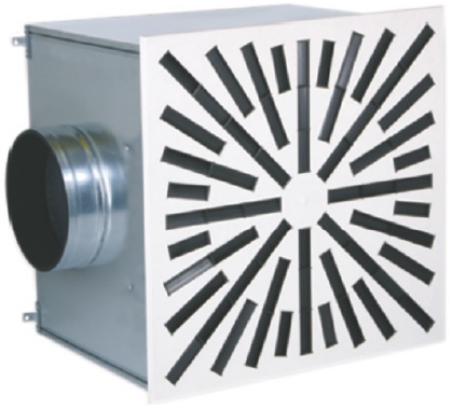
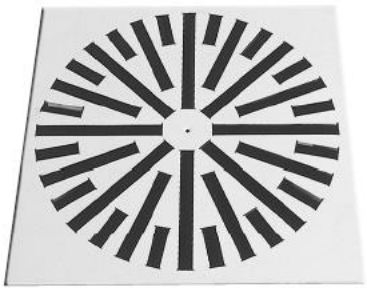


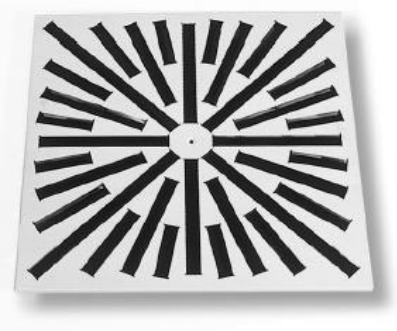
# Swirl Diffusers
# SWD

**GMCAIR HVAC SYSTEM&EQUIPMENT LLC**
www.gmcair.co.uk

SWD124



SWD224



SWD324

## DESCRIPTION:

Ceiling 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. Ceiling swirl diffusers allow for large volume flow rates. The result is a mixed flow ventilation in comfort zones, with good overall room ventilation, creating only very little turbulence in the occupied zone.

SWD124 : Swirl diffuser with adjustable and circular arranged blades and circular front plate

SWD224 : Swirl diffuser with adjustable and circular arranged blades and square front plate

SWD324 : Swirl diffuser with fixed and square arranged blades and square front plate

## MATERIAL :

Sheet metal front plate and plastic blades

## FUNCTION :

SWD series swirl diffuser, type is used for the supply and return of cooled and heated air in facilities such as office, shops, meeting room, cinemas, and with height between 2.60m and 4.00m.And with special arrangement of blades it is possible to use heights upto 6m. The air pattern can be adjusted to meet different local requirements. Horizontal air discharge is one-way, two-way or omni directional. Vertical air discharge is possible but only for heating. The supply air to room air temperature difference may range from –14K to +12 K.

## FINISHING :

- Powder coated in RAL9010 colour as standard.
- Other colours on request

## INSTALLATION :

- Bridge (standart)
- No Fixing

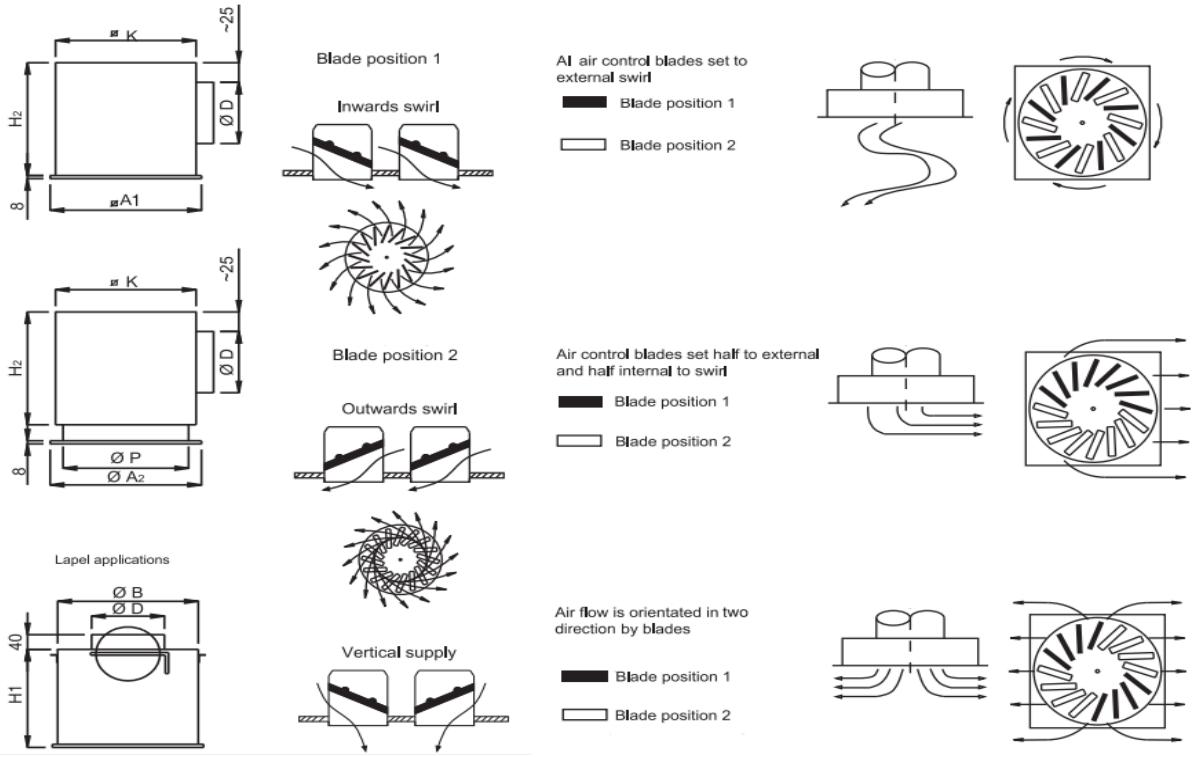
## ACCESSORIES:

