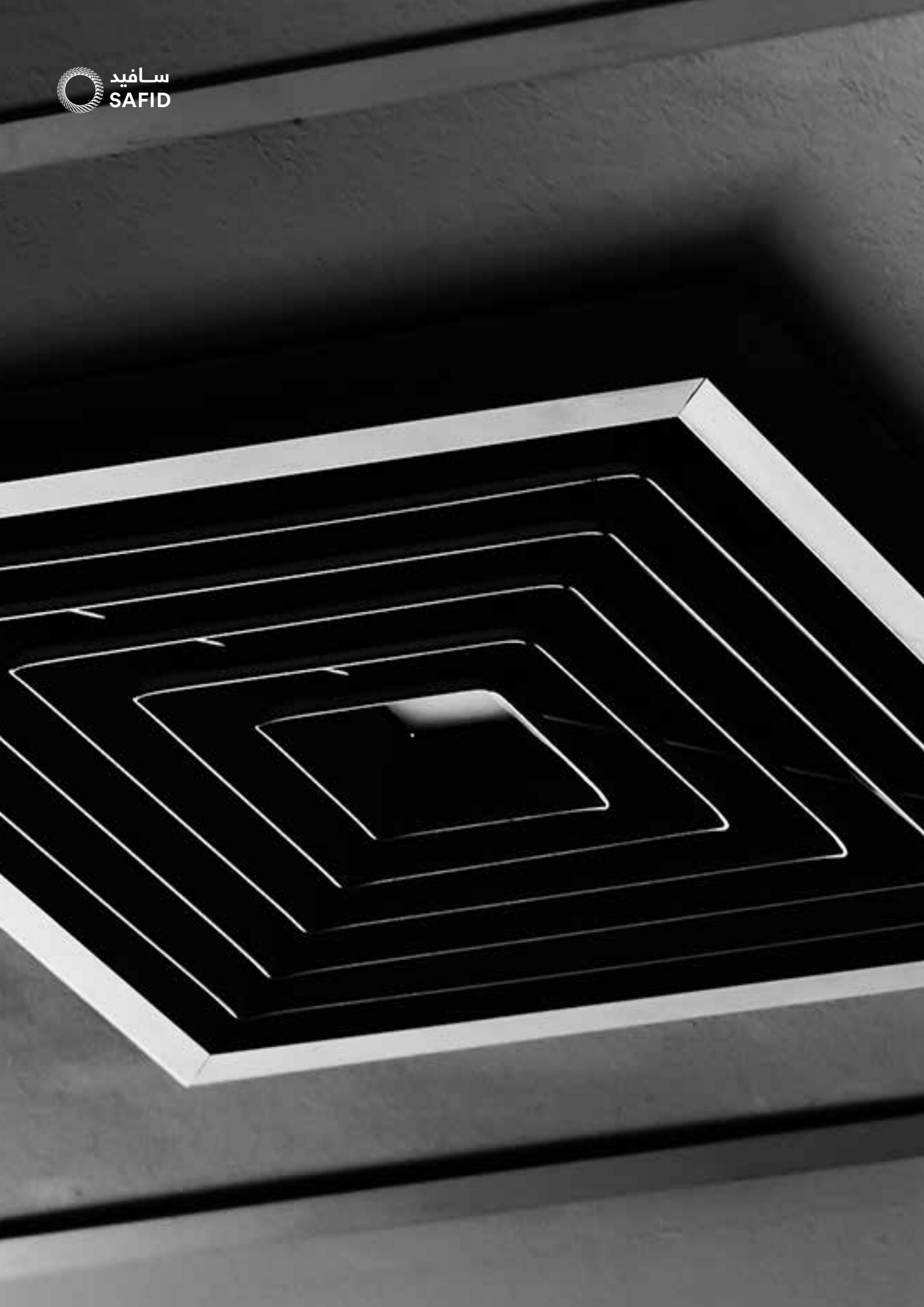


SQUARE CEILING DIFFUSERS





Description

SCD type ceiling diffusers has been designed to handle a wide range of airflows and maintain a high quality of air diffusion in occupied spaces. The SCD series can be used for supply, return and exhaust air applications. Because this type of air outlet discharge horizontally near the ceiling, the warmest air in the room will mixed immediately with the cool primary air far above the occupied zone. Therefore, this type of air outlet is capable of handling large quantity of air at high temperature differentials. It has a pleasing appearance that suit to any type of ceiling to match the architectural design.

Standard Construction

Materials:

The frame and blades of ceiling diffusers are made of extruded aluminum alloy profiles.

The inner core of SCD type diffuser is fully removable for easy installation to plenum box. One side is with aluminum short pin held on the hole at the frame and the other side is with aluminum long pin with spring to allow adjustment for the removal of the inner core.

Option:

The inner core of the diffuser can be fixed if requested (Model: SCDF).

Damper:

The frame and blades are made of extruded aluminum alloy profiles. If a volume control damper is required, it can be easily attached on the top side of diffuser by means of a locking clips. The air volume can be controlled by adjusting the damper blades from the face of the diffuser by means of screw driver.

Finish:

The standard coating finish is polyester powder coating, white color RAL 9010 (**Code: Z0**).

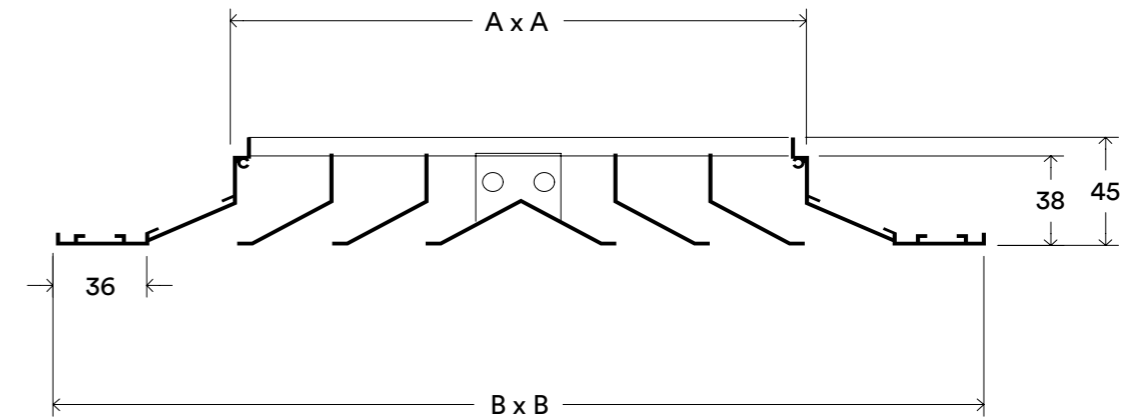
The coating finish of volume control damper is polyester powder coating, black color.

Optional Finish:

1. Natural anodized aluminium finish, **Code: Z1**
2. The powder coating can be of any color if requested as specified, **Code: Z2**

SCD SERIES [SCD - 1, SCD - 2, SCD - 3, SCD - 4, SCDF]

Dimensions



Standard Sizes

Dimensions				
Neck Size		A	B	RANGE
(in)	(mm)	(mm)	(mm)	(CFM)
6 x 6	150 x 150	147	285	50 - 225
9 x 9	225 x 225	222	360	112 - 506
12 x 12	300 x 300	297	435	200 - 900
15 x 15	375 x 375	372	510	312 - 1406
18 x 18	450 x 450	447	585	450 - 2025



SAFID Square Ceiling Diffusers SCD Series, 300X300 and 450X450, 4 way pattern are tested by Intertek Laboratories in accordance with ANSI/ASHRAE 70-2006 Standard "Method of Testing for Rating the Performance of Air Outlets and Inlets" which incorporates ADC 1062: GRD84 Test Code for Grilles, Registers and Diffusers.

