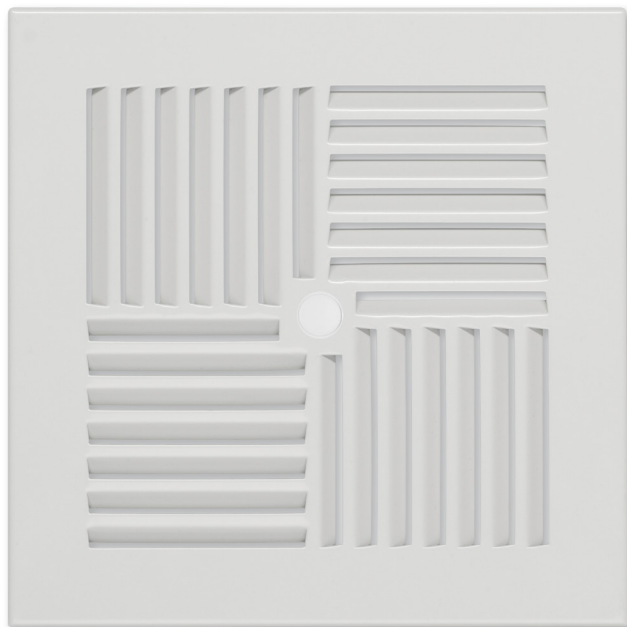


Staircase swirl diffusers

Type SD



For installation into steps and floor areas with no foot traffic

Circular and square staircase swirl diffusers

- Nominal size 180 mm
- Volume flow rate range 10 – 25 l/s or 36 – 90 m³/h
- Diffuser face made of sheet steel, powder-coated
- For variable and constant volume flows
- For false floors and positive pressure plenums
- Installation into the risers of steps or into horizontal or sloping floor areas which do not carry foot traffic
- High induction results in a rapid reduction of the temperature difference and airflow velocity
- Low sound power level due to optimised air distribution inside the diffuser

Optional equipment and accessories

- Exposed diffuser face available in RAL CLASSIC colours
- Spigot
- Cross bar



Circular diffuser face

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Application

Application

- Type SD staircase swirl diffusers are primarily used as supply air diffusers for comfort conditioning applications
- For auditoriums in theatres, cinemas or concert halls
- Supply air discharge directly to the occupied zone
- Swirling air discharge, either parallel to the installation surface or angled, for mixed flow ventilation
- The efficient swirl creates high induction levels, thereby rapidly reducing the temperature difference and airflow velocity (supply air variant)
- For variable and constant volume flows
- For supply air to room air temperature differences from –6 to +6 K

- For false floors and positive pressure plenums
- Installation into the risers of steps or into horizontal or sloping floor areas which do not carry foot traffic

Special characteristics

- High induction results in a rapid reduction of the temperature difference and airflow velocity
- Air discharge either parallel to the installation surface or angled
- Excellent air quality since the supply air is discharged directly to the occupied zone
- Installation into the risers of steps and into floor areas which do not carry foot traffic

Nominal sizes

- 180

Description

Variants

- SD-Q-LQ: Square diffuser face, square face style
- SD-Q-LR: Square diffuser face, circular face style
- SD-R-LR: Circular diffuser face, circular face style

Parts and characteristics

- Square or circular diffuser face with four sections of blades
- Diffuser face with fixed air control blades
- Angled air discharge from diffuser fixed to cross bar
- Air discharge parallel to the installation surface from diffuser fixed to spigot
- Simple installation of the diffuser face due to central fixing screw with decorative cap

Attachments

- S: Spigot
- T: Cross bar

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180

Materials and surfaces

- Diffuser face made of sheet steel
- Cross bar and spigot made of galvanised sheet steel
- Spigot dip coated similar to RAL 9005, black
- Exposed diffuser face powder-coated RAL 9010, pure white
- P1: Powder-coated, RAL CLASSIC colour

Standards and guidelines

- Sound power level of the air-regenerated noise measured according to EN ISO 5135

Maintenance

- Maintenance-free as construction and materials are not subject to wear
- Inspection and cleaning to VDI 6022