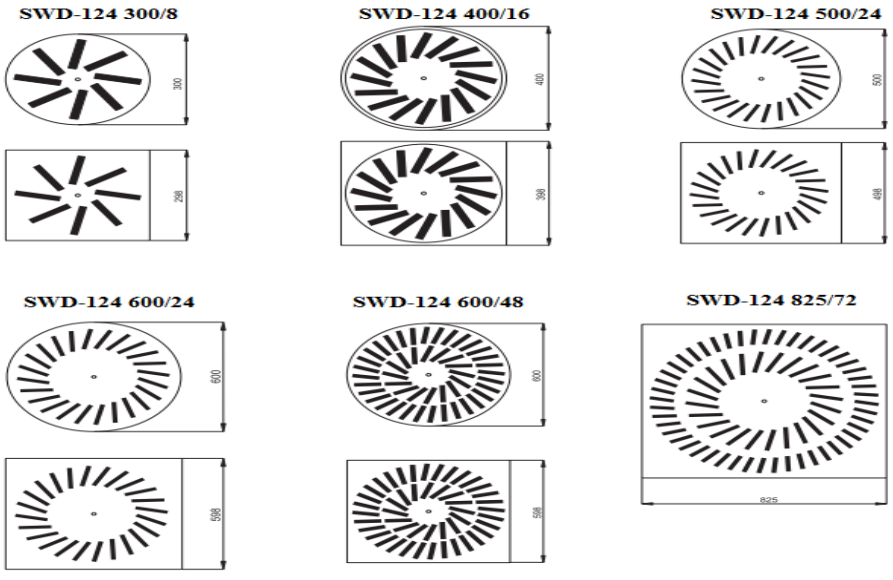
- Plenum box

## STANDARD SIZES (mm):

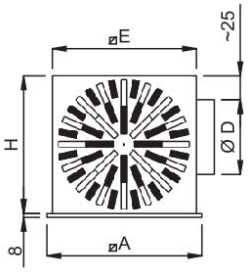
**SWD 124 STANDARD SELECTION TABLE /**

| Standard size | A1 | A2 | B | D | H1 | $H_2$ | P | K |
|---|---|---|---|---|---|---|---|---|
| 300 / 8 | 298 | 300 | 280 | 158 | 200 | 250 | 278 | 290 |
| 400 / 16 | 398 | 400 | 364 | 198 | 200 | 295 | 362 | 372 |
| 500 / 24 | 498 | 500 | 462 | 198 | 200 | 295 | 460 | 476 |
| 600 / 24 | 598 | 600 | 559 | 248 | 200 | 345 | 557 | 567 |
| 600 / 48 | 598 | 600 | 580 | 248 | 300 | 345 | 578 | 590 |
| 825 / 72 | 825 | | 796 | 313 | 300 | 410 | | 806 |



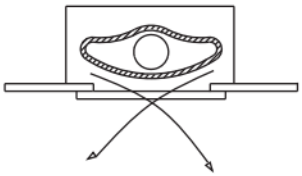



## SWD-224 STANDARD SELECTION TABLE




| Standard size | A | E | H | D | (Vmin-Vmax) Air Volume (m³/h) | V(volume) 40db A |
|---|---|---|---|---|---|---|
| 310 | 308 | 290 | 260 | 158 | 155-410 | 280 |
| 400 | 398 | 370 | 260 | 158 | 170-490 | 330 |
| 500 | 498 | 470 | 300 | 198 | 300-960 | 540 |
| 600 | 598 | 570 | 350 | 248 | 410-1430 | 810 |
| 625 | 623 | 570 | 350 | 248 | 410-1430 | 810 |
| 800 | 798 | 770 | 455 | 353 | 610-2600 | 1200 |

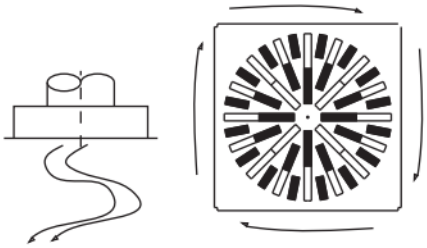
Blade position 1



All air control blades set to external swirl

Blade position 1

Blade position 2

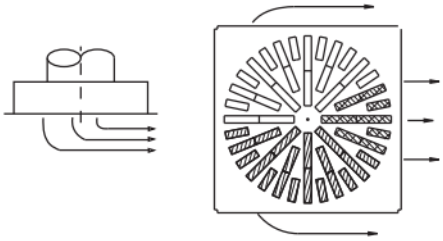


Air flow is orientated in one direction by blades

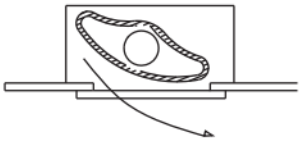
Blade position 2, Left

Blade position 2, Right

Closed



Blade position 2

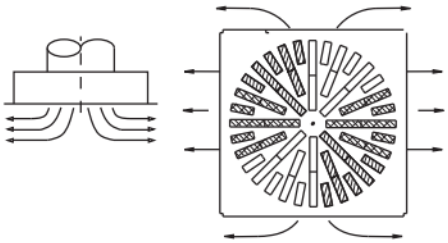


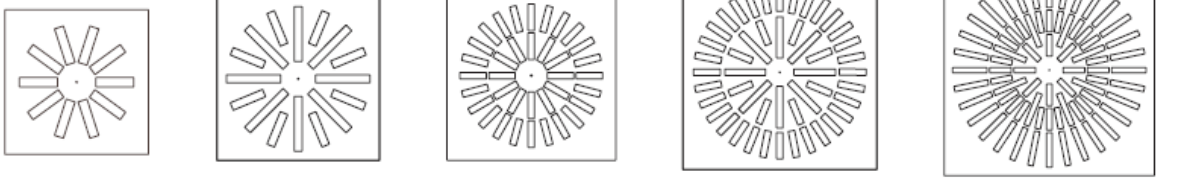
Air flow is orientated in two direction by blades.

