

Staircase Swirl Diffusers

Type SDRF



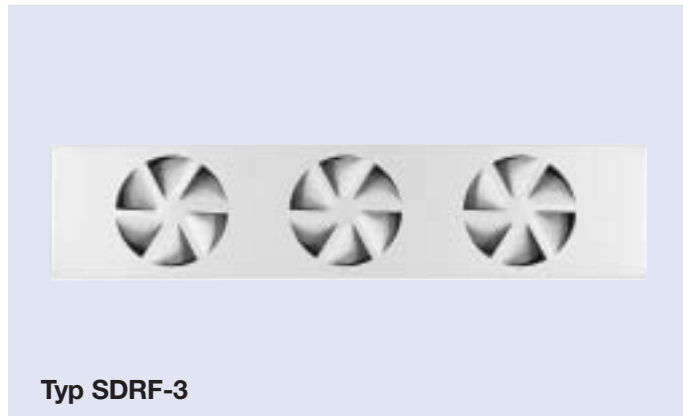
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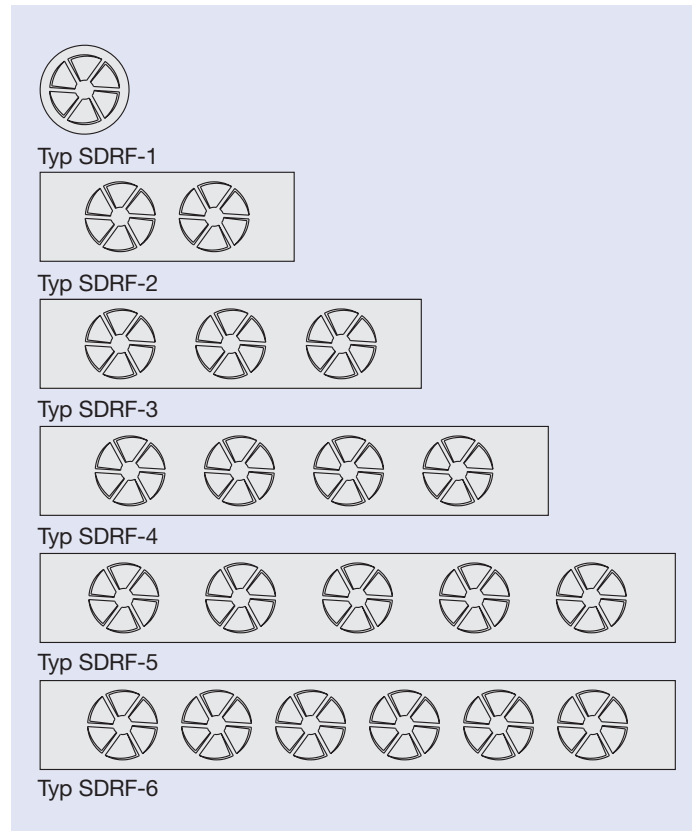
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Description

Staircase diffusers Type SDRF are used in comfort conditioning applications. They are designed for vertical installation in steps. In theatres, concert halls, cinemas, auditoria as well as other lecture and assembly rooms these diffusers are often provided per seat, allowing each person to be supplied individually with the required volume of fresh air. To achieve comfortable conditions the maximum temperature differentials of $\pm 6K$ should not be exceeded and preferably not attained.



Construction · Dimensions · Materials · Installation

Construction

Staircase diffusers Type SDRF comprise a face plate with 1 to 6 standard stamped discharge elements. As swirl diffusers, all discharge elements are circular in construction and provided with radial fixed air control blades and have rear spigots with perforated plate cover. The circular faceplate Type SDRF-1 is supplied as standard, the faceplate type SDRF-2 is rectangular. On request the staircase swirl diffusers can be supplied with more than 6 discharge elements!

Materials

Sheet steel diffuser faceplate, rear spigots with perforated cover are galvanised sheet steel as is the bridge fix for Type SDRF-1. The surfaces are pre-treated and powder-coated black (RAL 9005).

Installation

Type SDRF-1

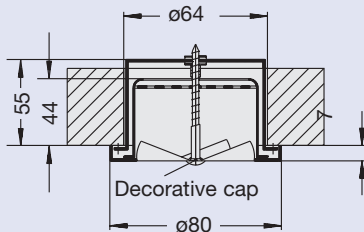
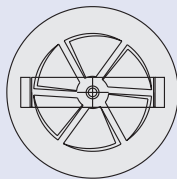
The fixing bridge supplied with the diffuser slides into an opening in the vertical step and is screw fixed. Then the whole diffuser is attached to the bridge using the centre screw provided. A decorative press-on cap is supplied to cover the screw head.