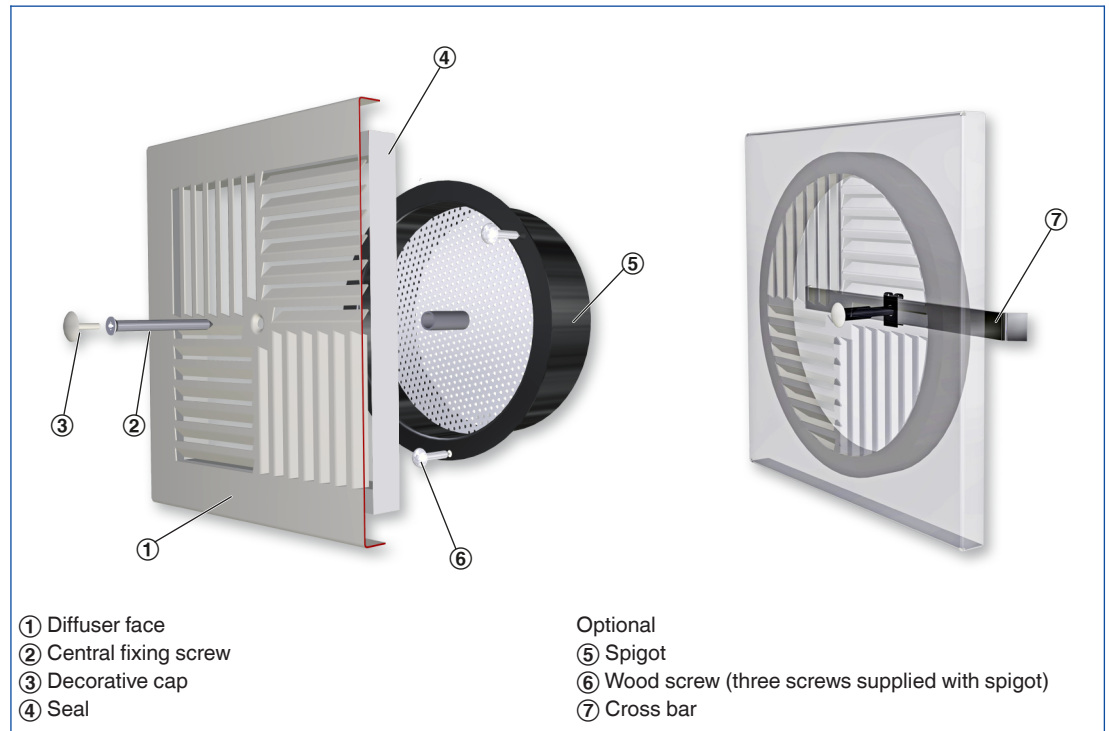
Functional description

Staircase swirl diffusers in air conditioning systems create a swirl to supply air to rooms. The resulting airflow induces high levels of room air, thereby rapidly reducing the airflow velocity and the temperature difference between supply air and room air. Staircase swirl diffusers supply the air directly to the occupied zone and even to individual room occupants. The result is mixed flow ventilation for comfort zones and an excellent air quality in the occupied zone.

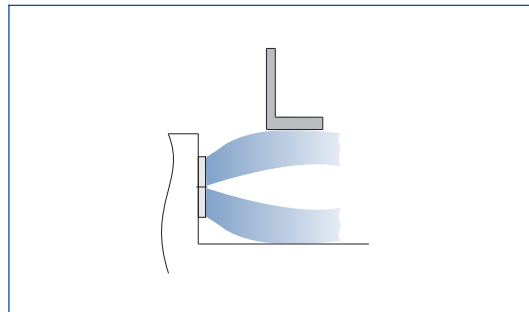
Type SD staircase swirl diffusers have fixed blades. Different attachments are available to influence the air pattern and adapt it to local

requirements. A spigot can be used to achieve air discharge parallel to the installation surface, while a cross bar can be used to achieve angled air discharge. The air pattern should be such that the air does not blow onto the feet of people sitting near the diffuser. If staircase swirl diffusers are placed underneath seats or vertically in the steps between seats, angled air discharge is recommended. If diffusers are placed in the steps below the seats, parallel air discharge is recommended. The supply air to room air temperature difference may range from -6 to $+6$ K.

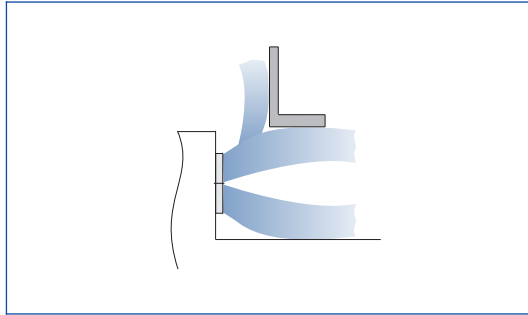
Schematic illustration



Angled air discharge



Air discharge parallel to the installation surface



Nominal sizes	180 mm
Minimum volume flow rate	10 l/s or 36 m ³ /h
Maximum volume flow rate	25 l/s or 90 m ³ /h
Supply air to room air temperature difference	–6 to +6 K

Quick sizing tables provide a good overview of the volume flow rates and corresponding sound power levels and differential pressures.