Supply Square Ceiling Diffuser

MODEL: SCD - 4

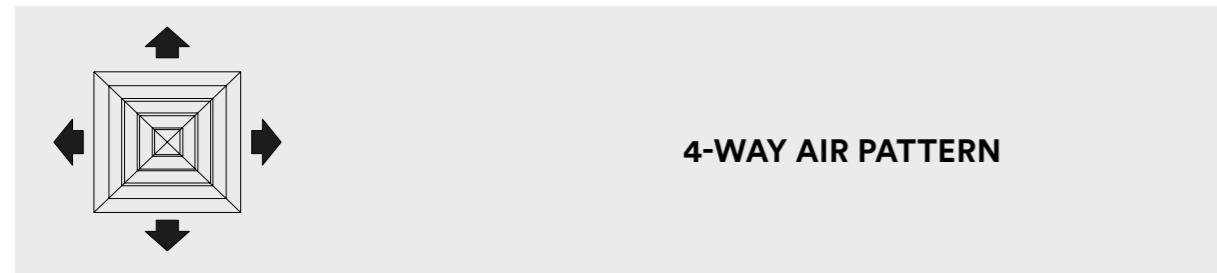


Table 1

NECK SIZE in (mm)	Ak (ft ²)	Neck Velocity	200	300	400	500	600	700	800	900
			Pressure Drop	0.012	0.036	0.06	0.086	0.122	0.17	0.22
6 x 6 (150 x 150)	0.129	CFM	50	75	100	125	150	175	200	225
		Throw	2 - 5	3 - 6	4 - 8	6 - 10	8 - 11	10 - 14	12 - 15	14 - 19
		NC	<20	<20	<20	25	28	32	36	39
9 x 9 (225 x 225)	0.246	CFM	112	168	225	281	337	393	450	506
		Throw	4 - 9	6 - 10	8 - 11	10 - 13	12 - 16	14 - 18	16 - 20	18 - 23
		NC	<20	<20	<20	27	30	35	39	42
12 x 12 (300 x 300)	0.405	CFM	200	300	400	500	600	700	800	900
		Throw	6 - 11	9 - 14	12 - 16	14 - 19	17 - 22	19 - 24	21 - 26	23 - 29
		NC	<20	<20	22	31	34	38	42	45
15 x 15 (375 x 375)	0.613	CFM	312	468	625	781	937	1093	1250	1406
		Throw	7 - 13	12 - 18	16 - 21	18 - 24	20 - 27	22 - 29	24 - 31	26 - 33
		NC	<20	<20	26	34	38	41	45	48
18 x 18 (450 x 450)	0.864	CFM	450	675	900	1125	1350	1575	1800	2025
		Throw	9 - 15	15 - 23	20 - 26	22 - 30	24 - 32	26 - 34	28 - 36	30 - 38
		NC	<20	20	30	36	41	44	48	51

NOTE

1. CFM is the total air capacity of each size.
2. Throw datas (in feet) are based on isothermal air conditions at 100 and 50 FPM terminal velocity.
3. NC levels are based on 10 dB room absorption.
4. Pressure drop in inches W.G. is total pressure = S.P. + V.P.
5. Neck velocity in FPM and Ak is the area factor.
6. For Return SCD add +1 dB to above NC and multiply pressure drop by 1.1

Supply Square Ceiling Diffuser

MODEL: SCD - 3



Table 2

NECK SIZE in (mm)	Ak (ft ²)	Neck Velocity	200	300	400	500	600	700	800	900
			Pressure Drop	0.012	0.036	0.06	0.086	0.122	0.17	0.22
6 x 6 (150 x 150)	0.129	CFM	50	75	100	125	150	175	200	225
		CFM1-Side A	12	19	26	31	38	43	50	57
		CFM2-Side B	19	28	37	47	56	66	75	84
		Throw-Side A	2 - 4	3 - 7	4 - 9	6 - 11	8 - 13	10 - 14	12 - 15	14 - 17
		Throw-Side B	3 - 5	4 - 8	5 - 10	7 - 12	9 - 14	11 - 15	13 - 16	15 - 18
		NC	<20	<20	<20	25	28	32	36	39
9 x 9 (225 x 225)	0.246	CFM	112	168	225	281	337	393	450	506
		CFM1-Side A	28	42	57	71	85	99	112	126
		CFM2-Side B	42	63	84	105	126	147	169	190
		Throw-Side A	4 - 7	5 - 9	7 - 11	9 - 13	11 - 15	13 - 17	15 - 19	17 - 21
		Throw-Side B	5 - 8	6 - 10	8 - 12	10 - 14	12 - 16	14 - 18	16 - 20	18 - 22
		NC	<20	<20	<20	27	30	35	39	42
12 x 12 (300 x 300)	0.405	CFM	200	300	400	500	600	700	800	900
		CFM1-Side A	50	76	100	126	150	176	200	226
		CFM1-Side B	75	112	150	187	225	262	300	337
		Throw-Side A	4 - 7	7 - 10	9 - 13	11 - 15	13 - 17	15 - 19	17 - 21	19 - 23
		Throw-Side B	5 - 8	8 - 11	10 - 14	12 - 16	14 - 18	16 - 20	18 - 22	20 - 24
		NC	<20	<20	22	31	34	38	42	45
15 x 15 (375 x 375)	0.613	CFM	312	468	625	781	937	1093	1250	1406
		CFM1-Side A	78	118	157	195	235	273	312	352
		CFM2-Side B	117	175	234	293	351	410	469	527
		Throw-Side A	5 - 9	8 - 12	11 - 16	13 - 18	15 - 20	17 - 21	18 - 23	19 - 24
		Throw-Side B	6 - 10	9 - 13	12 - 17	14 - 19	16 - 21	18 - 22	19 - 24	20 - 25
		NC	<20	<20	26	34	38	41	45	48
18 x 18 (450 x 450)	0.864	CFM	450	675	900	1125	1350	1575	1800	2025
		CFM1-Side A	112	169	226	281	338	393	450	507
		CFM2-Side B	169	253	337	422	506	591	675	759
		Throw-Side A	6 - 9	9 - 13	12 - 17	15 - 19	17 - 21	18 - 23	20 - 24	21 - 25
		Throw-Side B	7 - 10	10 - 14	13 - 18	16 - 20	18 - 22	19 - 24	21 - 25	22 - 26
		NC	<20	20	30	36	41	44	48	51

NOTE

1. CFM is the total air capacity of each size.
2. Throw datas (in feet) are based on isothermal air conditions at 100 and 50 FPM terminal velocity.
3. NC levels are based on 10 dB room absorption.
4. Pressure drop in inches W.G. is total pressure = S.P. + V.P.
5. Neck velocity in FPM and Ak is the area factor.
6. For Return SCD add +1 dB to above NC and multiply pressure drop by 1.1

