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 m³/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)
Staircase swirl diffusers

General information

**Type**
- SDRF

**Function**
- General information
- Technical data
- Quick sizing
- Specification text
- Order code
- Variants
- Dimensions and weight
- Product details
- Installation examples
- Installation details
- Basic information and nomenclature

**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

**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 flow-optimising 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.

**Schematic illustration of SDRF/1**

![Diagram of SDRF/1]

A SDRF-S  
B SDRF-K  
① Diffuser face  
② Cup  
③ Cross bar  
④ Central fixing screw  
⑤ Decorative cap  
⑥ Spring clip
**Schematic illustration of SDRF-K**

1. Diffuser face
2. Cup
3. Spring clip

**Schematic illustration of SDRF-S**

1. Diffuser face
2. Cup
3. Screw hole
Air discharge parallel to the installation surface
### Staircase swirl diffusers
#### Technical data

<table>
<thead>
<tr>
<th>Nominal sizes</th>
<th>1, 2, 3, 4, 5, 6 outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum volume flow rate</td>
<td>2 – 12 l/s or 7 – 43 m³/h</td>
</tr>
<tr>
<td>Maximum volume flow rate</td>
<td>5 – 25 l/s or 18 – 90 m³/h</td>
</tr>
<tr>
<td>Supply air to room air temperature difference</td>
<td>–6 to +6 K</td>
</tr>
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</table>
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

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>$\dot{V}$</th>
<th>$\Delta p_{t}$</th>
<th>$L_{WA}$</th>
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<tbody>
<tr>
<td></td>
<td>l/s</td>
<td>m³/h</td>
<td>Pa</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
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<td>14</td>
<td>25</td>
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<tr>
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<td>5</td>
<td>18</td>
<td>39</td>
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<tr>
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<tr>
<td></td>
<td>20</td>
<td>72</td>
<td>16</td>
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<tr>
<td></td>
<td>25</td>
<td>90</td>
<td>25</td>
</tr>
</tbody>
</table>

### Sizing example

**Given data**

$\dot{V} = 15$ l/s (54 m³/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
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 m³/h
- Maximum volume flow rate: 5 to 25 l/s or 18 to 90 m³/h
- Supply air to room air temperature difference: −6 to +6 K

Sizing data
- \( V \) \( [m^3/h] \)
- \( \Delta p \) \( [Pa] \)

Air-regenerated noise
- \( L_{WA} \) \( [dB(A)] \)
Staircase swirl diffusers
Order code

SDRF

SDRF – K / 3 / P1 – RAL ...

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. Type
SDRF  Staircase swirl diffuser

2. Fixing
K  With spring clips
S  With screws

3. No. of outlets
1
2
3
4
5
6

Order example: SDRF-K/3/P1-RAL 9016

<table>
<thead>
<tr>
<th>Installation</th>
<th>Nominal size</th>
<th>Exposed surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>With spring clips</td>
<td>3 outlets</td>
<td>RAL 9016, traffic white, gloss level 70 %</td>
</tr>
</tbody>
</table>

4. Exposed surface
No entry: powder-coated RAL 9005, black
P1  Powder-coated, specify RAL CLASSIC colour
   Gloss level
   RAL 9010 50 %
   RAL 9006 30 %
   All other RAL colours 70 %
Staircase swirl diffusers
Variants

SDRF-K/1  SDRF-K/2  SDRF-K/3  SDRF-K/4

SDRF-K/5  SDRF-K/6
Staircase swirl diffusers
Dimensions and weight

SDRF

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>m</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>0.10</td>
</tr>
</tbody>
</table>

SDRF-K/1

SDRF-S/1
Staircase swirl diffusers
Dimensions and weight

SDRF

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

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>L (mm)</th>
<th>A (mm)</th>
<th>C (mm)</th>
<th>m (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200</td>
<td>74</td>
<td>63</td>
<td>0.15</td>
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<tr>
<td>3</td>
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<td>4</td>
<td>400</td>
<td>86</td>
<td>71</td>
<td>0.35</td>
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<tr>
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<td>500</td>
<td>92</td>
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<td>0.45</td>
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<tr>
<td>6</td>
<td>500</td>
<td>74</td>
<td>65</td>
<td>0.50</td>
</tr>
</tbody>
</table>
Staircase swirl diffusers

Product details

**SDRF**

**Nominal size** | **$A_{eff}$** m²
---|---
1 | 0.000626
2 | 0.001252
3 | 0.001878
4 | 0.002504
5 | 0.003130
6 | 0.003756

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

- Ø80
- Ø55

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

- Ø55
Staircase swirl diffusers
Installation examples

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**

Illustration shows SDRF-K/3

**SDRF-S/1, vertical installation into steps**
Illustration shows SDRF-S/3
Nomenclature

$L_{wa}$ [dB(A)]
A-weighted sound power level of air-regenerated noise

$\dot{V}$ [m$^3$/h] and [l/s]
Volume flow rate

$\Delta t_z$ [K]
Supply air to room air temperature difference, i.e.

$\Delta p_t$ [Pa]
Total differential pressure

$A_{eff}$ [m$^2$]
Effective air discharge area

All sound power levels are based on 1 pW.