

Ceiling Swirl Diffusers

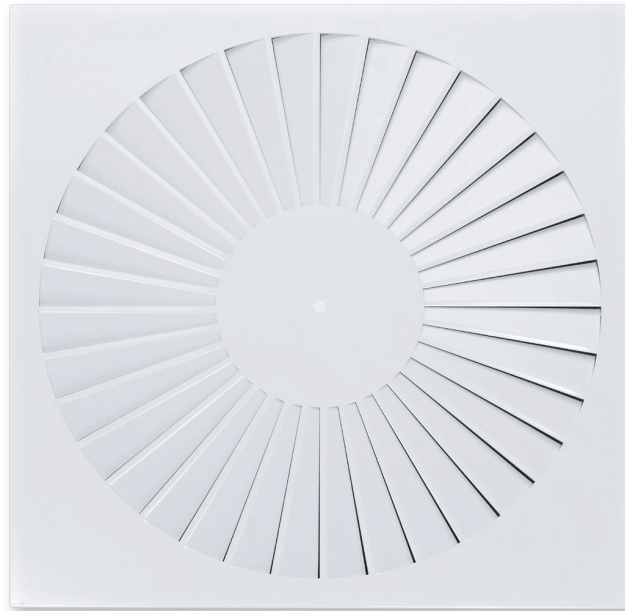
Type FD



Plenum box with damper blade and square diffuser face



Horizontal swirling air discharge



For comfort zones, with fixed air control blades

Circular and square ceiling swirl diffusers for high room air change rates

- Nominal sizes 300, 400, 500, 600, 625
- Volume flow rate range 9 – 225 l/s or 31 – 810 m³/h
- Diffuser face made of galvanised sheet steel, powder coated
- For supply and extract air
- For variable and constant volume flows
- For all types of ceiling systems, and with an extended border also suitable for freely suspended installation
- High induction results in a rapid reduction of the temperature difference and airflow velocity
- Air change rates of up to 35 per hour can be achieved by arranging several diffusers in a row with a minimum pitch of 0.9 m (centre line to centre line)
- Ideal for comfort zones

Optional equipment and accessories

- Exposed diffuser face available in RAL CLASSIC colours
- Horizontal or vertical duct connection
- Inner insulation

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Application

Application

- Type FD ceiling swirl diffusers are used as supply air or extract air diffusers for comfort zones
- Attractive design element for building owners and architects with demanding aesthetic requirements
- Horizontal swirling supply 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 -12 to +10 K
- For room heights up to 4 m (lower edge of suspended ceiling)
- For all types of ceiling systems
- With an extended border also suitable for freely suspended installation (supply air variant)

Special characteristics

- High induction results in a rapid reduction of the supply air to room air temperature difference and airflow velocity
- For all types of ceiling systems, and with an extended border also suitable for freely suspended installation
- Horizontal or vertical duct connection
- Air change rates of up to 35 per hour can be achieved by arranging several diffusers in a row with a minimum pitch of 0.9 m (centre line to centre line)

Nominal sizes

- 300, 400, 500, 600, 625

Description

Variants

- FD-Q : Square diffuser face
- FD-R : Circular diffuser face
- FD*-Z : Supply air
- FD*-A : Extract air

Connection

- H : Horizontal duct connection
- V : Vertical duct connection

Parts and characteristics

- Circular or square diffuser face
- Diffuser face with radially arranged fixed air control blades
- Plenum box for supply air, with an optimised equalising element that ensures a uniform airflow through the diffuser face
- Simple installation of the diffuser face due to central fixing screw with decorative cap
- Damper blade for volume flow rate balancing (optional)

Attachments

- M : Damper blade for volume flow rate balancing

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180

Materials and surfaces

- Diffuser face made of galvanised sheet steel
- V, H: Plenum box and cross bar made of galvanised sheet steel
- Plenum box made of galvanised sheet steel
- Diffuser face powder coated RAL 9010, pure white
- P1: Powder coated, RAL CLASSIC colour

Internal thermal insulation

- Fire retardant thermal insulation materials
 - 6mm thick rubber foam lining

Standards and guidelines

- Sound power level of the air-regenerated noise measured according to EN ISO 5135

