

Swirl Diffusers

Type VDW



Horizontal swirling
air discharge



Horizontal one-way
air discharge



Horizontal two-way
air discharge



ECOVENT AIR SYSTEMS
INNOVATIVE AIR SOLUTIONS

With low sound power level for comfort zones, with individually manually adjustable air control blades

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

- Nominal sizes 300, 400, 500, 600, 625, 825
- Volume flow rate range 7 – 470 l/s or 25 – 1692 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, air control blades in black or white
- Horizontal or vertical duct connection
- Inner insulation

Type		Page
VDW	General Information	2 & 3
	Function . Technical data	4 - 6
	Quick Sizing	7 & 8
	Specification text	9
	Order code	10
	Variants	11
	Dimension and weight . Product details	12 & 13
	Installation details . Installation example	14 & 15
	Basic information and nomenclature	16

Application

Application

- Type VDW 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)
- Individually adjustable air control blades to meet individual requirements
- 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

- Air control blades can be adjusted individually manually for adjusting the air pattern
- For all types of ceiling systems, and with an extended border also suitable for freely suspended installation
- Black or white air control blades
- 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 × 8, 400 × 16, 500 × 24, 600 × 24, 600 × 48, 625 × 24, 625 × 54, 825 × 72



Description

Variants

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

Connection

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

Parts and characteristics

- Circular or square diffuser face
- Diffuser face with individually manually adjustable air control blades
- 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
- Air control blades made of plastic, UL 94, V-0, flame retardant
- Exposed diffuser face powder coated
- RAL 9010, pure white
- P1: Powder coated, RAL CLASSIC colour
- Air control blades for supply air similar to RAL 9005, black; extract air variant without air control blades
- Q11: Air control blades for extract air similar to RAL 9005, black
- Q21: Air control blades for supply air and extract air similar to RAL 9010, white

Maintenance

- Maintenance-free as construction and materials are not subject to wear

Internal thermal insulation

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



ECOVENT AIR SYSTEMS
INNOVATIVE AIR SOLUTIONS

Functional description

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 -12 to $+10$ K.

A damper blade (optional) simplifies volume flow rate balancing for commissioning. To give rooms an aesthetic, uniform look, type VDW diffusers may also be used for extract air. Air control blades are not required for extract air applications.

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.

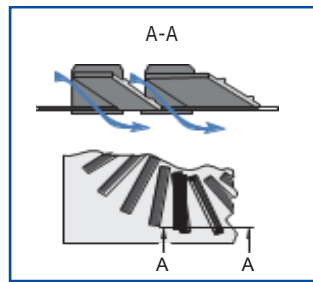
Type VDW ceiling swirl diffusers have adjustable air control blades. The air pattern can be adjusted to meet different local requirements.

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

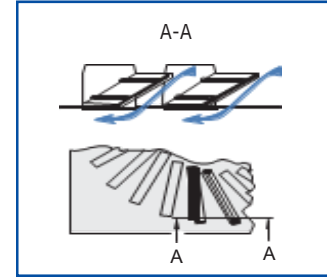


Air pattern

Air control blades set to external swirl



Air control blades set to internal swirl



Horizontal air discharge



Horizontal omni directional air discharge



Setting of the air control blades



All air control blades set to external swirl

Setting of the air control blades



Outer air control blades set to external swirl,
inner blades set to internal swirl