Blade position 2, Left

Blade position 2, Right

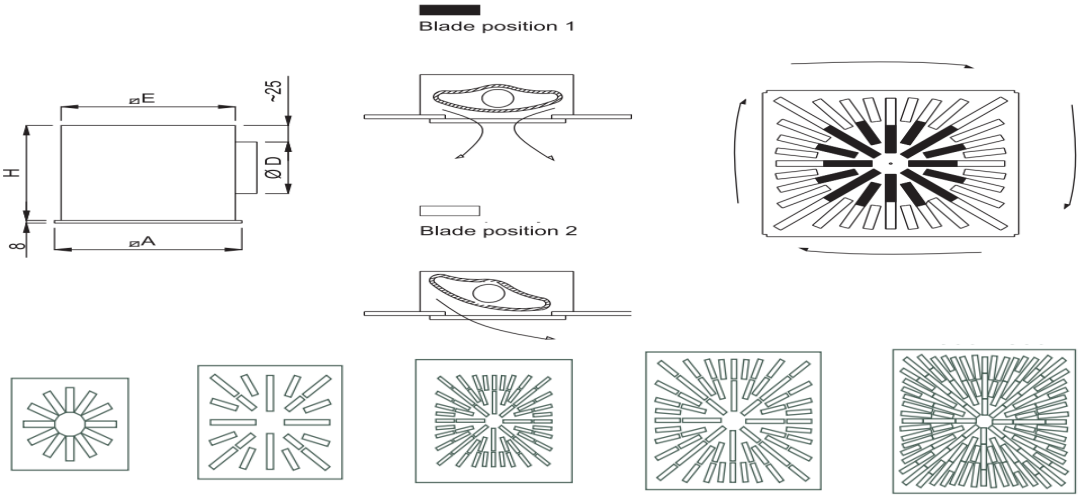
Closed



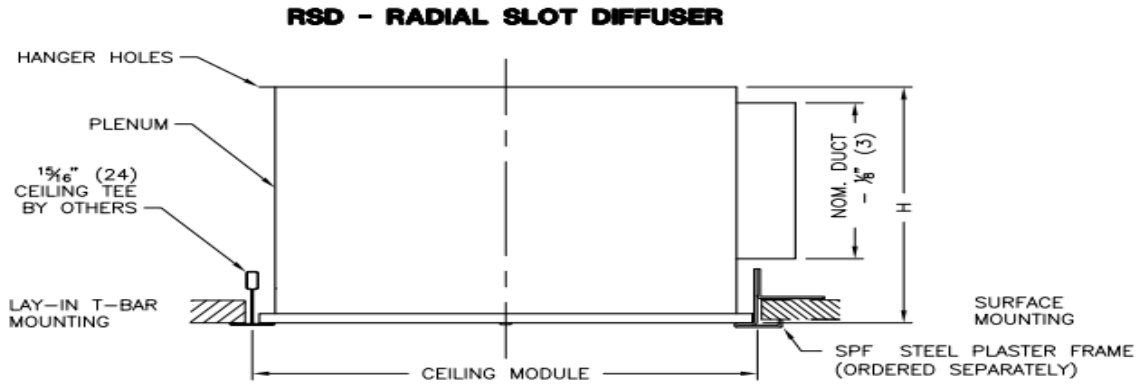


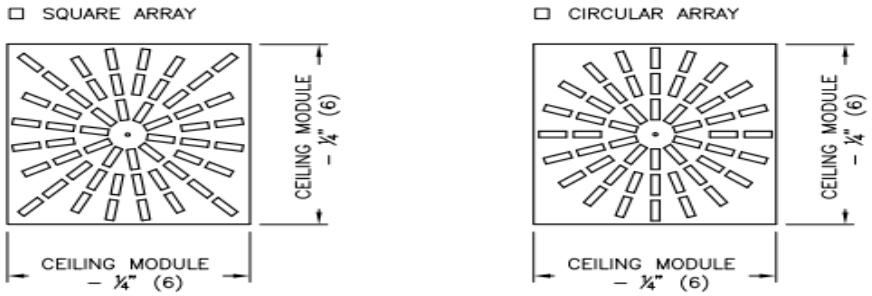
## SWD-324 STANDARD SELECTION TABLE

| Standard size | A | E | H | D | (Vmin-Vmax) Air Volume (m³/h) | V(volume) 40db A |
|---|---|---|---|---|---|---|
| 310 | 308 | 290 | 260 | 158 | 160-420 | 290 |
| 400 | 398 | 370 | 260 | 158 | 170-510 | 345 |
| 500 | 498 | 470 | 300 | 198 | 370-1160 | 650 |
| 600 | 598 | 570 | 350 | 248 | 420-1600 | 890 |
| 625 | 623 | 570 | 350 | 248 | 420-1600 | 890 |
| 800 | 798 | 770 | 455 | 353 | 620-3060 | 1420 |



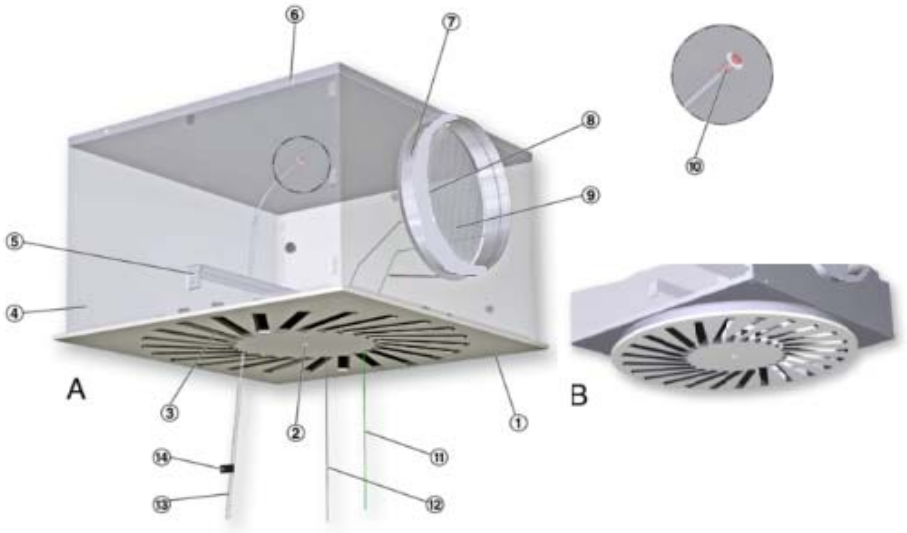

## Imperial System




| CEILING MODULE | NOM. DUCT | H |
|---|---|---|
| 24" X 24" | 8" , 10" , 12" | 14" |
| (600 x 600) | (203 , 254, 305) | (356) |