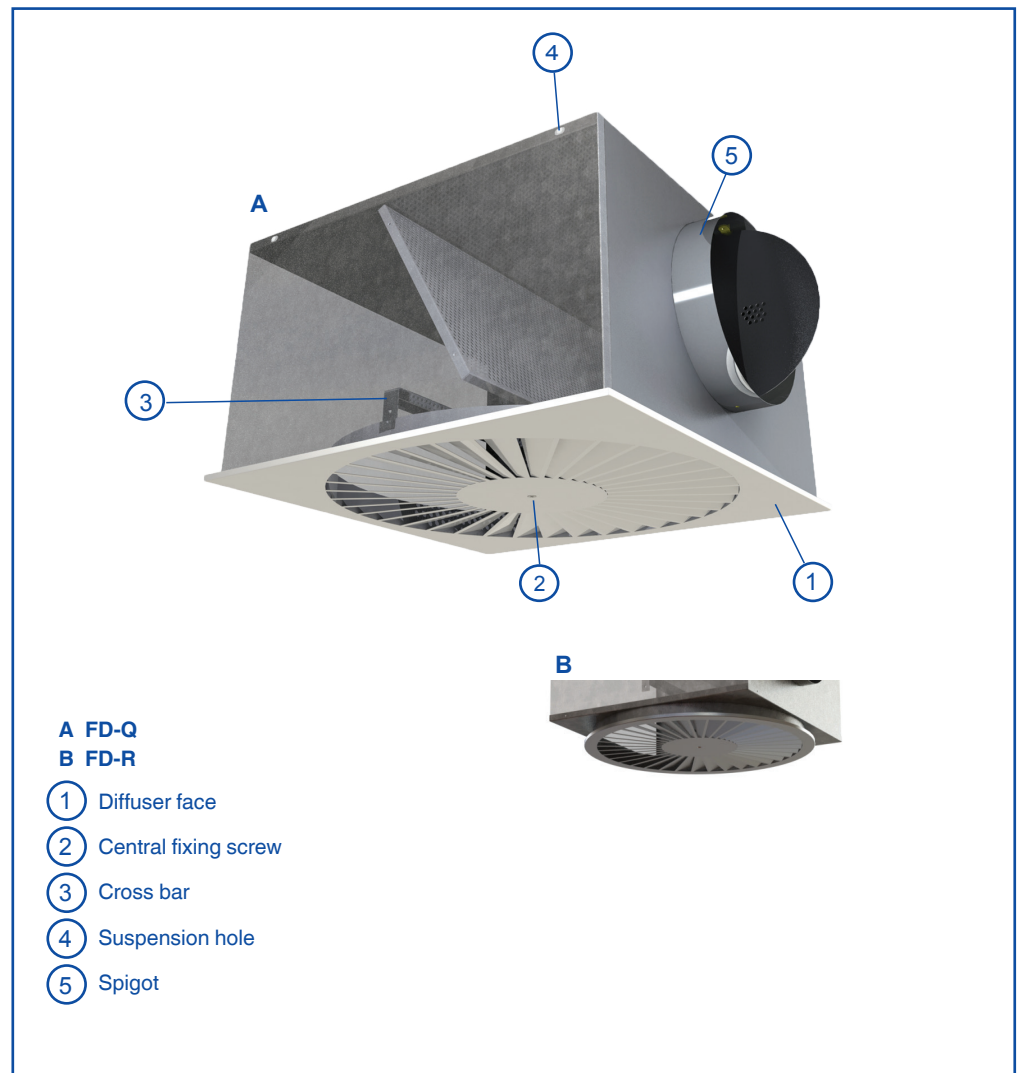
Functional description

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.

Type FD ceiling swirl diffusers have fixed blades. Air discharge is horizontal omni directional. The supply air to room air temperature difference may range from -12 to $+10$ K.

A damper blade (optional) simplifies volume flow rate balancing for commissioning. To give rooms an aesthetic, uniform look, type FD diffusers may also be used for extract air.

Schematic illustration of the FD, with plenum box for horizontal duct connection



Technical data

Nominal sizes	300, 400, 500, 600, 625 mm
Minimum volume flow rate, with $\Delta t_z = -6$ K	9 – 28 l/s or 31 – 102 m ³ /h
Maximum volume flow rate, with $L_{WA} \cong 50$ dB(A)	70 – 235 l/s or 252 – 846 m ³ /h
Supply air to room air temperature difference	-12 to +10 K

Quick sizing

Quick sizing 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°. Exact values for all parameters can be determined with our Easy Product Finder design programme.