Supply Square Ceiling Diffuser

MODEL: SCD - 2

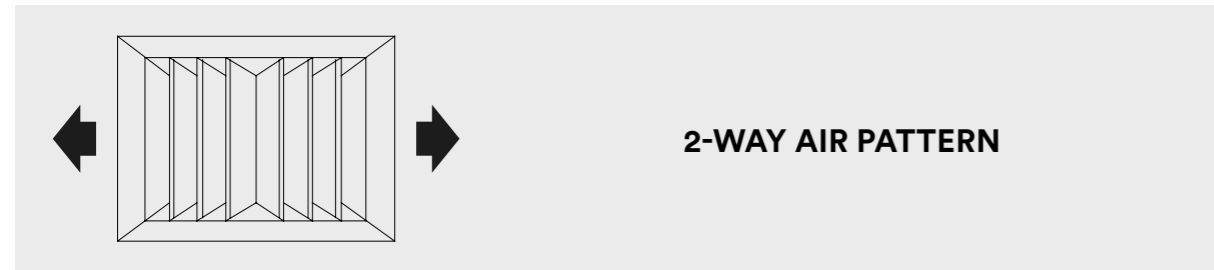


Table 3

NECK SIZE in (mm)	Ak (ft²)	Neck Velocity																																			
		200	300	400	500	600	700	800	900																												
6 x 6 (150 x 150)	0.129	Pressure Drop	0.012	0.036	0.06	0.086	0.122	0.17	0.22	0.27	CFM	50	75	100	125	150	175	200	225	Throw	4 - 8	5 - 10	7 - 12	6 - 10	11 - 15	12 - 18	14 - 20	16 - 22	NC	<20	<20	<20	25	28	32	36	39
		CFM	112	168	225	281	337	393	450	506	Throw	6 - 10	8 - 13	10 - 15	13 - 18	15 - 20	17 - 22	18 - 25	20 - 27	NC	<20	<20	<20	27	30	35	39	42									
		CFM	200	300	400	500	600	700	800	900	Throw	8 - 13	11 - 17	14 - 20	14 - 19	19 - 25	21 - 27	23 - 30	26 - 34	NC	<20	<20	22	31	34	38	42	45									
		CFM	312	468	625	781	937	1093	1250	1406	Throw	9 - 15	14 - 21	18 - 24	21 - 28	23 - 30	25 - 33	27 - 35	29 - 38	NC	<20	<20	26	34	38	41	45	48									
18 x 18 (450 x 450)	0.864	CFM	450	675	900	1125	1350	1575	1800	2025	Throw	10 - 17	17 - 26	22 - 30	25 - 34	26 - 35	28 - 38	30 - 41	33 - 45	NC	<20	20	30	36	41	44	48	51									

NOTE

1. CFM is the total air capacity of each size.
2. Throw datas (in feet) are based on isothermal air conditions at 100 and 50 FPM terminal velocity.
3. NC levels are based on 10 dB room absorption.
4. Pressure drop in inches W.G. is total pressure = S.P. + V.P.
5. Neck velocity in FPM and Ak is the area factor.
6. For Return SCD add +1 dB to above NC and multiply pressure drop by 1.1

Supply Square Ceiling Diffuser

MODEL: SCD - 1

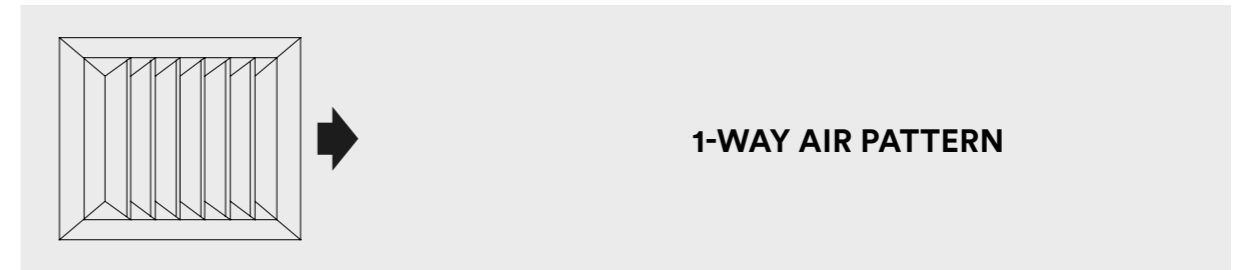


Table 4

NECK SIZE in (mm)	Ak (ft²)	Neck Velocity																																			
		200	300	400	500	600	700	800	900																												
6 x 6 (150 x 150)	0.129	Pressure Drop	0.012	0.036	0.06	0.086	0.122	0.17	0.22	0.27	CFM	50	75	100	125	150	175	200	225	Throw	5 - 10	7 - 12	10 - 15	12 - 18	14 - 20	15 - 21	17 - 23	19 - 25	NC	<20	<20	<20	25	28	32	36	39
		CFM	112	168	225	281	337	393	450	506	Throw	8 - 13	11 - 17	14 - 19	16 - 22	18 - 24	20 - 26	21 - 28	24 - 32	NC	<20	<20	<20	27	30	35	39	42									
		CFM	200	300	400	500	600	700	800	900	Throw	10 - 15	14 - 19	17 - 23	20 - 26	22 - 29	24 - 32	26 - 35	30 - 38	NC	<20	<20	22	31	34	38	42	45									
		CFM	312	468	625	781	937	1093	1250	1406	Throw	12 - 18	16 - 23	20 - 27	23 - 31	26 - 34	28 - 37	30 - 39	33 - 42	NC	<20	<20	26	34	38	41	45	48									
18 x 18 (450 x 450)	0.864	CFM	450	675	900	1125	1350	1575	1800	2025	Throw	13 - 20	20 - 29	25 - 34	27 - 38	30 - 39	32 - 41	34 - 45	37 - 48	NC	<20	20	30	36	41	44	48	51									

NOTE

1. CFM is the total air capacity of each size.
2. Throw datas (in feet) are based on isothermal air conditions at 100 and 50 FPM terminal velocity.
3. NC levels are based on 10 dB room absorption.
4. Pressure drop in inches W.G. is total pressure = S.P. + V.P.
5. Neck velocity in FPM and Ak is the area factor.
6. For Return SCD add +1 dB to above NC and multiply pressure drop by 1.1

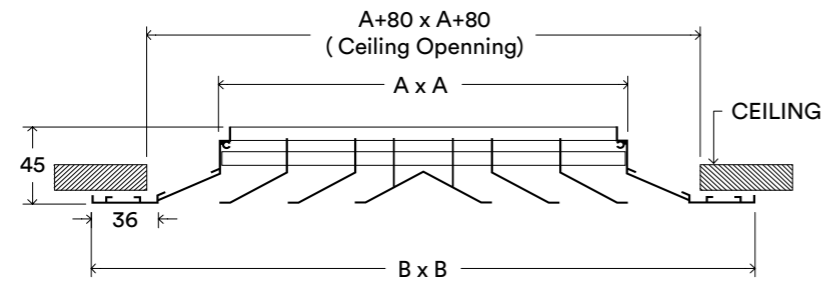
Square Ceiling Diffuser Variants

SCD Series

Flush Mounting in Ceiling

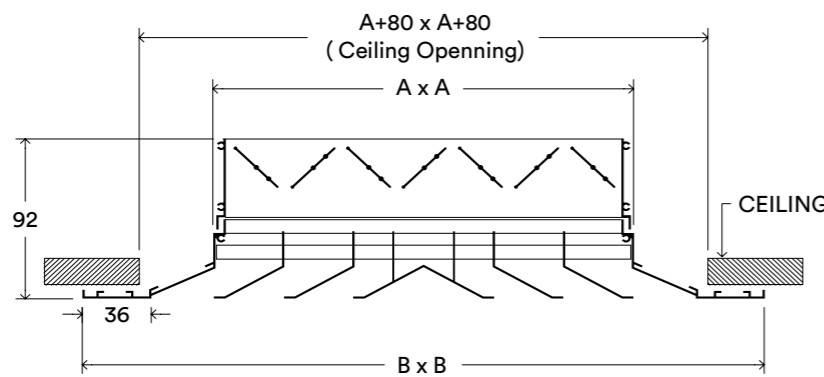
Square Ceiling Diffuser Without Volume Control Damper