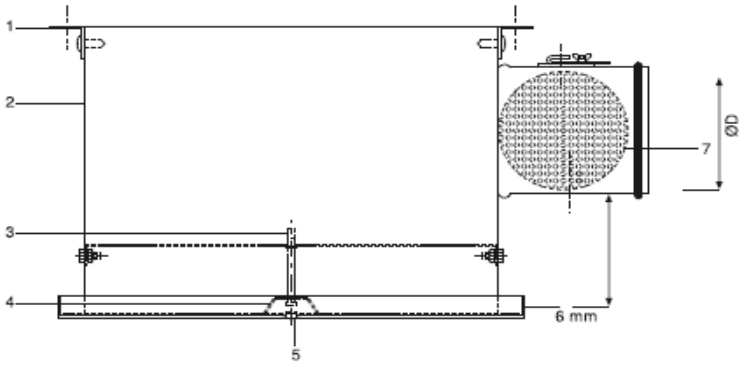
## SWD124 Plenum Box Details:



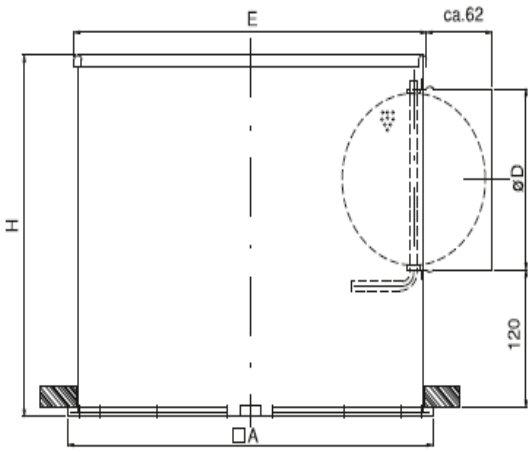

**SWD124 A: Square front plate** **SWD124 B: Circular front plate**

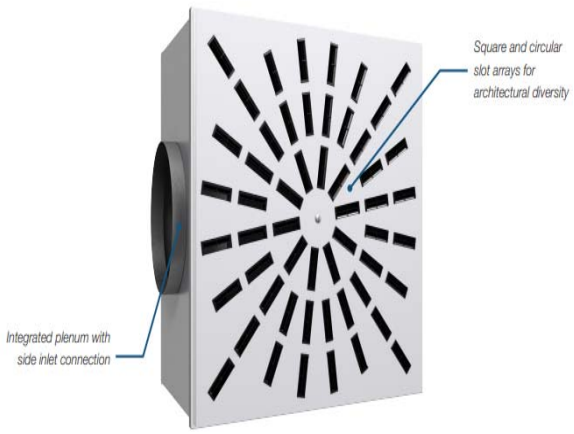
① Diffuser face
② Central fixing screw
③ Adjustable air control blades
④ Plenum box
⑤ Cross bar (bridge)
⑥ Suspension hole
⑦ Spigot Optional
⑧ Lip seal Optional
⑨ Damper blade for volume flow rate balancing-Optional
⑩ Pressure tap - Optional
⑪ Green cord for closing the damper blade
⑫ White cord for opening the damper blade
⑬ Measuring tube
⑭ Text label indicating plenum box variant

## SWD224/324 Plenum Box Details:




1-Hook pieces
2-Plenum box
3-Screw
4-Installation bridge
5-Plastic cap
6-Swril diffuser
7-Air control damper
8-Air control damper



## SWD124 SELECTION TABLE

| | |
|---|---|
| Nominal sizes | 300, 400, 500, 600, 625, 825 mm |
| Minimum volume flow rate, with $\Delta t_z$ = –6 K | 7 – 99 l/s or 25 – 357 m³/h |
| Maximum volume flow rate, with $L_{WA}$ ≅ 50 dB(A) | 80 – 470 l/s or 288 – 1692 m³/h |
| Supply air to room air temperature difference | –12 to +10 K |

