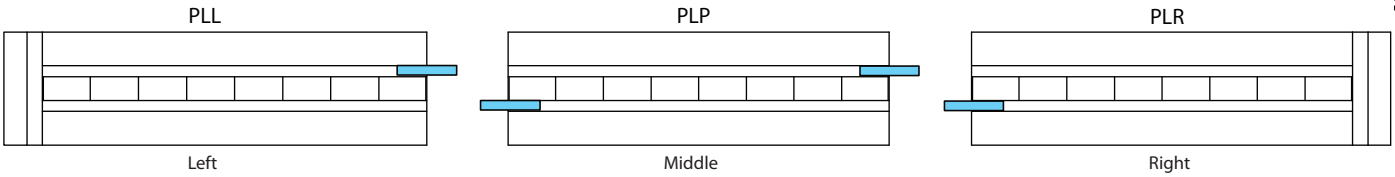




Connectors (pins)

The connection between diffusers is made using pins (included) when diffusers are installed in series.





Specifications

1 - Description and physical characteristics

1.1 The high induction linear diffuser shall be made of extruded aluminum profiles.

1.2 The 150 mm long eccentric rollers shall have an alphanumeric identification, which will allow an adjustment of the air flow pattern over 180 degrees.

1.3 The diffuser shall be adapted to fit regular North American suspended ceilings, classic gypsum ceilings or wall installations.

1.4 The diffuser shall be supplied with a wide or narrow profile.

1.5 The diffuser shall be powder coated with a polyester TGIC-free paint, providing a smooth, easy-to-clean, chip and fade resistant finish. The architect or client shall choose a standard colour from the RAL colour chart.

2 - Performance

2.1 Performance shall be guaranteed by using performance curves or simulation software for critical areas. These curves shall indicate pressure drop, acoustic power generated as well as showing a cross-sectional view illustrating the critical airflow path in cooling, isothermal and heating modes.

2.2 **Parameters of guaranteed comfort**

2.2.1 The performance statistics of the diffuser shall reflect a maximum air speed of 0.15 m/s (30 ft/m) in occupied zone at 1.3 m (4 ft) from the floor. The performance guarantee shall be demonstrated with performance curves showing the air stream path.

2.2.2 The diffuser shall ensure a maximum variant in temperature of -1°C between the air jet and the occupied area 4 ft (1.3 m) above the floor. To achieve this, the ratio of temperature differential shall perform at a minimum of $\Delta T_{xy} / \Delta T_0 \leq 0.1$ (for an initial differential of $\Delta T_0 = -10^{\circ}C$).

2.2.3 In cooling mode, the diffuser shall guarantee in variable volume (VAV) a critical distance (X_{crit}) of at least the value indicated in the following table:

Diffuser inlet (in)	6	8	10	12
Max. air flow (cfm)	80-150	151-280	281-400	401-600
min. (cfm)	20-40	41-90	91-140	141-200
X critic - ft	1'- 7"	1'- 11"	2'- 3"	2'-7"
(m)	0.5	0.6	0.7	0.8

3 - Plenum

3.1 The diffuser shall include a plenum provided by the manufacturer. The plenum shall be made from 24 gauge galvanised steel and comprise suspension points on the four corners. The inlet collar shall be centred on the side and adapted to the air flow. The plenum's interior joints shall be assembled by clinching and sealed with silicon.

3.2 When required, the plenum shall be supplied with a damper adjustable through the finished side of the front plate, in order to adjust air volume. This damper shall be available in two options:

3.2.1 **Radial damper**: Key with circular pivoting blades on a flexible metallic cable, which is adjustable through the front plate of the diffuser, allowing for air flow adjustment from 0% to 100%.

3.2.2 **Spring key:** Pivotally perforated plate at the inlet, adjustable with a spring mechanism through the front of the diffuser.

4 - Balancing

4.1 Balancing shall be executed by a ventilation balancing technician with a recognised professional certification.

4.2 The technician shall take into account the air volume factor of correction using a balometer (factor FCB).

5 - Required quality : NAD Klima SAL 50 model

Codification

SAL 50	**Product**
0300, 0600, 0750, 0900, 1050, 1200, 1350, 1500, 1650, 1800, 1950	**Length of diffuser**
1, 2, 3, 4	**Number of slots**
DFS = Standard diffuse 21 / 65 DFL = Window diffuse BC / 65 DFR = Window diffuse DE / 21 DFH = Diffuse height BC / DE DFE = Diffuse window (max. 4 m) BC / EF DFF = Diffuse AB / EF DFN = Diffuse CD / AB DFT = Diffuse CD / EF DVB = Divergence 21 DVD = Divergence 65 DVM = Wall divergence DE (jet towards the ceiling) DVV = Vertical divergence CD	**Air flow**
PL2 = Wide profile with end cap in "L" shape on both sides PLL = Wide profile with end cap in "L" shape on left side PLR = Wide profile with end cap in "L" shape on right side PLP = Wide profile without an end cap (with pins) PS2 = Narrow profile with flat end cap on two sides PSL = Narrow profile with flat end cap on left side PSR = Narrow profile with flat end cap on right side PSP = Narrow profile without end cap (with pull pins)	**Profile and end cap**
W = White (RAL 9003) C = Cream (RAL 9010) B = Black	**Colour of eccentric rollers**
9003 = White 9010 = Cream 00SB = Solar black (Standard matte black) 00SM = Silver matte (Standard metallic gray) _____ = RAL color (indicate colour number)	**Diffuser colour**
S = Plenum with inlet on the side T = Plenum with inlet on the top X = Without plenum	**Plenum**
I = With acoustic insulation A = With closed cell acoustic insulation X = Without insulation	**Acoustic insulation**
F = With fireproof insulation and fireproof dampers (balancing damper not available) X = Without fireproof insulation and fireproof dampers	**Fireproof insulation**
D = With spring damper R = With radial damper ** X = Without damper	**Balancing damper**
G = Gypsum ceiling W = Wall X = Suspended ceiling R = Return Grille (SAL 50 without connection plenum)	**Type of installation**
SAL 50 - 0300 - 1 - DFS - PL2 - B - 9003 - S - X - X - X - X	**Example**

Notes : ** Not available on oval collar

Sherweb, Sherbrooke, Canada

www.nadklima.com

NAD Klima
144, rue Léger,
Sherbrooke, QC, J1L 1L9 Canada
T : 819 780-0111 • 1 866 531-1739

info@nadklima.com

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