SD-Q-LQ-S (supply air), sound power level and total differential pressure

Nominal size	\dot{V}		Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)
180	10	36	8	<15
	15	54	18	24
	20	72	33	32
	25	90	51	39

SD-Q-LQ-T (supply air), sound power level and total differential pressure

Nominal size	\dot{V}		Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)
180	10	36	3	<15
	15	54	7	21
	20	72	12	32
	25	90	19	40

SD-Q-LR-S, SD-R-LR-S (supply air), sound power level and total differential pressure

Nominal size	\dot{V}		Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)
180	10	36	9	<15
	15	54	21	25
	20	72	38	34
	25	90	59	41

SD-Q-LR-T, SD-R-LR-T (supply air), sound power level and total differential pressure

Nominal size	\dot{V}		Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)
180	10	36	4	<15
	15	54	10	25
	20	72	18	35
	25	90	27	43

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Staircase swirl diffusers with square or circular diffuser face and fixed air control blades for swirling supply air discharge creating high induction levels. For supply air only; for comfort conditioning applications. For installation into the risers of steps or into horizontal or sloping floor areas which do not carry foot traffic.

Ready-to-install component which consists of the diffuser face with fixed air control blades arranged in quadrants.

The diffuser face is fixed to a cross bar or to a spigot with a central screw, concealed by a decorative cap.

Spigot suitable for ducts to EN 1506 or EN 13180. Sound power level of the air-regenerated noise measured according to EN ISO 5135.

Special characteristics

- High induction results in a rapid reduction of the temperature difference and airflow velocity
- Air discharge either parallel to the installation surface or angled
- Excellent air quality since the supply air is discharged directly to the occupied zone
- Installation into the risers of steps and into floor areas which do not carry foot traffic

Materials and surfaces

- Diffuser face made of sheet steel
- Cross bar and spigot made of galvanised sheet steel
- Spigot dip coated similar to RAL 9005, black
- Exposed diffuser face powder-coated RAL 9010, pure white
- P1: Powder-coated, RAL CLASSIC colour

Technical data

- Nominal sizes: 180 mm
- Minimum volume flow rate: 10 l/s or 36 m³/h
- Maximum volume flow rate: 25 l/s or 90 m³/h
- Supply air to room air temperature difference: –6 to +6 K

Sizing data

- \dot{V} _____
[m³/h]
 - Δp_t _____
[Pa]
- Air-regenerated noise
- L_{WA} _____
[dB(A)]

SD

SD – Q – LQ – S / 180 / P1 – RAL ...					
1	2	3	4	5	6

1 Type

SD Staircase swirl diffuser

5 Nominal size [mm]

180

2 Construction style

Q Square diffuser face

R Circular diffuser face

6 Exposed surface

No entry: powder-coated RAL 9010, pure white

P1 Powder-coated, specify RAL CLASSIC colour

3 Diffuser face style

LQ Square (only available with square diffuser face)

LR Circular

Gloss level

RAL 9010 50 %

RAL 9006 30 %

All other RAL colours 70 %

4 Fixing

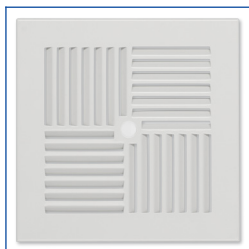
S to spigot

T to cross bar

Order example: SD-Q-LQ-S/180/P1-RAL 9016

Construction style	Square
Diffuser face style	Square
Fixing	Spigot
Nominal size	180
Exposed surface	RAL 9016, traffic white, gloss level 70 %