| Nominal size | $\dot{V}$ | $\dot{V}$ | Damper blade position | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0° | | 45° | | 90° | |
| | | | $\Delta p_t$ | $L_{WA}$ | $\Delta p_t$ | $L_{WA}$ | $\Delta p_t$ | $L_{WA}$ |
| | l/s | m³/h | Pa | dB(A) | Pa | dB(A) | Pa | dB(A) |
| 300 × 8 | 7 | 26 | 1 | <15 | 1 | <15 | 1 | <15 |
| | 35 | 126 | 15 | 23 | 18 | 22 | 30 | 24 |
| | 60 | 216 | 45 | 39 | 53 | 38 | 87 | 40 |
| | 85 | 306 | 91 | 50 | 105 | 50 | 174 | 51 |
| 400 × 16 | 13 | 46 | 1 | <15 | 1 | <15 | 1 | <15 |
| | 60 | 216 | 13 | 22 | 15 | 23 | 28 | 25 |
| | 100 | 360 | 36 | 38 | 42 | 39 | 78 | 42 |
| | 140 | 504 | 71 | 50 | 83 | 50 | 154 | 54 |
| 500 × 24 | 19 | 70 | 1 | <15 | 1 | <15 | 3 | <15 |
| | 70 | 252 | 11 | 19 | 14 | 19 | 34 | 24 |
| | 125 | 450 | 35 | 38 | 45 | 37 | 108 | 42 |
| | 175 | 630 | 68 | 50 | 89 | 49 | 212 | 54 |
| 600 × 24, 625 × 24 | 28 | 102 | 1 | <15 | 1 | <15 | 2 | <15 |
| | 105 | 378 | 11 | 20 | 15 | 21 | 33 | 22 |
| | 165 | 594 | 26 | 34 | 37 | 34 | 83 | 36 |
| | 260 | 936 | 65 | 50 | 91 | 51 | 205 | 55 |
| 600 × 48 | 40 | 145 | 1 | <15 | 2 | <15 | 5 | <15 |
| | 130 | 468 | 12 | 21 | 18 | 23 | 50 | 29 |
| | 210 | 756 | 32 | 37 | 47 | 40 | 131 | 45 |
| | 305 | 1098 | 67 | 50 | 98 | 55 | 276 | 60 |
| 625 × 54 | 52 | 186 | 2 | <15 | 2 | <15 | 7 | <15 |
| | 140 | 504 | 13 | 22 | 16 | 24 | 48 | 33 |
| | 225 | 810 | 34 | 38 | 41 | 39 | 125 | 51 |
| | 310 | 1116 | 64 | 50 | 77 | 52 | 238 | 64 |
| 825 × 72 | 99 | 357 | 2 | <15 | 4 | <15 | 10 | <15 |
| | 225 | 810 | 13 | 24 | 21 | 27 | 51 | 33 |
| | 400 | 1440 | 41 | 44 | 65 | 49 | 161 | 54 |
| | 470 | 1692 | 56 | 50 | 90 | 57 | 222 | 61 |

- Selection tables provide a good overview of the volume flow rates and corresponding sound power levels and differential pressures.
- The minimum volume flow rates apply to a supply air to room air temperature difference of –6 K.
- The maximum volume flow rates apply to a sound power level of approx. 50 dB (A) with damper blade position 0°.

## SWD224 SELECTION TABLE

| $Q_v$ ($m^3/h$) | MODEL | 310 | 400 | 500 | 600 | 800 |
|---|---|---|---|---|---|---|
| 200 | Lt (m) | 1,1 | | | | |
| | Vt (m/s) | 0,2 | | | | |
| | NR | 27 | | | | |
| | P (Pa) | 25 | | | | |
| 300 | Lt (m) | 1,8 | 1 | | | |
| | Vt (m/s) | 0,2 | 0,2 | | | |
| | NR | 37 | 33 | | | |
| | P (Pa) | 50 | 40 | | | |
| 400 | Lt (m) | 2,8 | 1,5 | | | |
| | Vt (m/s) | 0,2 | 0,2 | | | |
| | NR | 42 | 40 | | | |
| | P (Pa) | 80 | 70 | | | |
| 500 | Lt (m) | 2 | 2,5 | 1,5 | | |
| | Vt (m/s) | 0,25 | 0,2 | 0,2 | | |
| | NR | 50 | 45 | 35 | | |
| | P (Pa) | 140 | 110 | 30 | | |
| 600 | Lt (m) | | | 2 | 1,5 | |
| | Vt (m/s) | | | 0,2 | 0,2 | |
| | NR | | | 37 | 35 | |
| | P (Pa) | | | 40 | 30 | |
| 800 | Lt (m) | | | 2,5 | 2 | |
| | Vt (m/s) | | | 0,2 | 0,2 | |
| | NR | | | 45 | 35 | |
| | P (Pa) | | | 70 | 38 | |
| 1000 | Lt (m) | | | 2,5 | 1,5 | 1,8 |
| | Vt (m/s) | | | 0,25 | 0,25 | 0,2 |
| | NR | | | 50 | 40 | 30 |
| | P (Pa) | | | 100 | 50 | 20 |
| 1500 | Lt (m) | | | | 3 | 3 |
| | Vt (m/s) | | | | 0,3 | 0,2 |
| | NR | | | | 45 | 40 |
| | P (Pa) | | | | 80 | 40 |
| 2000 | Lt (m) | | | | | 4 |
| | Vt (m/s) | | | | | 0,2 |
| | NR | | | | | 47 |
| | P (Pa) | | | | | 80 |
| 2500 | Lt (m) | | | | | 4 |
| | Vt (m/s) | | | | | 0,25 |
| | NR | | | | | 52 |
| | P (Pa) | | | | | 100 |

**SELECTION CRITERIAS**

$L=L_t+H_1$

$H_1$=1,2mt

Ceiling height 3m

Ceiling effect

Louvers Position "B"

Lt(m) : Throw Distance
NR : Sound Level
Pt(Pa) : Pressure Drop
Vk(m/s): Slot Output Speed

## SWD324 SELECTION TABLE

| $Q_v$ ($m^3/h$) | MODEL | 310 | 400 | 500 | 600 | 800 |
|---|---|---|---|---|---|---|
| 200 | Lt (m) | 1 | | | | |
| | Vt (m/s) | 0,2 | | | | |
| | NR | 25 | | | | |
| | P (Pa) | 22 | | | | |
| 300 | Lt (m) | 2 | 1,2 | | | |
| | Vt (m/s) | 0,2 | 0,2 | | | |
| | NR | 35 | 33 | | | |
| | P (Pa) | 45 | 40 | | | |
| 400 | Lt (m) | 3 | 2 | | | |
| | Vt (m/s) | 0,2 | 0,2 | | | |
| | NR | 45 | 40 | | | |
| | P (Pa) | 90 | 65 | | | |
| 500 | Lt (m) | 3 | 2,5 | 1,3 | | |
| | Vt (m/s) | 0,25 | 0,2 | 0,2 | | |
| | NR | 50 | 45 | 30 | | |
| | P (Pa) | 140 | 100 | 19 | | |
| 600 | Lt (m) | | | 2 | 1,5 | |
| | Vt (m/s) | | | 0,2 | 0,2 | |
| | NR | | | 35 | 25 | |
| | P (Pa) | | | 28 | 18 | |
| 800 | Lt (m) | | | 2,5 | 2 | |
| | Vt (m/s) | | | 0,2 | 0,2 | |
| | NR | | | 40 | 35 | |
| | P (Pa) | | | 45 | 35 | |
| 1000 | Lt (m) | | | 3 | 3 | 1,5 |
| | Vt (m/s) | | | 0,2 | 0,2 | 0,2 |
| | NR | | | 45 | 40 | 25 |
| | P (Pa) | | | 65 | 50 | 15 |
| 1500 | Lt (m) | | | | 4 | 2,5 |
| | Vt (m/s) | | | | 0,2 | 0,2 |
| | NR | | | | 50 | 35 |
| | P (Pa) | | | | 100 | 30 |
| 2000 | Lt (m) | | | | | 3,5 |
| | Vt (m/s) | | | | | 0,2 |
| | NR | | | | | 43 |
| | P (Pa) | | | | | 55 |
| 2500 | Lt (m) | | | | | 4,5 |
| | Vt (m/s) | | | | | 0,2 |
| | NR | | | | | 50 |
| | P (Pa) | | | | | 80 |