FD-*-Z-H (supply air), sound power level and total differential pressure

Nominal size	\dot{V} l/s	\dot{V} m ³ /h	Damper blade position					
			0°		45°		90°	
			ΔP_t Pa	L_{WA} dB(A)	ΔP_t Pa	L_{WA} dB(A)	ΔP_t Pa	L_{WA} dB(A)
300	9	31	1	<15	1	<15	2	<15
	35	126	13	28	17	27	27	27
	55	198	31	39	41	40	67	39
	80	288	67	50	87	54	142	54
400	16	59	1	<15	1	<15	2	<15
	60	216	10	24	14	25	27	26
	105	378	32	39	42	40	83	44
	145	522	60	50	81	53	158	57
500	24	85	1	<15	2	<15	4	<15
	80	288	12	24	19	26	43	29
	135	486	33	39	53	41	123	45
	185	666	62	50	99	54	231	58
600, 625	28	102	1	<15	1	<15	3	<15
	95	342	10	25	15	25	29	24
	160	576	28	39	41	40	81	39
	225	810	55	50	81	52	160	53

Note

0° : Damper blade position fully open

FD-*-Z-V (supply air), sound power level and total differential pressure

Nominal size	\dot{V}	\dot{V}	Damper blade position					
			0°		45°		90°	
			ΔP_t	L_{WA}	ΔP_t	L_{WA}	ΔP_t	L_{WA}
			Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
	l/s	m ³ /h						
300	9	31	1	<15	1	<15	2	<15
	30	108	9	25	11	25	19	25
	50	180	26	38	32	38	54	38
	70	252	51	49	62	49	106	49
400	16	59	1	<15	1	<15	2	<15
	60	216	10	24	13	23	23	24
	105	378	31	39	40	39	72	42
	145	522	60	50	77	51	138	55
500	24	85	1	<15	1	<15	4	<15
	80	288	11	24	14	23	44	29
	130	468	28	38	36	39	117	44
	180	648	54	50	70	53	223	56
600, 625	28	102	1	<15	1	<15	2	<15
	95	342	9	25	12	24	28	27
	160	576	26	40	35	41	78	44
	220	792	50	51	67	55	148	57

Note

0° : Damper blade position fully open

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme

Ceiling swirl diffusers with square or circular diffuser face. Supply air and extract air variants for comfort zones. Diffuser face with fixed air control blades for horizontal swirling supply air discharge creating high induction levels. For installation into all types of suspended ceilings. Ready to install component which consists of the casing, diffuser face, spigot, and a cross bar to which the diffuser face is fixed. The diffuser face is fixed to the cross bar with a central screw. Spigot suitable for ducts to EN 1506 or EN 13180. 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 supply air to room air temperature difference and airflow velocity
- For all types of ceiling systems, and with an extended border also suitable for freely suspended installation
- Horizontal or vertical duct connection
- Air change rates of up to 35 per hour can be achieved by arranging several diffusers in a row with a minimum pitch of 0.9 m (centre line to centre line)

Materials and surfaces

- Diffuser face made of galvanised sheet steel
- V, H: Plenum box and cross bar made of galvanised sheet steel
- Plenum box made of galvanised sheet steel
- Diffuser face powder coated RAL 9010, pure white
- P1: Powder coated, RAL CLASSIC colour

Technical data

- Nominal sizes: 300, 400, 500, 600, 625 mm
- Minimum volume flow rate, with $\Delta t_z = -6$ K: 9 – 28 l/s or 31 – 102 m³/h
- Maximum volume flow rate, with $L_{WA} \approx 50$ dB(A): 70 – 235 l/s or 252 – 846 m³/h
- Supply air to room air temperature difference: -12 to +10 K