Model : SCD -1, 2, 3, 4
: SCDF -1, 2, 3, 4



Square Ceiling Diffuser With Volume Control Damper

Model : SCD-1-V, 2-V, 3-V, 4-V
: SCDF-1-V, 2-V, 3-V, 4-V



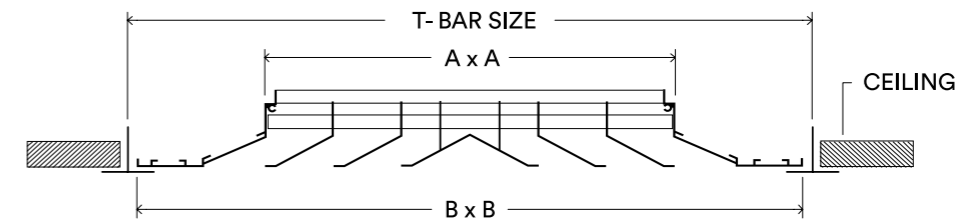
Square Ceiling Diffuser Variants

SCD Series

Lay in Ceiling T-Bar

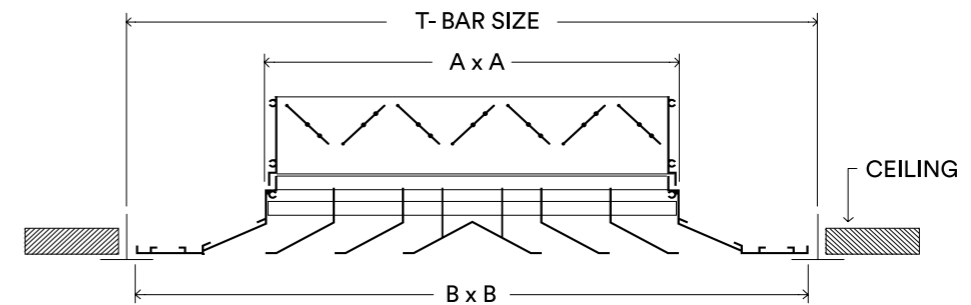
Square Ceiling Diffuser Without Volume Control Damper.

Model : SCD-1-T, 2-T, 3-T, 4-T
: SCDF-1-T, 2-T, 3-T, 4-T



Square Ceiling Diffuser With Volume Control Damper.

Model : SCD -1-T-V, 2-T-V, 3-T-V, 4-T-V
: SCDF-1-T-V, 2-T-V, 3-T-V, 4-T-V



Standard Sizes

T-Bar Size	Neck Size	A	B
600 x 600	460 x 460	457	595
610 x 610	470 x 470	467	605

Diffusers to fit other sizes of T-Bars are available on request.

NOTE

For the performance data, use the neck size 450 x 450 from Table 1 to Table 4.

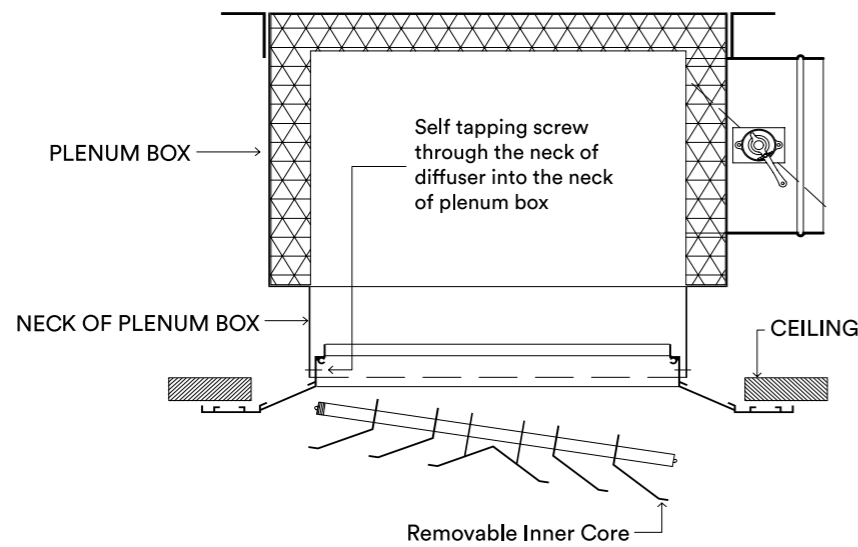
Fixing Details

SCD Series

Flush Mounting in Ceiling

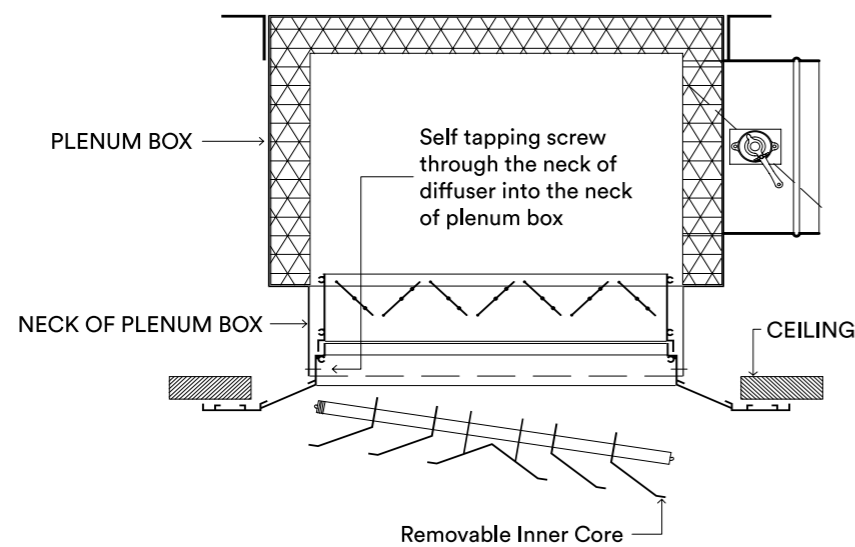
Fixing To Plenum Box:

Diffuser Model: SCD-1, 2, 3, 4



Fixing To Plenum Box:

Diffuser Model: SCD-1-V, 2-V, 3-V, 4-V



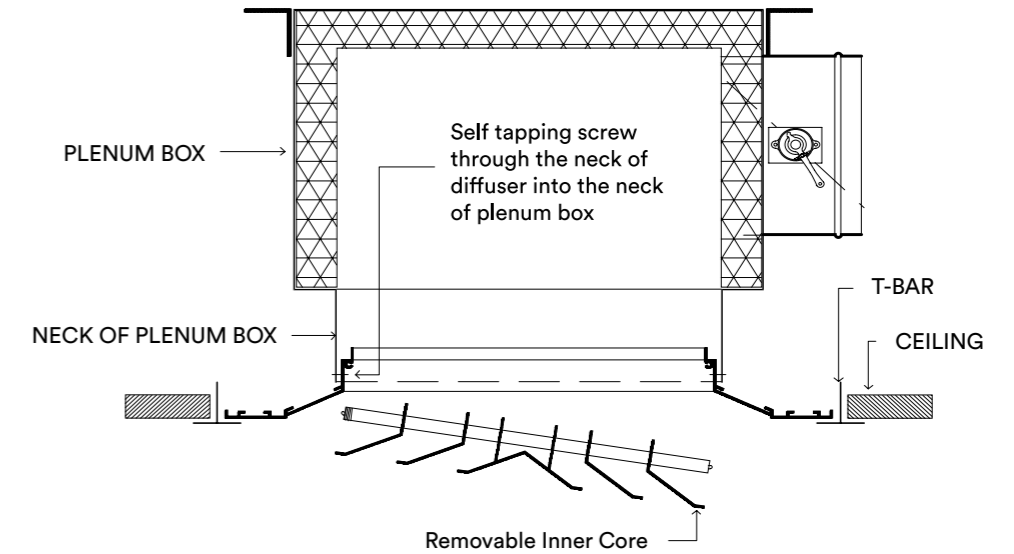
Fixing Details

SCD Series

Lay in Ceiling T-Bar

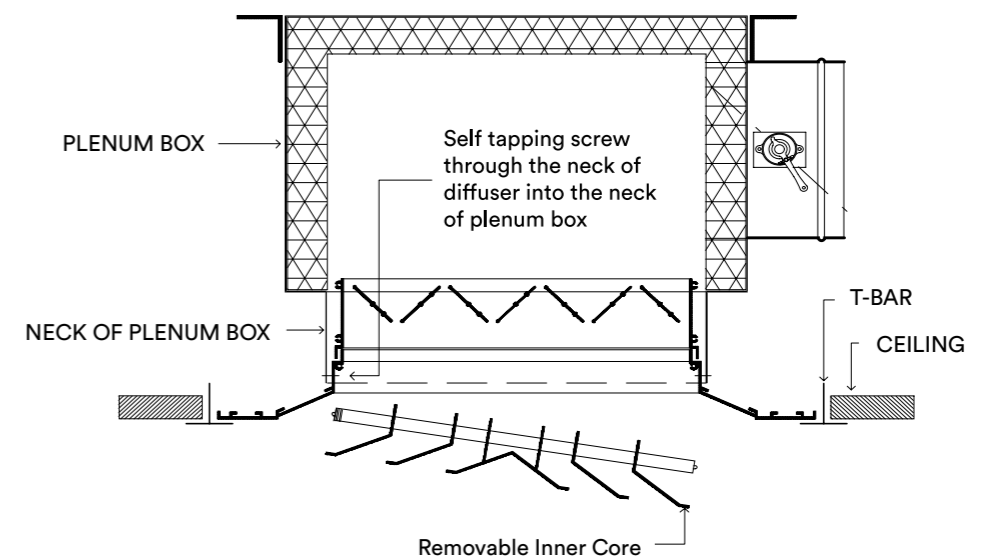
Fixing To Plenum Box:

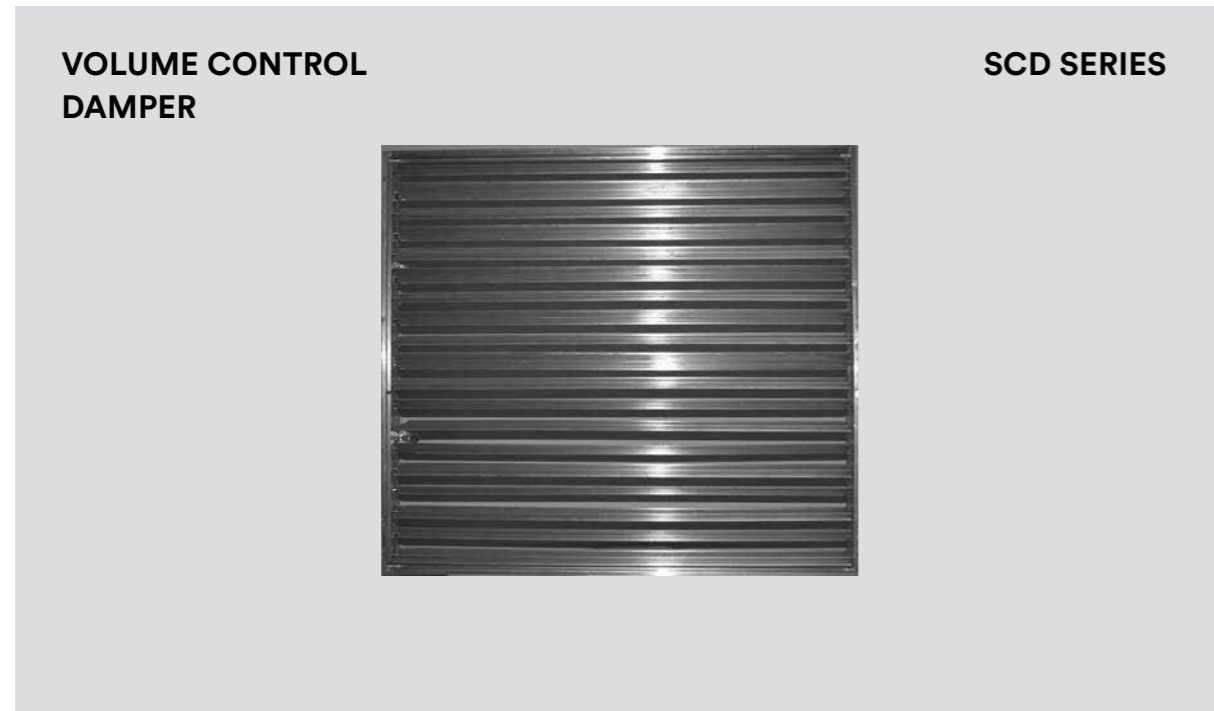
Diffuser Model: SCD-1-T, 2-T, 3-T, 4-T



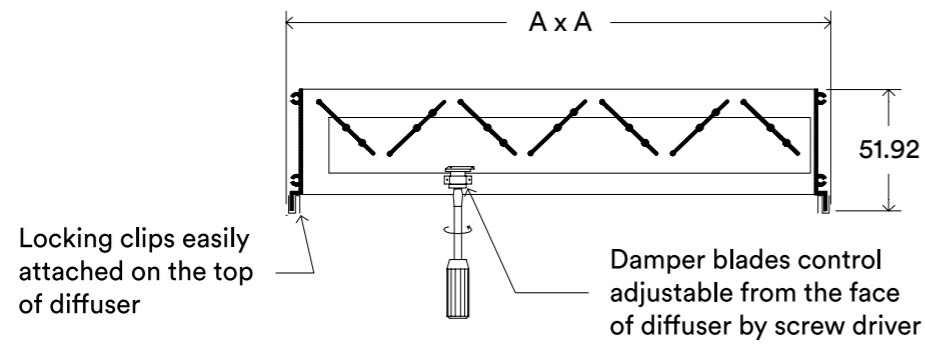
Fixing To Plenum Box:

Diffuser Model: SCD 1-T-V, 2-T-V, 3-T-V, 4-T-V





Dimensions



Dimensions

Neck Size		A x A
(inches)	(mm)	(mm)
6 x 6	150 x 150	147 x 147
9 x 9	225 x 225	222 x 222
12 x 12	300 x 300	297 x 297
15 x 15	375 x 375	372 x 372
18 x 18	450 x 450	447 x 447

Definitions:

“Throw” of a jet is the distance an airstream travels from the air outlet to a point where the maximum velocity in the airstream cross section has been reduced to a selected terminal velocity.

“Throw Distance” of a jet is denoted by T_v , where subscript V indicates the terminal velocity for which the throw is given.

“Characteristic Room Length (L)” is the distance from the diffuser to the nearest boundary wall in the horizontal direction of airflow. However, if the airflow is directed to the opposite diffuser, the characteristic room length (L_t) is equal to one-half the horizontal distance between two diffusers (L_h) plus the vertical distance (L_v) the mixed air jet travels downward to reach the occupied zone ($L_t=L_h+L_v$).

“Terminal Velocity (V_t)” is the maximum sustained airstream velocity at the end of the throw (e.g. 150, 100, 50 fpm).

“Discharge or Intake Air Velocity (V_k)” of an outlet or inlet (fpm) is the velocity of airstream measured at certain locations of outlet’s or inlet’s air slots.

“Area Factor (Ak)” of an air outlet or inlet is a factor determined from discharge or intake air velocity (V_k) and the airflow rate (Q).

$$A_k = Q / V_k$$

The recommended maximum airflow (CFM) per one airflow direction of the diffuser in relation to the ceiling height and temperature difference (ΔT) between the supply air and room air temperature can be selected on the table below.