**SELECTION CRITERIAS**

$L=L_t+H_1$

$H_1=1,2mt$

Ceiling height 3m

Ceiling effect

Louvre Positions "B"

Lt(m) : Throw Distance
NR : Sound Level
Pt(Pa) : Pressure Drop
Vk(m/s): Slot Output Speed

**imperial System**

**RSD RADIAL SLOT DIFFUSER**

## 12 in. x 12 in. - Circular Array

| Inlet Size | Neck Velocity (fpm) / Velocity Pressure (in. w.g.) | 200 / 0.002 | 300 / 0.006 | 400 / 0.010 | 500 / 0.016 | 600 / 0.022 | 700 / 0.031 | 800 / 0.040 | 900 / 0.050 | 1000 / 0.062 | 1200 / 0.090 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6"ø | Static Pressure (in. w.g.) | 0.014 | 0.029 | 0.048 | 0.071 | 0.098 | 0.128 | 0.163 | 0.200 | 0.241 | 0.333 |
| | Flow Rate (cfm) | 39 | 59 | 79 | 98 | 118 | 137 | 157 | 177 | 196 | 236 |
| | Sound (NC) | - | - | - | 18 | 23 | 27 | 30 | 33 | 36 | 41 |
| | Throw (ft.) | 0 - 1 - 2 | 1 - 1 - 3 | 1 - 2 - 4 | 2 - 3 - 6 | 2 - 3 - 7 | 3 - 4 - 7 | 3 - 4 - 8 | 3 - 5 - 8 | 4 - 6 - 9 | 4 - 7 - 10 |

## 24 in. x 24 in. - Circular Array

| Inlet Size | Neck Velocity (fpm) / Velocity Pressure (in. w.g.) | 200 / 0.002 | 300 / 0.006 | 400 / 0.010 | 500 / 0.016 | 600 / 0.022 | 700 / 0.031 | 800 / 0.040 | 900 / 0.050 | 1000 / 0.062 | 1200 / 0.090 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8"ø | Static Pressure (in. w.g.) | 0.006 | 0.013 | 0.022 | 0.032 | 0.045 | 0.059 | 0.075 | 0.093 | 0.112 | 0.155 |
| | Flow Rate (cfm) | 70 | 105 | 140 | 175 | 209 | 244 | 279 | 314 | 349 | 419 |
| | Sound (NC) | - | - | - | - | 16 | 21 | 25 | 28 | 31 | 36 |
| | Throw (ft.) | 1-1-2 | 1-2-3 | 1-2-4 | 2-3-6 | 2-3-7 | 3-4-8 | 3-4-9 | 3-5-10 | 4-6-11 | 4-7-12 |
| 10"ø | Static Pressure (in. w.g.) | 0.013 | 0.027 | 0.045 | 0.067 | 0.092 | 0.122 | 0.155 | 0.191 | 0.231 | |
| | Flow Rate (cfm) | 109 | 164 | 218 | 273 | 327 | 382 | 436 | 491 | 545 | |
| | Sound (NC) | - | - | 18 | 24 | 29 | 33 | 37 | 41 | 44 | |
| | Throw (ft.) | 1-2-3 | 2-3-5 | 2-3-7 | 3-4-9 | 3-5-10 | 4-6-11 | 5-7-12 | 5-8-13 | 6-9-14 | |
| 12"ø | Static Pressure (in. w.g.) | 0.025 | 0.052 | 0.086 | 0.129 | 0.178 | 0.235 | 0.298 | | | |
| | Flow Rate (cfm) | 157 | 236 | 314 | 393 | 471 | 550 | 628 | | | |
| | Sound (NC) | - | 20 | 28 | 34 | 39 | 44 | 48 | | | |
| | Throw (ft.) | 2-3-5 | 3-4-8 | 3-5-10 | 4-6-11 | 5-8-13 | 6-9-14 | 7-10-15 | | | |