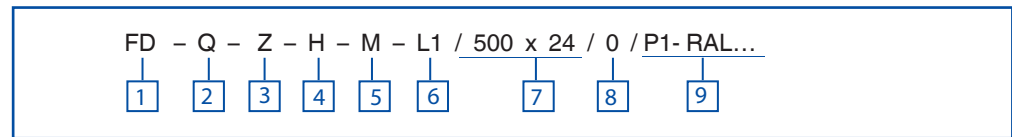
Sizing data

- V _____
[m³/h]
- Δp_t _____
[Pa]

Air-regenerated noise

- L_{WA} _____
[dB(A)]

FD



1 Type

FD Swirl diffuser

2 Construction style

R Circular
Q Square

3 System

Z Supply air
A Extract air

4 Connection

H Horizontal
V Vertical

5 Damper blade for volume flow rate balancing

No entry: without damper blade
M With

6 Internal Lining

No entry: No Internal insulation (Standard)
L1 6mm thick rubber foam

7 Nominal size (mm)

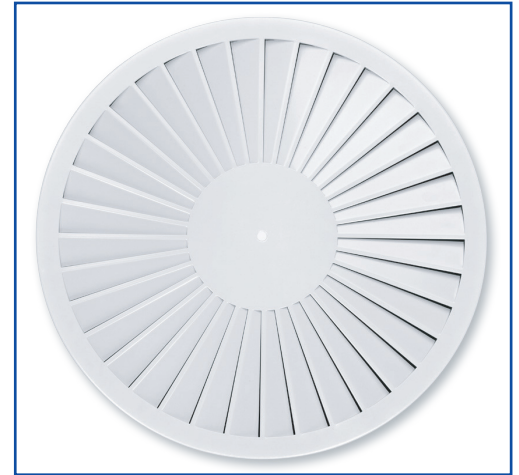
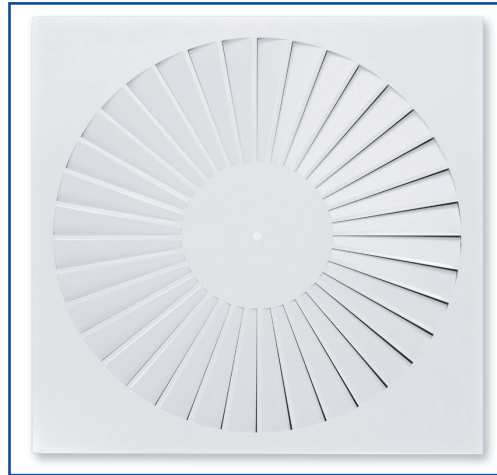
300
400
500
600
625

8 Colour of air control blades

No entry: powder coated RAL 9010, pure white
P1 Powder coated, specify RAL CLASSIC color

Order example : FD-Q-Z-V-M-L1/600/P1-RAL9006

Construction style	Square
System	Supply air
Connection	Vertical
Damper blade for volume flow rate balancing	With damper blade
Internal lining	6mm thick rubber foam lining
Nominal size	600
Exposed surface	RAL 9006, white aluminium



FD-Q...-H

Variant

- Ceiling swirl diffuser with square diffuser face
- With plenum box for horizontal duct connection

Nominal sizes

- 300, 400, 500, 600, 625

Parts and characteristics

- Square diffuser face
- Plenum box for horizontal duct connection
- Square opening to accommodate the diffuser face

- Equalising element that ensures a uniform airflow through the diffuser face (supply air variant)
- Simple installation of the diffuser face due to central fixing screw with decorative cap
- Damper blade for volume flow rate balancing (optional)

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180

FD-Q...-V

Variant

- Ceiling swirl diffuser with square diffuser face
- With plenum box for vertical duct connection

Nominal sizes

- 300, 400, 500, 600, 625

Parts and characteristics

- Square diffuser face
- Plenum box for vertical duct connection
- Square opening to accommodate the diffuser face

- Equalising element that ensures a uniform airflow through the diffuser face (supply air variant)
- Simple installation of the diffuser face due to central fixing screw with decorative cap
- Damper blade for volume flow rate balancing (optional)

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN13180

FD-R-...-H

Variant

- Ceiling swirl diffuser with circular diffuser face
- With plenum box for horizontal duct connection

Nominal sizes

- 300, 400, 500, 600, 625

Parts and characteristics

- Circular diffuser face
- Plenum box for horizontal duct connection
- Circular opening to accommodate the diffuser face