SD-Q-LQ



SD-Q-LR



SD-R-LR



SD-..._S

Attachment

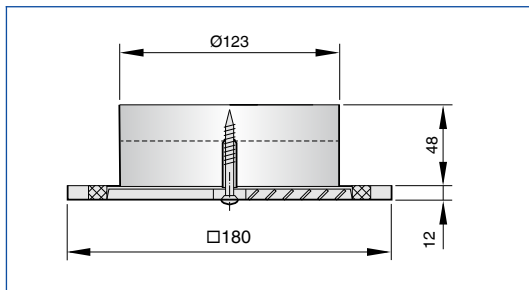
- Spigot

SD-...-T

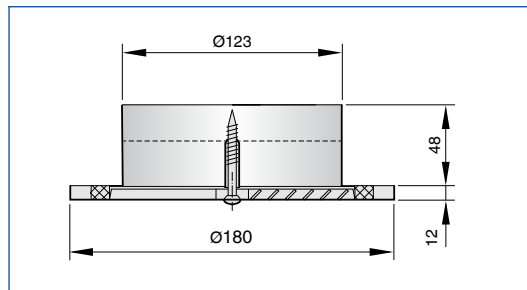
Attachment

- Cross bar

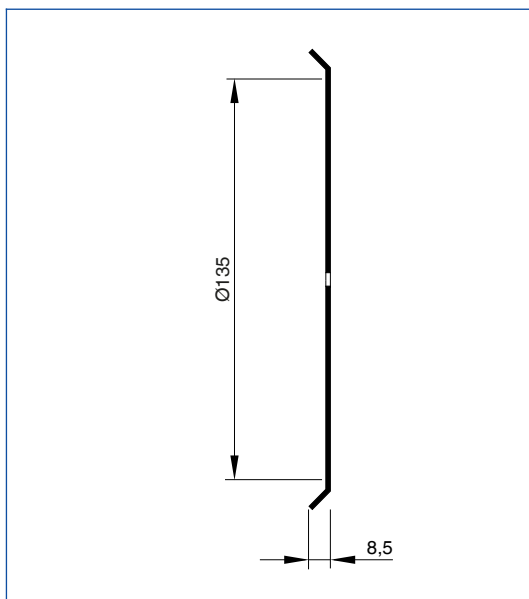
SD-Q-L*-S



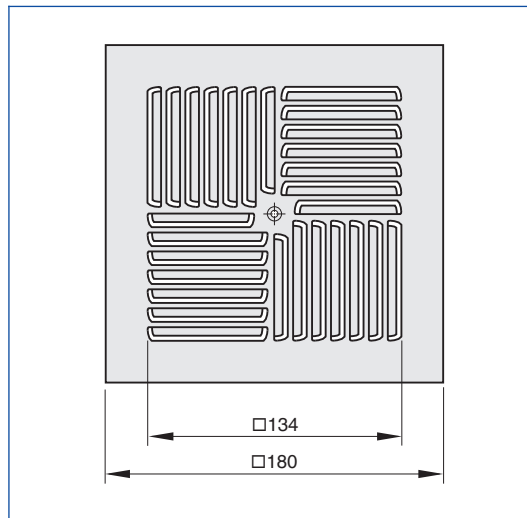
SD-R-LR-S



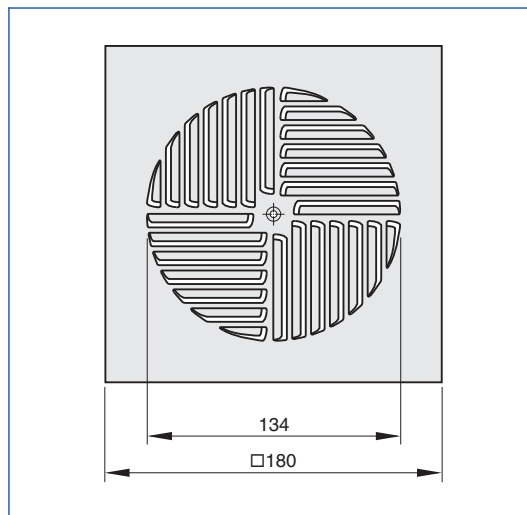
SD-...-T



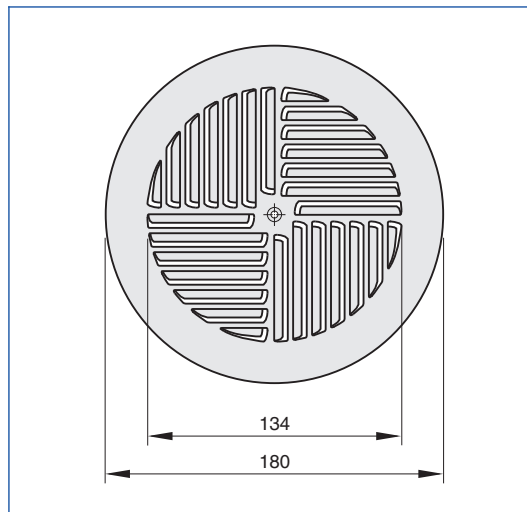
SD-Q-LQ



SD-Q-LR