## 24 in. x 24 in. - Square Array

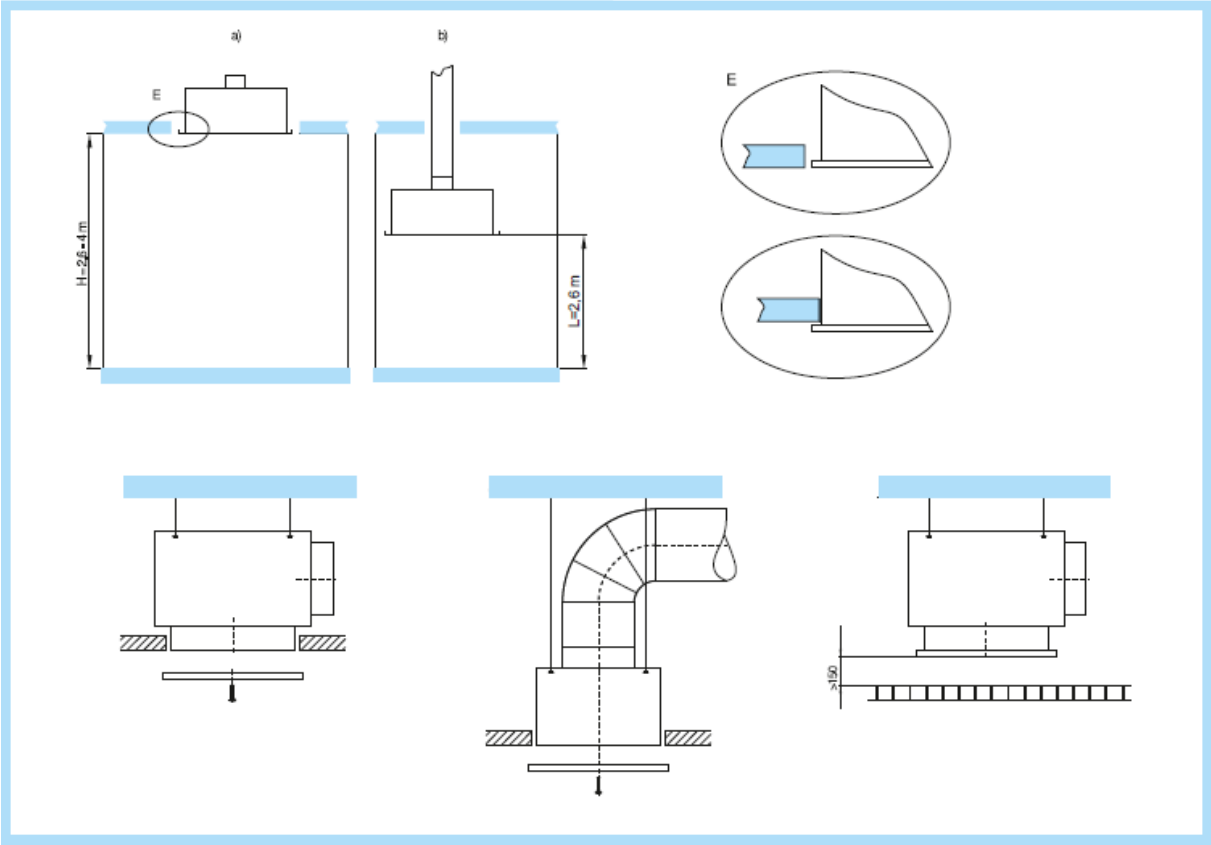
| Inlet Size | Neck Velocity (fpm) / Velocity Pressure (in. w.g.) | 200 / 0.002 | 300 / 0.006 | 400 / 0.010 | 500 / 0.016 | 600 / 0.022 | 700 / 0.031 | 800 / 0.040 | 900 / 0.050 | 1000 / 0.062 | 1200 / 0.090 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8"ø | Static Pressure (in. w.g.) | 0.006 | 0.013 | 0.021 | 0.030 | 0.041 | 0.054 | 0.067 | 0.083 | 0.099 | 0.135 |
| | Flow Rate (cfm) | 70 | 105 | 140 | 175 | 209 | 244 | 279 | 314 | 349 | 419 |
| | Sound (NC) | - | - | - | - | 17 | 21 | 25 | 28 | 31 | 36 |
| | Throw (ft.) | 0-0-2 | 0-1-3 | 1-2-4 | 1-2-6 | 2-3-7 | 2-4-8 | 3-4-9 | 3-5-10 | 4-6-11 | 4-7-13 |
| 10"ø | Static Pressure (in. w.g.) | 0.011 | 0.022 | 0.038 | 0.057 | 0.079 | 0.105 | 0.134 | 0.167 | 0.202 | |
| | Flow Rate (cfm) | 109 | 164 | 218 | 273 | 327 | 382 | 436 | 491 | 545 | |
| | Sound (NC) | - | - | 18 | 24 | 29 | 34 | 37 | 41 | 44 | |
| | Throw (ft.) | 0-1-3 | 1-2-5 | 2-3-7 | 3-4-9 | 3-5-10 | 4-6-12 | 5-7-13 | 5-8-14 | 6-9-15 | |
| 12"ø | Static Pressure (in. w.g.) | 0.026 | 0.053 | 0.089 | 0.132 | 0.182 | 0.239 | 0.303 | | | |
| | Flow Rate (cfm) | 157 | 236 | 314 | 393 | 471 | 550 | 628 | | | |
| | Sound (NC) | - | 20 | 28 | 34 | 39 | 44 | 48 | | | |
| | Throw (ft.) | 1-2-5 | 2-4-8 | 3-5-10 | 4-6-12 | 5-8-14 | 6-9-15 | 7-10-16 | | | |

**Performance Notes:**

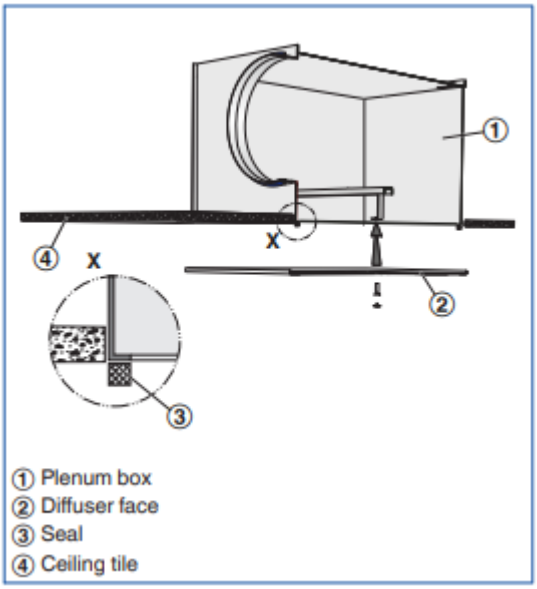
1. Tested in accordance with ASHRAE Standard 70 - 2006 “Method of Testing for Rating the Performance of Air, Outlets and Inlets.
2. Airflow is in cubic feet per minute [cfm].
3. NC, sound pressure levels, are based on a room absorption of 10 dB re 10-12 Watts, and a single diffuser/grille.
4. Blanks “-“ indicate an NC level below 15.
5. All pressures are in inches of water column [in. w.g.].
6. Pressures not listed can be calculated using the following formula: Ptotal = Pstatic + Pvelocity
7. Throw data is based on supply air and room air being at isothermal conditions
8. Throw data is given in feet [ft] to terminal velocities of