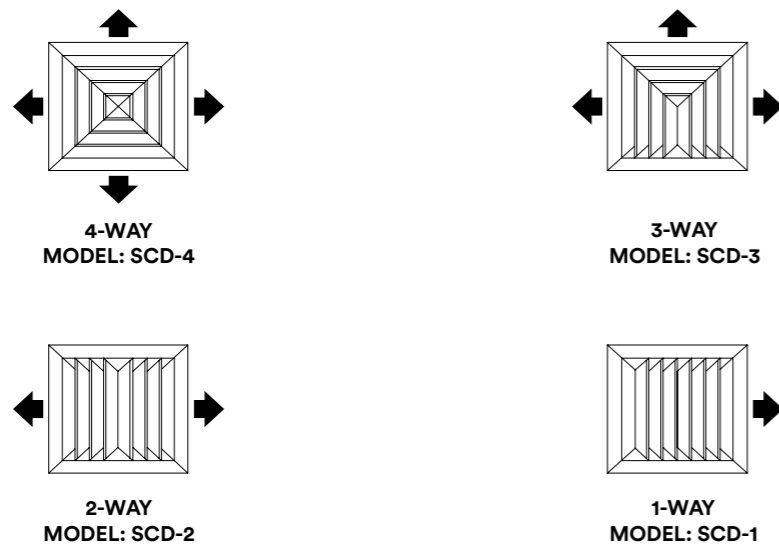
Table 5

Ceiling Height (ft)	Max. Temperature Difference (ΔT) (°F)	Maximum Airflows per One Direction (CFM)
8	20	215
9	25	400
10	29	745
12	30	1000
14	30	1400
16	30	1800

NOTE

The total airflows per diffuser can be lower than the allowed maximum airflows at any given ceiling height and temperature difference to meet the required room NC level.

Inner Core Arrangement:



Airflow Measurement:

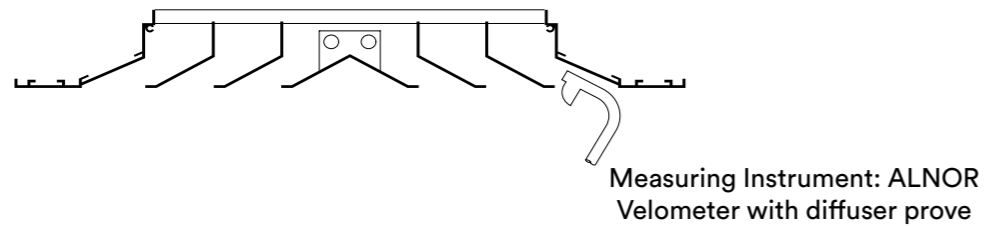
1. Place the diffuser prove in a position as shown in Figure 1.
2. Measure the air velocity in various air slots and locations.
3. Determine the average air velocity readings and calculate the airflow rate by using the formula.

$$Q = V_k \times A_k$$

Where:

- Q= airflow rate in CFM
- V_k = average air velocity in FPM
- A_k = area factor in FT²

Figure-1



NOTE

The alternative instrument to directly measure the airflow rate of each diffusers is the Flow Measuring Hood.

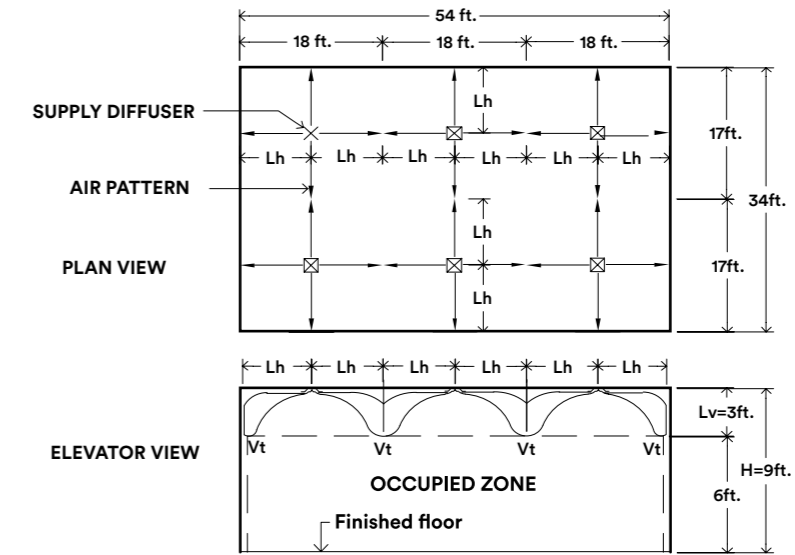


Figure 2

Example:

Specifications:

General office with room dimensions of 54 feet x 34 feet and the ceiling height is 9 feet. The total airflow to the room is 4200 CFM.

The required room Noise Criteria is NC35.

The supply and room air temperature difference (ΔT) is 25 °F.

Calculations:

Check first the required length of throw (Lt), Lt=Lh+Lv.

Where:

Lh = the length of horizontal distance between the opposite diffusers or the horizontal distance from diffuser to the wall.

Lv = the length of vertical distance from the ceiling down to the region of occupied zone, where the standard height of the occupied zone is 6ft above the finished floor.

Since the general office is a common area, divide the space into 6 parts with equal size of 18ft x 17ft. In this case, the airflow will be directed to the opposite diffuser. The length of horizontal throw will be one-half the distance between two diffusers (Lh=18/2=9ft, the longest side) and the length of vertical throw the mixed air jet travels downward (Lv=9-6=3ft) to reach the occupied zone. Therefore Lt=Lh+Lv =9ft+3ft.=12ft. See Figure 2.

Divide the total airflow 4200CFM in to 6 resulting to 700CFM per diffuser which is still covered by the allowed maximum airflows as per Table 5. In the Performance Data Table 1, Model: SCD-4, select the neck size of diffuser 15"x15" (375 x 375); Noise Criteria is NC 30; Throw is 17 - 22ft. and pressure drop is 0.073in W.G. See locations of diffusers in Figure 2.

Order Details

Order Code:

Model :

SCD = Square ceiling diffuser with removable inner core (standard)

SCDF = Square ceiling diffuser with fixed inner core

1=1 WAY Air Pattern

2=2 WAY Air Pattern

3=3 WAY Air Pattern

4=4 WAY Air Pattern

T= Diffuser lay in T-Bar

V= With volume control damper (black standard color)

Diffuser's Coating Finish:

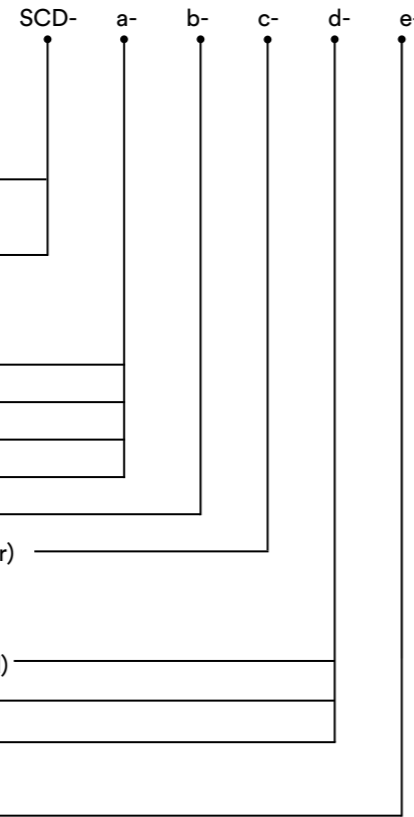
Z0 = Powder coated, white color (RAL 9010 Standard)

Z1 = Natural anodized aluminium finish

Z2 = Any other color if requested as specified

Diffuser's Size :

Neck Size



Plenum Box: See Page 21 - 24 for details

Specifications:

1. Supply square ceiling diffuser with removable inner core, with 4 Way air pattern, with powder coating white color RAL 9010 and with opposed blades volume control damper. Neck size = 375 x 375

2. Same as Item No 1 but without volume control damper.

Order Example

Ordering :

Make : SAFID

Item No. 1

Type : SCD - 4 - V - Z0 - 375 x 375

Qty : 1 pc

Item No. 2

Type : SCD - 4 - Z0 - 375 x 375

Qty : 1 pc

NOTE

For plenum box ordering, see Page 24.