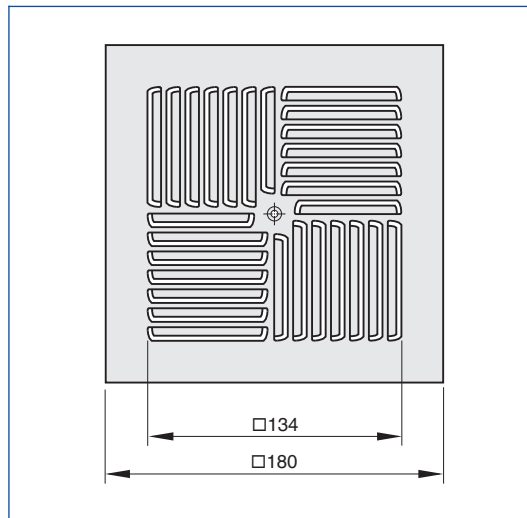
SD-R-LR



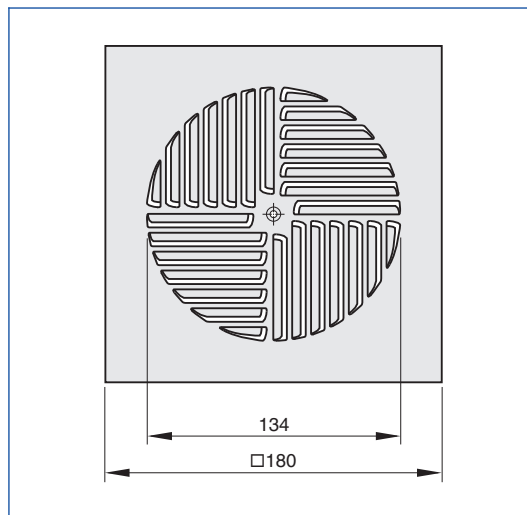
SD

Produktvariante	m	
	kg	
SD-Q-LQ		0.3
SD-Q-LR		0.3
SD-R-LR		0.3

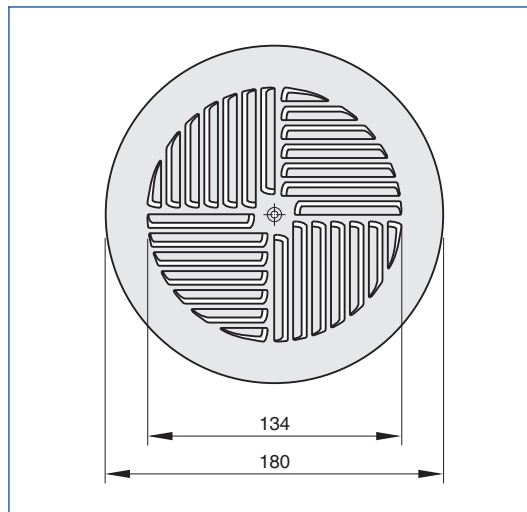
SD-Q-LQ



SD-Q-LR



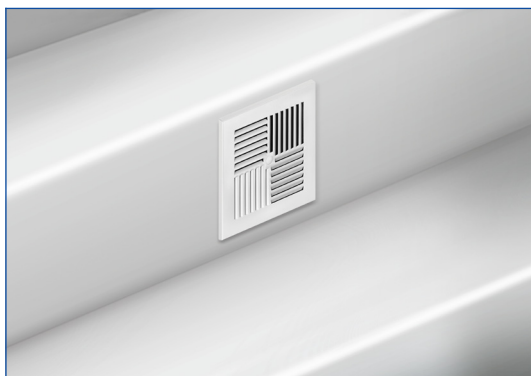
SD-R-LR



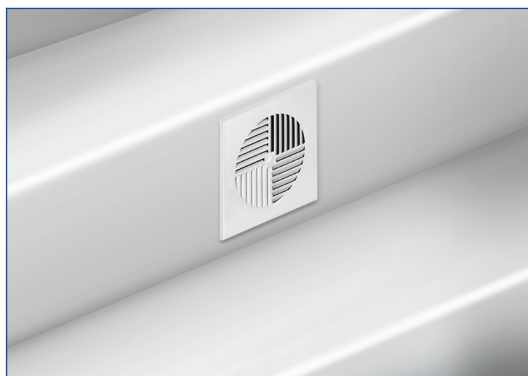
SD

Produktvariante	A_{eff}	
	m^2	
SD-Q-LQ		0.00445
SD-Q-LR		0.00354
SD-R-LR		0.00354