Type SDRF-2...6

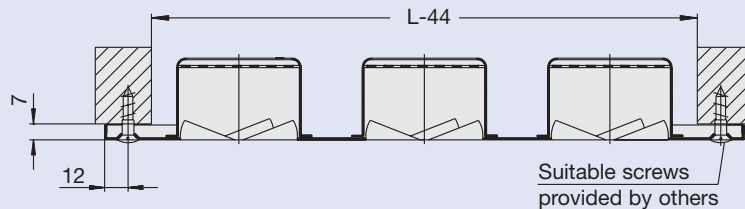
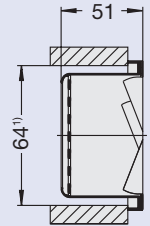
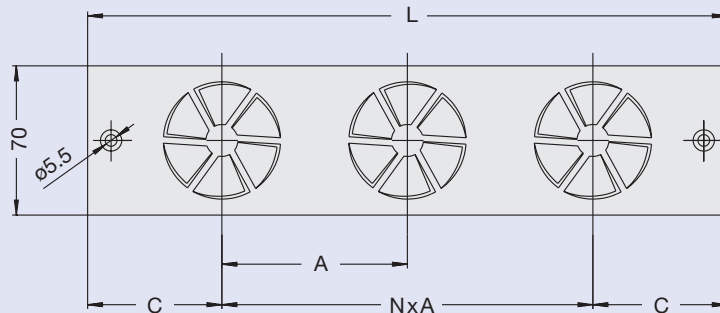
The whole diffuser slides into the opening in the vertical step and is screw fixed at the edge. Alternatively the Type SDRF-1 can be fixed using clips.

Dimensions Type SDRF-2...6			
Type	L (mm)	C (mm)	N x A
SDRF-2	200	63	1 x 74
SDRF-3	300	63	2 x 87
SDRF-4	400	71	3 x 86
SDRF-5	500	66	4 x 92
SDRF-6	500	65	5 x 74

Type SDRF-1



Type SDRF-2...6

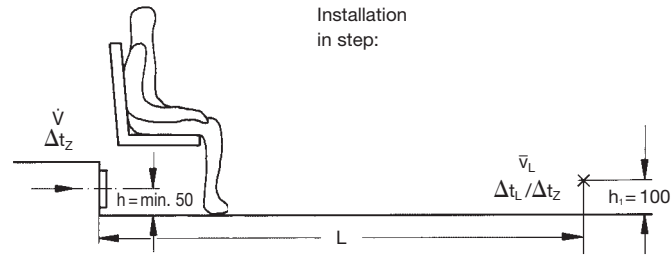


1) Opening for installation with clip fix:

Type SDRF-1 \varnothing 70 mm
 Type SDRF-2...6L -44 x 67 mm

Nomenclature · Technical data

Nomenclature



- $\dot{V}/\text{element}$ in l/s: Volume flow per individual element
 \dot{V} in l/s: Volume flow per diffuser
 \dot{V} in m³/h: Volume flow per diffuser
 \bar{v}_L in m/s: Air velocity 100mm above floor at distance L
 $\Delta t_L / \Delta t_z$ in K: Temperature quotient at distance L
 L in m: Distance from diffuser
 h in m: Installation height above floor min 50 mm
 h₁ in m: Height of measurement point above floor
 L_{WA} in dB(A): A weighted sound power level
 Δp_t in Pa: Total pressure drop
 Δt_z in K: supply air temperature differential

Example

An auditorium with 150 seats is to be fitted with staircase swirl diffusers Type SDRF. Total supply air 1350 l/s, giving a volume flow of $\dot{V} = 9$ l/s per diffuser.

The diffusers are fitted vertically in steps.

- Height of installation above floor $h = 0.10$ m
 Distance from diffuser $L = 0.70$ m
 Height of measurement point above floor $h_1 = 0.10$ m
 Supply air temperature differential $\Delta t_z = -4$ K

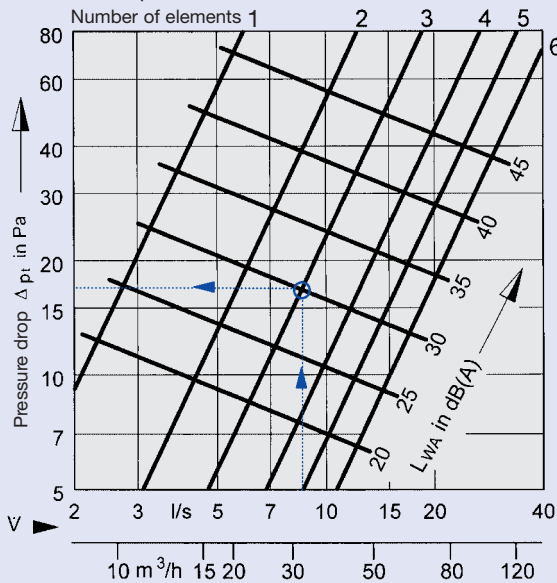
Diagram 1: Sound power and pressure drop
 $L_{WA} = 30$ dB (A)
 $\Delta p_t = 17$ Pa