VK SERIES [VK - 200, VK - 210, VK - 220, VK - 230, VK - 240, VK - 250]

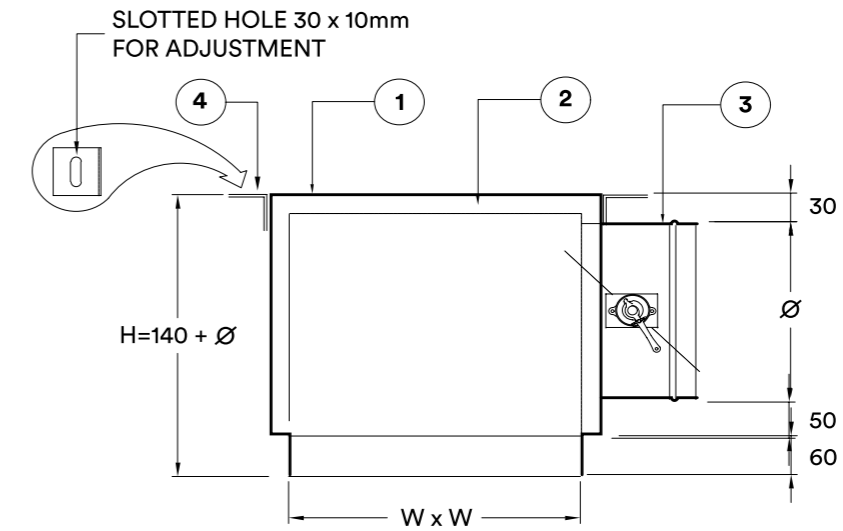
1 - Casing

2 - Acoustic Lining

3 - Spigot Inlet

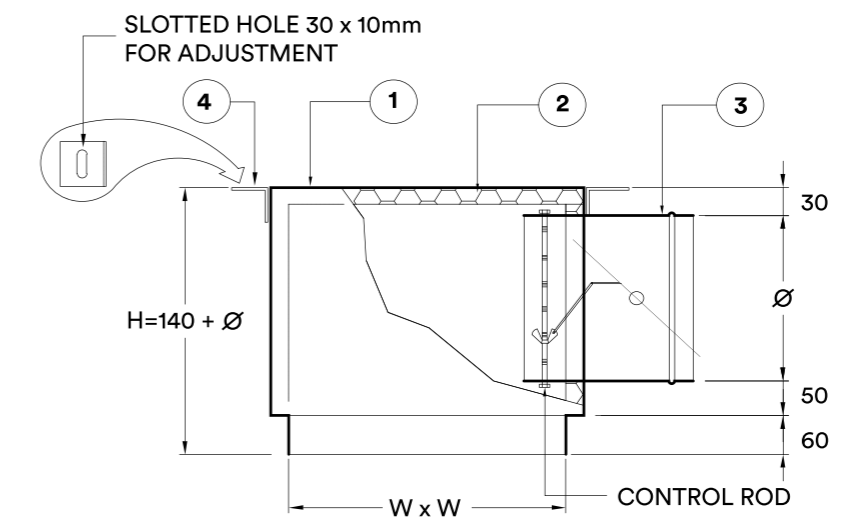
4 - Hanging Bracket

Plenum Box VK - 200



Plenum Box VK - 210

VK - 210 plenum box designed for square ceiling diffusers is suitable for supply and ducted return and exhaust air systems. The standard construction is built of galvanized steel sheet Ga.24, conform to ASTM A653, lock forming quality with 25mm thick acoustic lining, density 48kg/m³. The exposed surface of acoustic lining is with strong black Woven Glass Fiber Fabric (WGF) facing to avoid fiberglass erosion. The spigot inlet with built-in balancing damper can be adjusted from the face of diffuser.

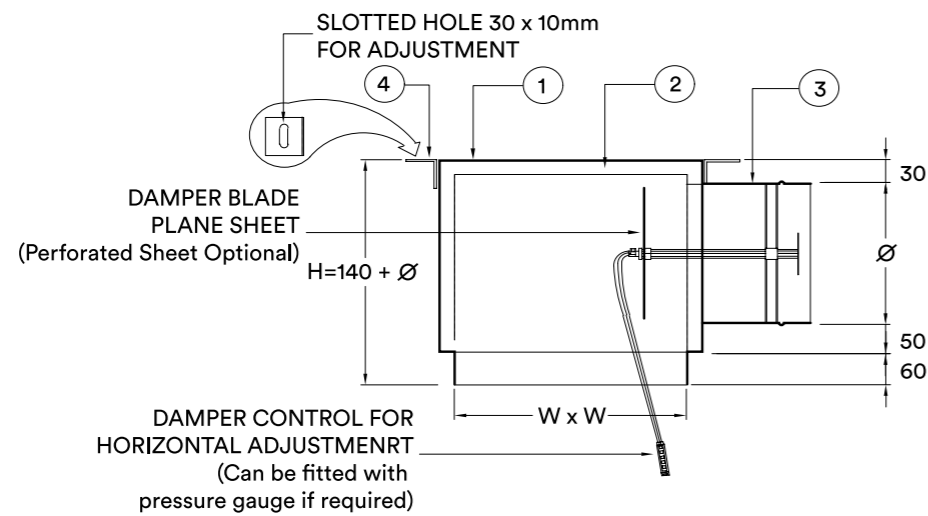


VK SERIES [VK - 200, VK - 210, VK - 220, VK - 230, VK - 240, VK - 250]

- 1 - Casing 2 -Acoustic Lining 3 - Spigot Inlet 4 - Hanging Bracket

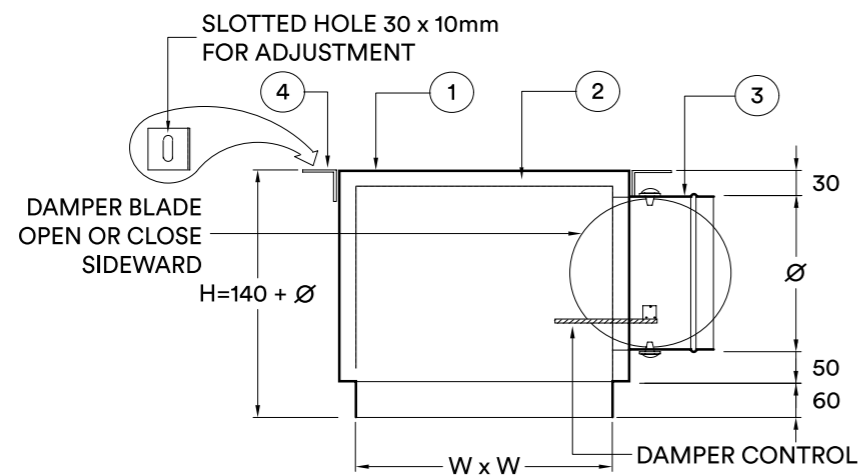
Plenum Box VK - 220

VK - 220 plenum box designed for square ceiling diffusers is suitable for supply and ducted return and exhaust air systems. The standard construction is built of galvanized steel sheet Ga.24, conform to ASTM A653, lock forming quality with 25mm thk. acoustic lining, density 48kg/m³. The exposed surface of acoustic lining is with strong black Woven Glass Fiber Fabric (WGF) facing to avoid fiberglass erosion. Spigot inlet with special damper adjustable horizontally with damper control on face of diffuser. A plastic tube is fitted to damper control for pressure test if required.



