# Staircase swirl diffusers Type SDRF



### Compact height, ideal for steps

Circular and rectangular staircase swirl diffusers

- Various nominal sizes with 1 6 outlets
- Volume flow rate range 2 25 l/s or 7 90 m<sup>3</sup>/h
- Diffuser face made of sheet steel, powder-coated
- For variable and constant volume flows
- For false floors designed as positive pressure plenums
- Installation into the risers of steps
- Visible screw fixing
- 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
- Spring clip fixing (concealed)



Fixing screws concealed with decorative caps



Screw fixing



Spring clip fixing

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### Staircase swirl diffusers General information

# SDRF

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#### Application

#### Application

- Type SDRF 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 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 designed as positive pressure plenums
- Installation into the risers of steps

#### **Special characteristics**

- High induction results in a rapid reduction of the temperature difference and airflow velocity
- \_ Air discharge parallel to the installation surface Excellent air quality since the supply air is
- discharged directly to the occupied zone
- Vertical installation into steps

#### **Nominal sizes**

- No. of outlets: 1, 2, 3, 4, 5, 6

#### Description

- Variants
- SDRF-K: Spring clip fixing
- SDRF-S: Screw fixing

#### Parts and characteristics

- Circular diffuser face with one outlet
- Rectangular diffuser face with two to six outlets
- Outlets with fixed blades and with flowoptimising cup; cup with perforated rear plate used as a damper element to improve air distribution if there are several outlets
- Fixing screws (with decorative caps) facilitate installing the diffuser face
- Optional spring clip fixing

#### **Materials and surfaces**

Diffuser face made of sheet steel

- Cup made of ABS plastic, UL 94, V-0, flame retardant
- Cup similar to RAL 9005, black
- Exposed diffuser face powder-coated RAL 9005, jet black
- 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 SDRF staircase swirl diffusers have fixed blades. Air discharge parallel to the installation surface. The supply air to room air temperature difference may range from -6 to +6 K.





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#### Schematic illustration of SDRF-K



#### Schematic illustration of SDRF-S



Air discharge parallel to the installation surface



1, 2, 3, 4, 5, 6 outlets
2 – 12 l/s or 7 – 43 m³/h
5 – 25 l/s or 18 – 90 m³/h
–6 to +6 K

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

#### SDRF, sound power level and total differential pressure

Nominal aiza	Ý		Δp <sub>t</sub>	L <sub>WA</sub>
Nominal Size	l/s	m³/h	Ра	dB(A)
	2	7	6	<15
4	3	11	14	24
	4	14	25	33
	5	18	39	39
	5	18	9	22
2	7	25	18	31
2	9	32	30	38
	10	36	37	41
	6	22	7	19
3	8	29	12	26
5	12	43	27	37
	14	50	37	41
	8	29	7	<15
4	12	43	15	29
	14	50	20	33
	18	65	33	41
	10	36	6	17
5	12	43	9	22
•	16	58	16	31
	20	72	25	38
	12	43	6	<15
6	16	58	10	23
-	20	72	16	31
	25	90	25	38

#### Sizing example

#### Given data

 $\dot{V}$  = 15 l/s (54 m<sup>3</sup>/h) Staircase swirl diffuser Maximum sound power level 35 dB(A)

#### **Quick sizing**

Type SD Variants: SD-Q-LQ, SD-Q-LR Type SDRF Nominal sizes: SDRF/4, SDRF/5 Selected: SDRF/4

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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 rectangular 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.

Ready-to-install component which consists of a diffuser face with up to six outlets. Each outlet with radially arranged fixed blades and a cup with damper element.

Diffuser face with fixing screws (concealed with decorative caps) or with spring clip fixing. 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 parallel to the installation surface
- Excellent air quality since the supply air is discharged directly to the occupied zone
- Vertical installation into steps

#### **Materials and surfaces**

- Diffuser face made of sheet steel

- Cup made of ABS plastic, UL 94, V-0, flame retardant
- Cup similar to RAL 9005, black
- Exposed diffuser face powder-coated RAL 9005, jet black
- P1: Powder-coated, RAL CLASSIC colour

#### **Technical data**

- Nominal sizes: 1, 2, 3, 4, 5 or 6 outlets
- Minimum volume flow rate: 2 12 l/s or 7 – 43 m<sup>3</sup>/h
- Maximum volume flow rate: 5 to 25 l/s or 18 to 90 m<sup>3</sup>/h
- Supply air to room air temperature difference:
   -6 to +6 K

#### Sizing data

- V΄\_\_\_\_\_ [m³/h] - Δρ,\_\_\_\_\_
- [Pa]
- Air-regenerated noise
- L<sub>WA</sub>\_\_\_\_\_ [dB(A)]

SDRF – K	/ 3 / P1 ·   3	- RAL 4
1 Type SDRF Staircase swirl diffuser	<b>4</b> Ex	No entry: powder-coated RAL 9005, black
K With spring clips S With screws	P1	colour
<ul> <li>3 No. of outlets</li> <li>1</li> <li>2</li> <li>3</li> <li>4</li> <li>5</li> <li>6</li> <li>Order example: SDRF-K/3/P1-RAL 9016</li> </ul>		Gloss level RAL 9010 50 % RAL 9006 30 % All other RAL colours 70 %
Installation		With spring clips
Nominal size		3 outlets
Exposed surface		RAL 9016, traffic white, gloss level 70 %

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#### SDRF-K/1



#### SDRF-S/1



#### SDRF-\*/1

Nominal size	m
	kg
1	0.10

#### SDRF-K (nominal sizes 2 to 6)



Illustration shows SDRF-K/3

#### SDRF-S (nominal sizes 2 to 6)



#### Illustration shows SDRF-S/3

SDRF

Nominal size	L	Α	С	m
	mm	mm	mm	kg
2	200	74	63	0.15
3	300	87	63	0.25
4	400	86	71	0.35
5	500	92	66	0.45
6	500	74	65	0.50

#### Diffuser face of SDRF-\*/1

Ø55

SDRF

Nominal	A <sub>eff</sub>
size	m²
1	0.000626
2	0.001252
3	0.001878
4	0.002504
5	0.003130
6	0.003756

#### Diffuser face of SDRF-\* (nominal sizes 2 to 6)

Ø80



SDRF-1, vertical installation into steps



SDRF-3, vertical installation into steps



#### Installation and commissioning

- Flush installation into vertical surfaces
- Screw fixing or spring clip fixing

These are only schematic diagrams to illustrate installation details.

#### SDRF-K/1, vertical installation into steps



#### SDRF-K, vertical installation into steps



Illustration shows SDRF-K/3

#### SDRF-S/1, vertical installation into steps



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#### SDRF-S/1 (nominal sizes 2 to 6), vertical installation into steps

#### Nomenclature

#### L<sub>WA</sub> [dB(A)]

A-weighted sound power level of air-regenerated noise

V [m<sup>3</sup>/h] and [l/s] Volume flow rate

#### Δt<sub>z</sub> [K]

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

supply air temperature minus room temperature

**Δp<sub>t</sub> [Pa]** Total differential pressure

**A<sub>eff</sub> [m<sup>2</sup>]** Effective air discharge area

All sound power levels are based on 1 pW.