- 150 fpm (minimum)
- 100 fpm (middle)
- 50 fpm (maximum)

## INSTALLATION DETAILS:

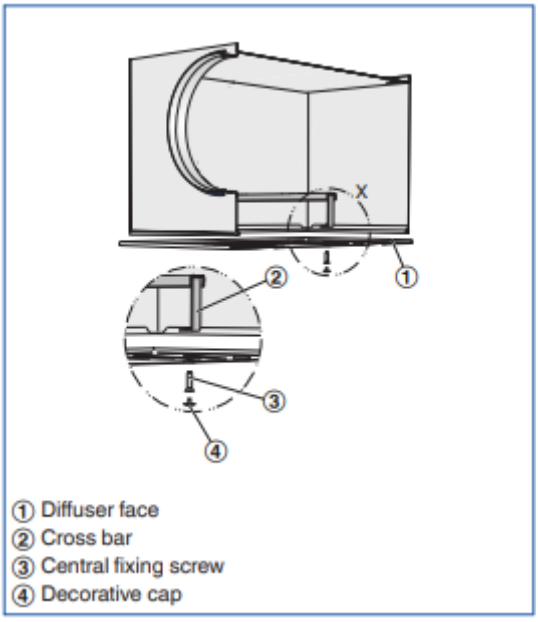



### Diffuser face – sealing




– The self-adhesive sealing tape (supplied) has to be applied to the return edges of the plenum box by others

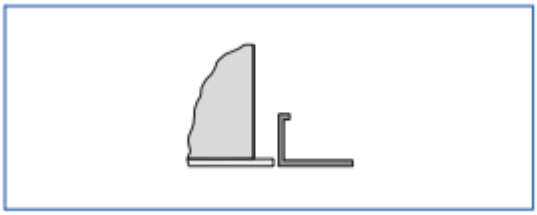
### Diffuser face – central screw fixing




- Using the central fixing screw, fix the diffuser face to the cross bar of the plenum box
- Attach the decorative cap

## Ceiling systems

### Installation into grid ceilings

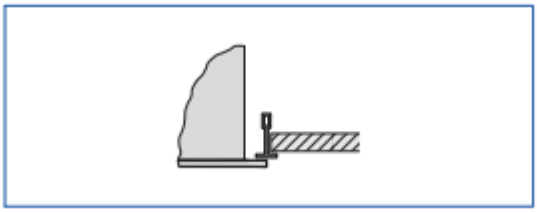


– Fix the plenum box to the ceiling
– The ceiling tile of the grid ceiling is independent of the ceiling diffuser
– Fix the diffuser face after the ceiling has been completed

### Installation in continuous ceilings

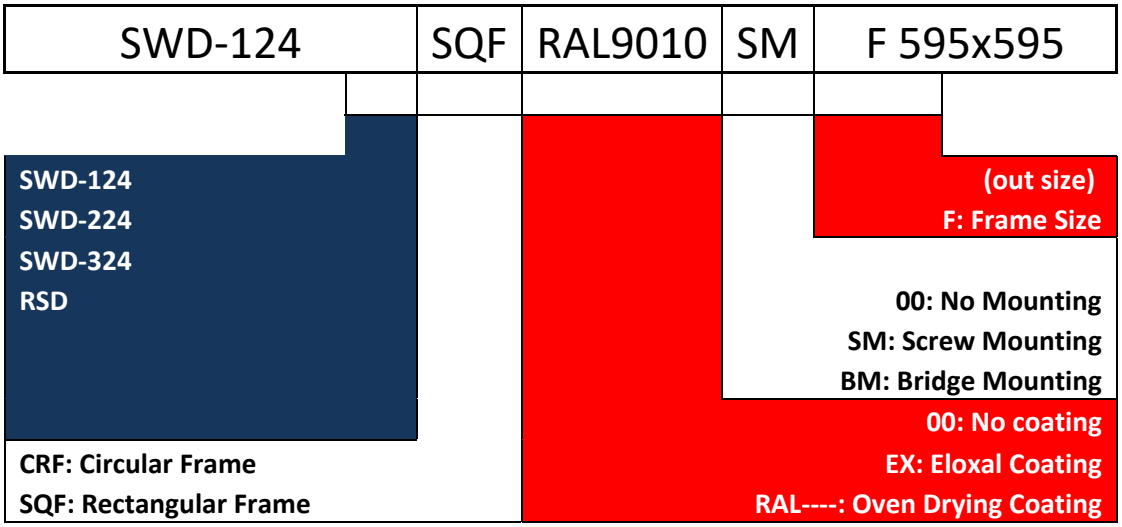
– Fix plenum box (including diffuser face, if necessary) to the ceiling
– Adjust plasterboard ceiling tile as required
– If necessary, fix the diffuser face after the ceiling has been completed

### Installation in T-bar ceilings



- Fix the plenum box to the ceiling
- The T-bar ceiling is independent of the ceiling diffuser
- Fix the diffuser face below the T-bars after the ceiling has been completed

## ORDER CODES


SWD-124
SQF
RAL9010
SM
F 595x595
SWD-124
SWD-224
SWD-324
RSD
(out size)
F: Frame Size
00: No Mounting
SM: Screw Mounting
BM: Bridge Mounting
00: No coating
EX: Eloxal Coating
RAL----: Oven Drying Coating
CRF: Circular Frame
SQF: Rectangular Frame