- Equalising element that ensures a uniform airflow through the diffuser face (supply air variant)
- Simple installation of the diffuser face due to central fixing screw with decorative cap
- Damper blade for volume flow rate balancing (optional)

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180

FD-R-...-V

Variant

- Ceiling swirl diffuser with circular diffuser face
- With plenum box for vertical duct connection

Nominal sizes

- 300, 400, 500, 600, 625

Parts and characteristics

- Circular diffuser face
- Plenum box for vertical duct connection
- Circular opening to accommodate the diffuser face

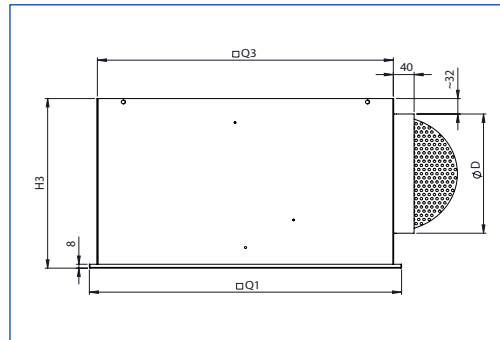
- Equalising element that ensures a uniform airflow through the diffuser face (supply air variant)
- Simple installation of the diffuser face due to central fixing screw with decorative cap
- Damper blade for volume flow rate balancing (optional)

Construction features

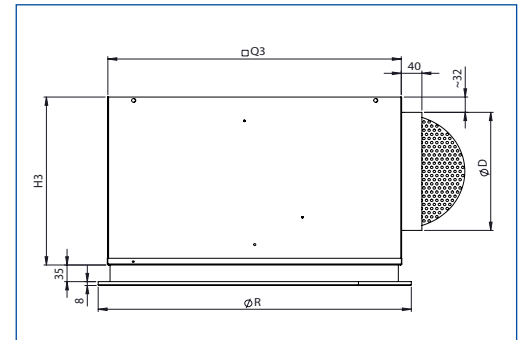
- Spigot suitable for circular ducts to EN 1506 or EN13180

Diffuser face with plenum box for horizontal duct connection

FD-Q--H



FD-R--H

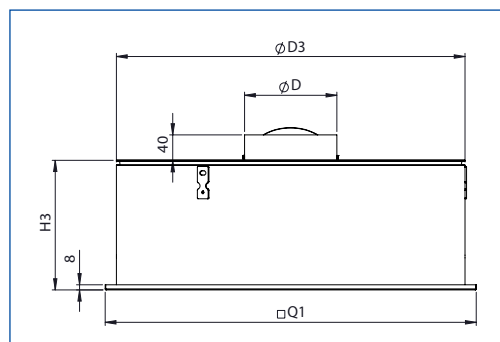


Nominal size	□Q1	□Q3	H3	ØD	AK Code, diffuser face		Weight (kg)
	mm				Square (Q)	Circular (R)	
300	298	290	257	158	AK-Uni-001	AK-Uni-013	4.0
400	398	372	302	198	AK-Uni-002	AK-Uni-014	6.2
500	498	476	302	198	AK-Uni-003	AK-Uni-015	8.5
600	598	567	352	248	AK-Uni-004	AK-Uni-016	11.6
625	623	567	352	248	AK-Uni-004	AK-Uni-016	11.9