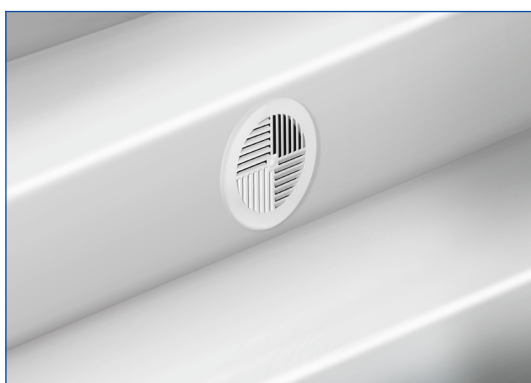
SD-Q-LQ, vertical installation into steps



SD-Q-LR, vertical installation into steps



SD-R-LR, vertical installation into steps

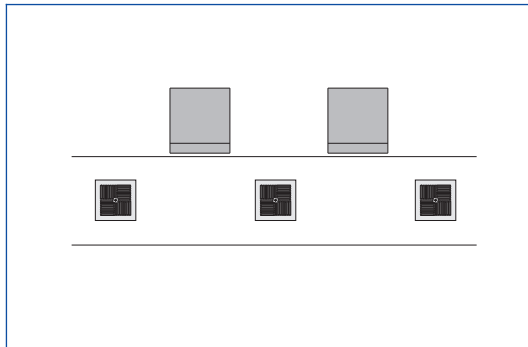


Installation and commissioning

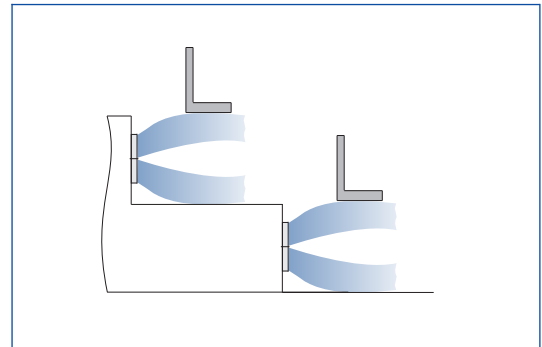
- Flush installation into vertical surfaces and into horizontal or sloping surfaces which do not carry foot traffic
- Diffuser fixed to cross bar provides angled air discharge
- Diffuser fixed to spigot provides air discharge parallel to the installation surface

These are only schematic diagrams to illustrate installation details.