Diagram 2: Air velocity
 $L = 0.70$ m
 $\bar{v}_L = 0.12 \times 1.73 = 0.20$ m/s

Diagram 2: Temperature quotient
 $L = 0.70$ m
 $\Delta t_L / \Delta t_z = 0.052 \times 1.73 = 0.09$
 $\Delta t_L = 0.09 \times (-4) = -0.36$ K

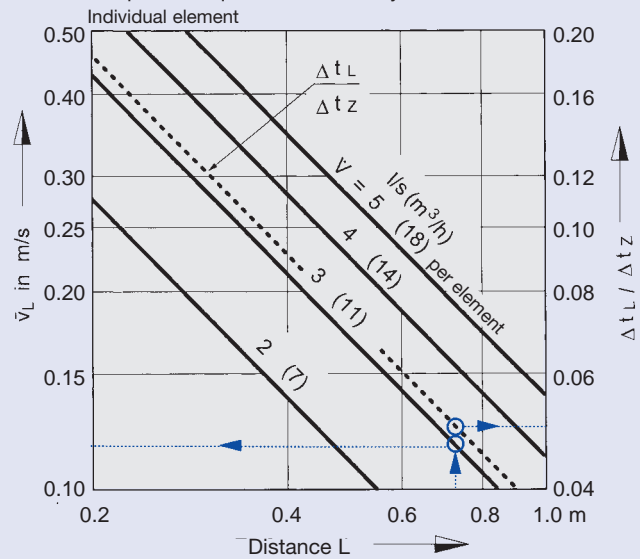
Acoustic data

1 Sound power level



Aerodynamic data

2 Temperature quotient/air velocity



Effective outlet area

No. of elements	A _{eff} in m ²
1	0.000626
2	0.001252
3	0.001878
4	0.002504
5	0.003130
6	0.003756

Diagram 2: Correction values for elements 1 to 6

No. of elements	1	2	3	4	5	6
$\bar{v}_L \times$	1.0	1.41	1.73	2.0	2.24	2.45
$\Delta t_L \times$	1.0	1.41	1.73	2.0	2.24	2.45

Specification Text

Staircase swirl diffusers Type SDRF are suitable for vertical installation in steps. They comprise a face plate (circular for Type SDRF-1 and rectangular for Types SDRF-2...6) with circular discharge elements and rear spigots with perforated plate cover.

The type SDRF-1 diffuser is fixed using a bridge and centre fix screw provided. The centre fix screw is supplied with a decorative cap.

Types SDRF-2...6 are installed in an opening in the stair and fixed at the edges using the counterpunched holes and suitable screws provided by others.

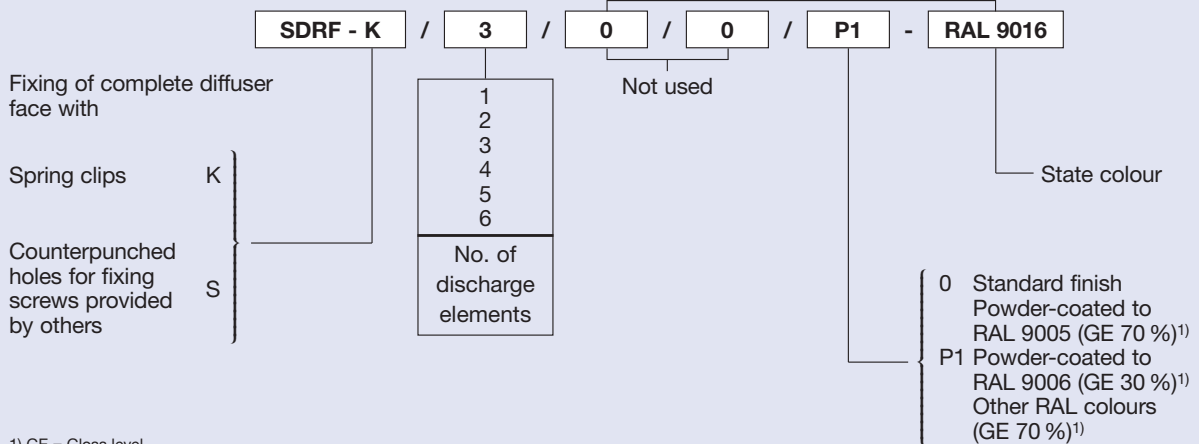
Alternatively Type SDRF-1 can be fixed by clips.

Materials

Sheet steel diffuser faceplate, rear spigots with perforated cover are galvanised sheet steel as is the bridge fix for Type SDRF-1. The surfaces are pre-treated and powder-coated black (RAL 9005).

Order Code

These codes need not be completed for standard products



Note:

Type SDRF-1 circular faceplate!
Types SDRF-2...6 rectangular face plate!

Order example

Make: TROX
Type: SDRF-K / 3 / P1 / RAL 9016