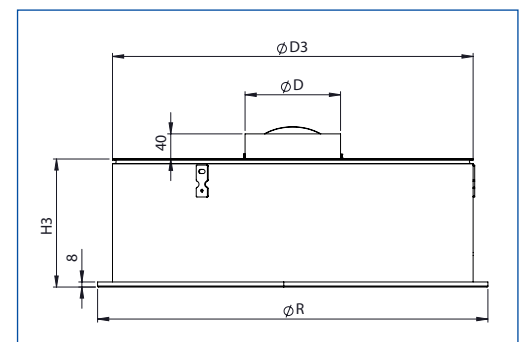
Weights apply to the supply air variant

Diffuser face with plenum box for vertical duct connection

FD-Q--V

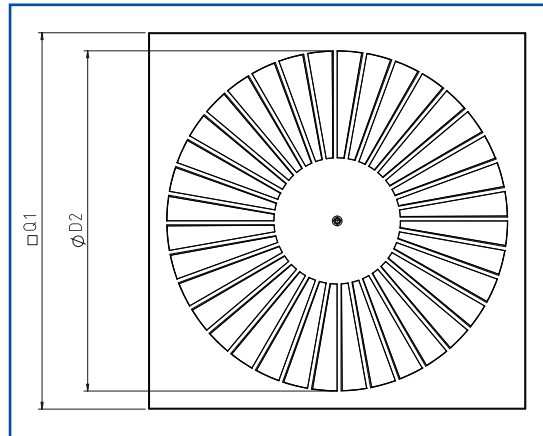


FD-R--V



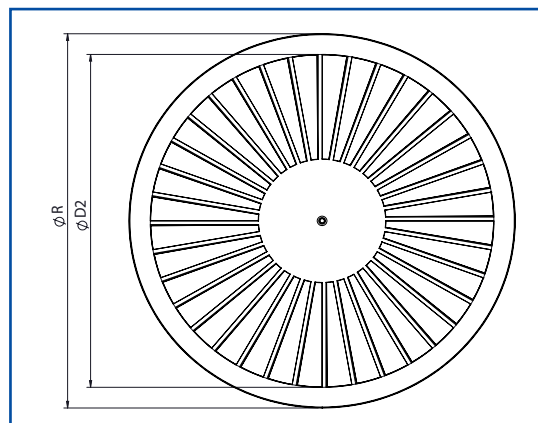
Nominal size	□Q1	ØD3	H3	ØD	Weight (kg)
	mm				
300	298	280	200	158	3.0
400	398	364	200	198	4.7
500	498	462	200	198	6.7
600	598	559	200	248	8.9
625	623	559	200	248	9.2

Diffuser face FD-Q



Nominal size	□Q1	ØD2	A _{eff}
	mm	mm	m ²
300	298	250	0.0088
400	398	350	0.0180
500	498	450	0.0251
600	598	538	0.0295
623	623	538	0.0295

Diffuser face FD-R



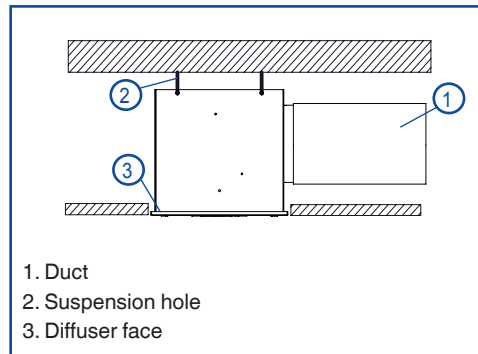
Nominal size	ØR	ØD2	A _{eff}
	mm	mm	m ²
300	300	250	0.0088
400	400	350	0.0180
500	500	450	0.0251
600	600	538	0.0295
625	623	538	0.0295

Installation and commissioning

- Preferably for rooms with a clear height up to 4.0 m
- Flush ceiling installation
- Freely suspended installation only with an extended border (supply air variant)
- Horizontal or vertical duct connection
- If necessary, carry out volume flow rate balancing with the damper blade

These are only schematic diagrams to illustrate installation details.

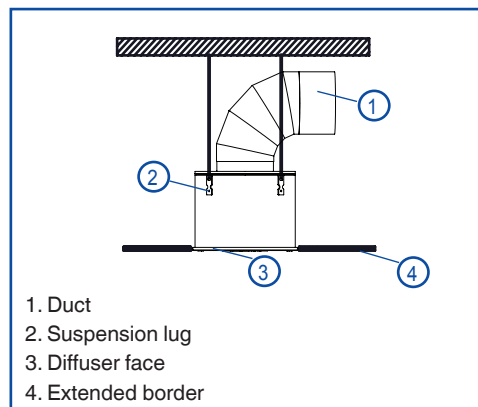
Flush ceiling installation with square plenum box



1. Duct
2. Suspension hole
3. Diffuser face

- Horizontal duct connection
- Four suspension holes
- Suspension with cords, wires or hangers, to be provided by others