Plenum Box VK - 230

VK - 230 plenum box designed for square ceiling diffusers is suitable for supply and ducted return and exhaust air systems. The standard construction is built of galvanized steel sheet Ga.24, conform to ASTM A653, lock forming quality with 25mm thk. acoustic lining, density 48kg/m³. The exposed surface of acoustic lining is with strong black Woven Glass Fiber Fabric (WGF) facing to avoid fiberglass erosion. The spigot inlet with damper blade open and close sideward can be adjusted from the face of diffuser.

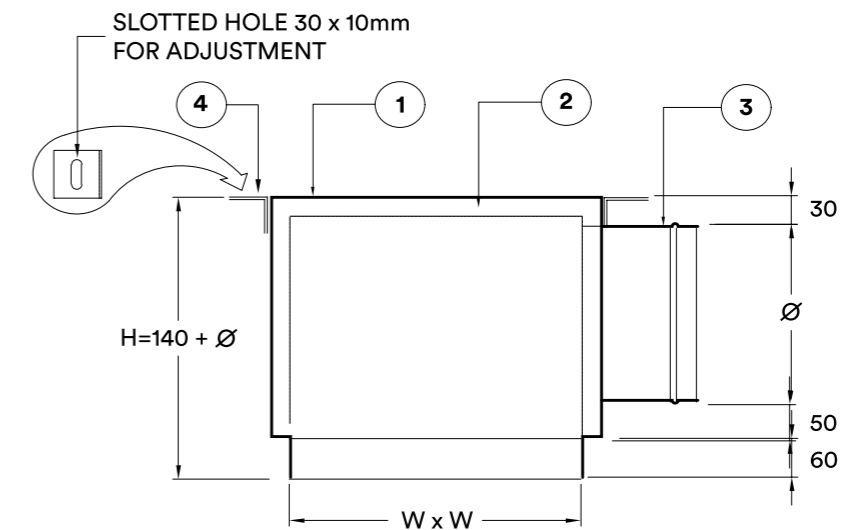


VK SERIES [VK - 200, VK - 210, VK - 220, VK - 230, VK - 240, VK - 250]

- 1 - Casing 2 -Acoustic Lining 3 - Spigot Inlet 4 - Hanging Bracket

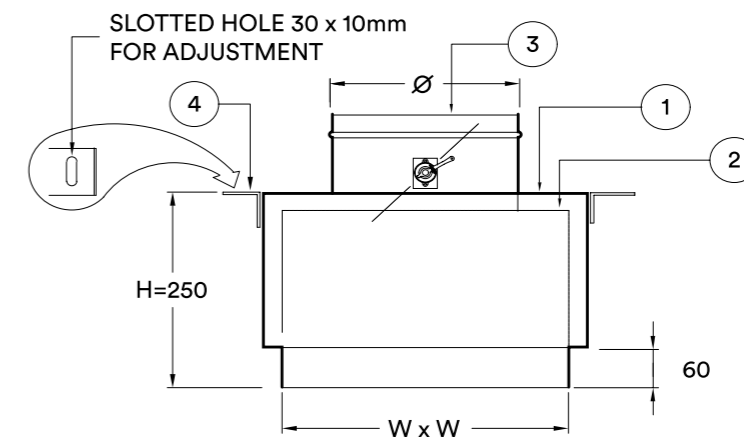
Plenum Box VK - 240

VK - 240 plenum box designed for square ceiling diffusers is suitable for supply and ducted return and exhaust air systems. The standard construction is built of galvanized steel sheet Ga.24, conform to ASTM A653, lock forming quality with 25mm thk. acoustic lining, density 48kg/m³. The exposed surface of acoustic lining is with strong black Woven Glass Fiber Fabric (WGF) facing to avoid fiberglass erosion. The spigot inlet is without balancing damper.

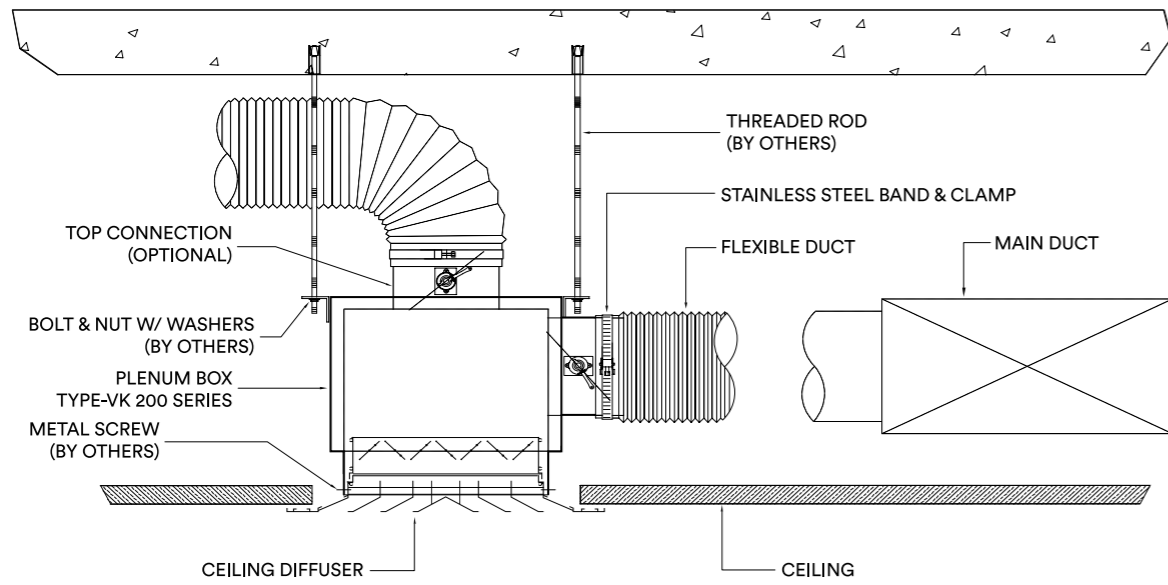


Plenum Box VK - 250

VK - 250 plenum box designed for square ceiling diffusers is suitable for supply and ducted return and exhaust air systems. The standard construction is built of galvanized steel sheet Ga.24, conform to ASTM A653, lock forming quality with 25mm thk. acoustic lining, density 48kg/m³. The exposed surface of acoustic lining is with strong black Woven Glass Fiber Fabric (WGF) facing to avoid fiberglass erosion. The spigot inlet with balancing damper fixed on top side of the plenum box is a good application for limited space where side connection is not possible.



Installation Details



VK - 200...210...220...230...240...250

Sizes of Plenum Box

Item No.	Diffuser Neck Size (mm)	Plenum Size W x W (mm)	Spigot Inlet Dia (mm)
1	150 x 150	155 x 155	100
2	225 x 225	230 x 230	150
3	300 x 300	305 x 305	200
4	375 x 375	380 x 380	250
5	450 x 450	455 x 455	300
6	460 x 460	465 x 465	300

Order Reference Details

Product Code: VK-2.. - Size / Spigot Inlet

VK-200	_____	_____	_____
VK-210	_____	_____	_____
VK-220	_____	_____	_____
VK-230	_____	_____	_____
VK-240	_____	_____	_____
VK-250	_____	_____	_____
305 x 305	_____	_____	_____
200 Dia	_____	_____	_____

NOTE

Spigot inlet diameter can be of any size as per the requirements of the customer.

Make : SAFID
 Type : VK-200 - 155 x 155 / 100
 Qty. : 1 pc