Installation between chairs, angled air discharge

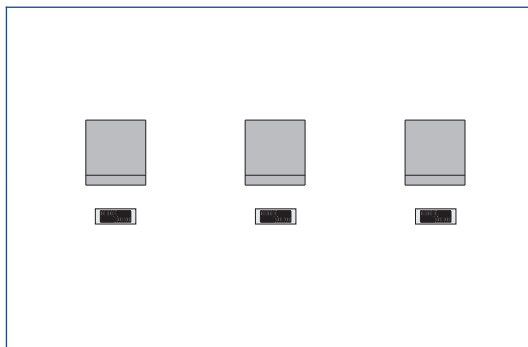


Installation into the risers of steps, angled air discharge

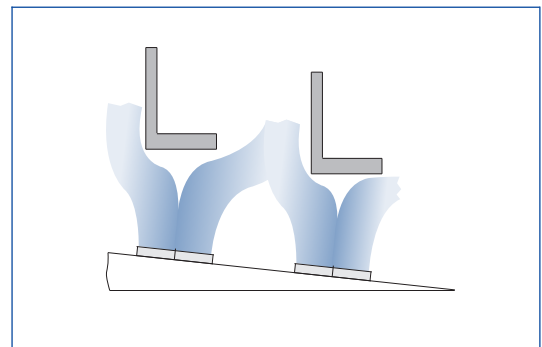


Installation with cross bar

Installation underneath chairs, angled air discharge

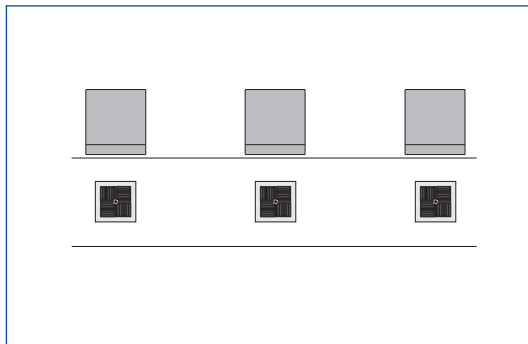


Installation into surfaces which do not carry foot traffic, angled air discharge

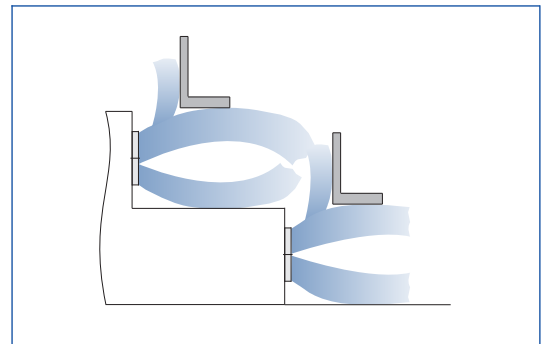


Installation with cross bar

Installation underneath chairs, air discharge parallel to the installation surface

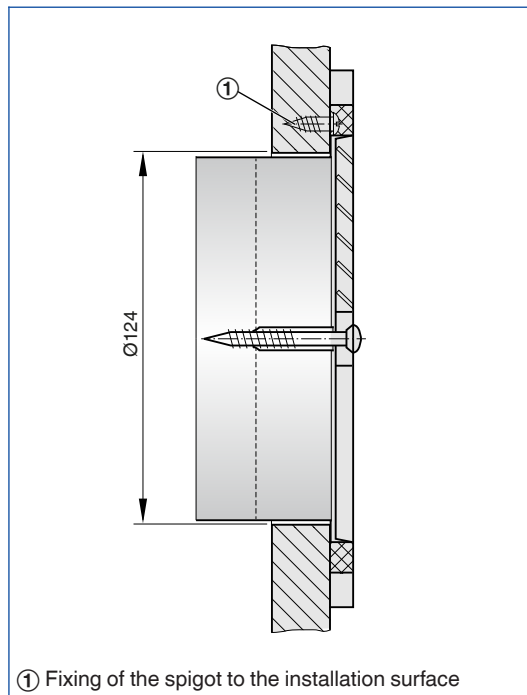


Installation into the risers of steps, air discharge parallel to the installation surface.

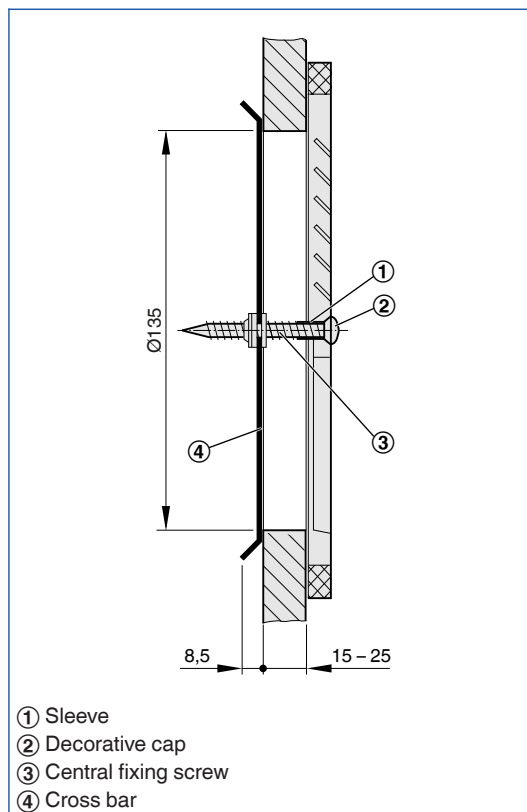


Installation with spigot

Installation opening, spigot



Installation opening with cross bar



Nomenclature

L_{WA} [dB(A)]

A-weighted sound power level of air-regenerated noise

\dot{V} [m³/h] and [l/s]

Volume flow rate

Δt_z [K]

Supply air to room air temperature difference, i.e.

supply air temperature minus room temperature

Δp_t [Pa]

Total differential pressure

A_{eff} [m²]

Effective air discharge area

All sound power levels are based on 1 pW.