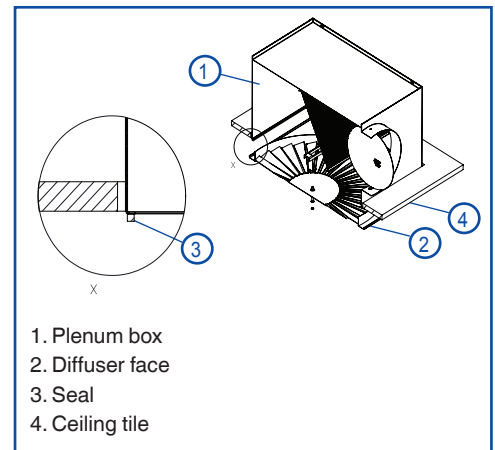
Freely suspended installation



1. Duct
2. Suspension lug
3. Diffuser face
4. Extended border

- Vertical duct connection
- Three suspension lugs
- Suspension with cords, wires or hangers, to be provided by others

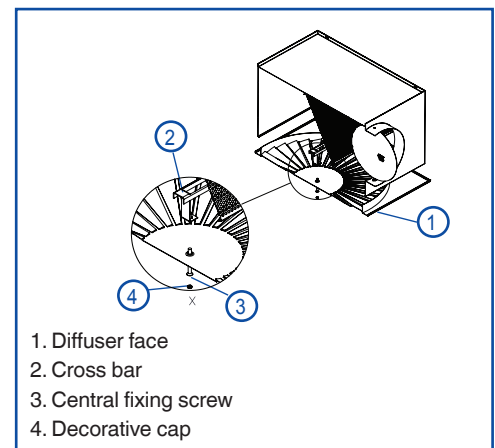
Diffuser face – sealing



1. Plenum box
2. Diffuser face
3. Seal
4. Ceiling tile

- 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

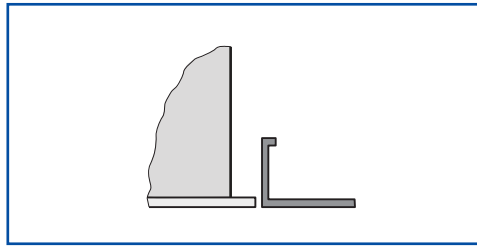


1. Diffuser face
2. Cross bar
3. Central fixing screw
4. Decorative cap

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

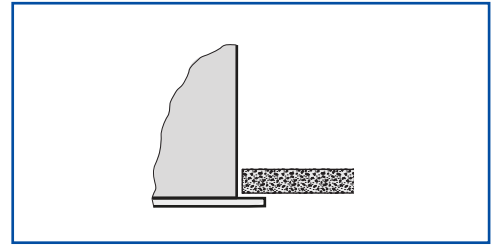
Ceiling systems

Installation into grid ceilings



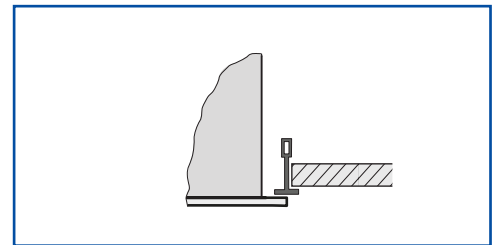
- Fix the plenum box to the ceiling
- The ceiling tile of the grid ceiling is independent of the ceiling diffuser
- Fix the diffuser face after the ceiling has been completed

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

Installation examples

Installation in T-bar ceilings



Installation in T-bar ceilings, arrangement in a row



Installation in continuous ceilings



Principal dimensions

 $\varnothing D$ (mm)

Outer diameter of the spigot

 $\varnothing D_2$ (mm)

Diameter of a circular diffuser face style

 $\varnothing D_3$ (mm)

Diameter of a circular plenum box

 $\varnothing R$ (mm)

Outer diameter of a circular diffuser face

 $\square Q_1$ (mm)

Outer diameter of a square diffuser face

 $\square Q_3$ (mm)

Dimensions of a square plenum box

 H_3 (mm)

Height of a ceiling diffuser with plenum box, from the lower edge of the suspended ceiling to the upper edge of the plenum box.

Nomenclature

 L_{WA} dB(A)

A weighted sound power level of air-regenerated noise

 V (m³/h) and (l/s)

Volume flow rate

 Δt_z (K)

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

 ΔP_t [Pa]

Total differential pressure

 A_{eff} [m²]

Effective air discharge area

All sound power levels are based on 1 pW.