Horizontal one-way air discharge



Setting of the air control blades

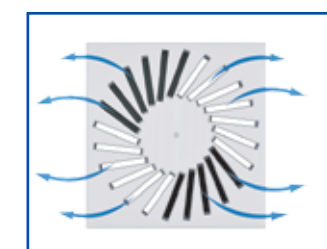


Air control blades set to internal and external
swirl per half circle

Horizontal two-way air discharge

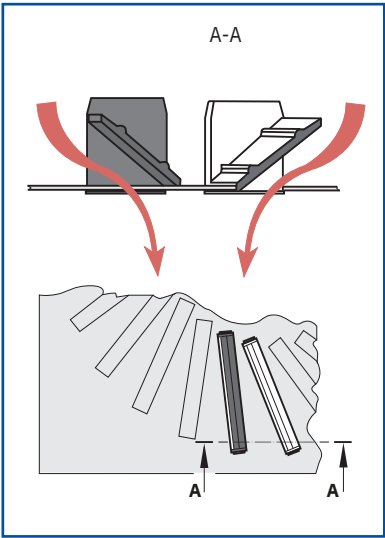


Setting of the air control blades



Vertical air discharge

Air control blades set to vertical air



Vertical air discharge



Setting of the air control blades



Air control blades set alternatively to internal and external swirl

Technical data

	Nominal sizes	300, 400, 500, 600, 625, 825 mm
Minimum volume flow rate, with $\Delta t Z = -6$ K		79 l/s or 25 – 357 m³/h
Maximum volume flow rate, with L W A $\cong 50$ dB(A)		80 – 470 l/s or 288 – 1692 m³/h
Supply air to room air temperature difference		-12 to +10 K

*Technical data selection is only applicable for standard plenum box

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 -6K. 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 design programme.

VDW-...-Z-H (supply air). Sound power level and total differential pressure

Nominal size	Damper blade position							
	Airflow, V 0° 45° 90°							
	ΔPt LWA		ΔPt LWA		ΔPt LWA		ΔPt LWA	
	l/s cmh	Pa dB(A)	Pa dB(A)	Pa dB(A)	Pa dB(A)	Pa dB(A)	Pa dB(A)	Pa dB(A)
300 x 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 x 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 x 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 x 24 625 x 24	28	107	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 x 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 x 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 x 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

VDW-...-Z-V (supply air), sound power level and total differential pressure

Nominal size	Damper blade position							
	Airflow, V 0° 45° 90°							
	ΔPt	LWA	ΔPt	LWA	ΔPt	LWA	ΔPt	LWA
	l/s	cmh	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
300 x 8	7	26	1	<15	1	<15	1	<15
	30	108	12	20	14	20	22	21
	55	198	41	38	46	38	74	39
	80	288	87	50	98	51	157	52
400 x 16	13	46	1	<15	1	<15	1	<15
	55	198	11	21	13	20	26	20
	100	360	38	39	44	40	85	40
	140	504	74	50	86	51	167	52
500 x 24	19	70	1	<15	1	<15	3	<15
	70	252	10	18	14	21	35	24
	125	450	31	36	45	40	112	43
	180	648	65	50	94	54	233	59
600 x 24	28	102	1	<15	1	<15	2	<15
	100	360	10	22	13	23	30	26
	170	612	28	38	38	40	87	43
	240	864	56	50	75	54	174	57
600 x 48	40	145	1	<15	2	<15	4	<15
	120	432	10	22	16	26	39	31
	200	720	27	38	43	44	109	48
	280	1008	53	50	85	58	214	63
625 x 54	52	186	2	<15	3	<15	7	<15
	130	468	10	23	16	26	42	33
	210	756	27	38	42	44	109	49
	290	1044	51	50	81	59	208	62
825 x 72	99	357	3	<15	4	<15	10	<15
	210	756	11	25	17	27	46	28
	320	1152	26	39	39	42	107	42
	430	1548	47	50	70	55	193	54

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, for a maximum air change rate of 35 per hour. Diffuser face with individually manually adjustable 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 diffuser face with radially arranged, individually adjustable black or white air control blades, and of a plenum box, equalising element (only supply air variants), side entry or top entry spigot, cross bar, and suspension holes or suspension lugs. The diffuser face is fixed to the cross bar with a central screw, concealed by a decorative cap. 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

- Air control blades can be adjusted individually manually for adjusting the air pattern
- For all types of ceiling systems, and with an extended border also suitable for freely suspended installation
- Black or white air control blades
- 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
- Air control blades made of plastic, UL 94, V-0, flame retardant
- Exposed diffuser face powder-coated
- RAL 9010, pure white
- P1: Powder-coated, RAL CLASSIC colour
- Air control blades for supply air similar to RAL 9005, black; extract air variant without air control blades
- Q11: Air control blades for extract air similar to RAL 9005, black
- Q21: Air control blades for supply air and extract air similar to RAL 9010, white

Technical data

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

Sizing data

- V
[m³/h]
- ΔP_t
[Pa]
- Air-regenerated noise
- LWA
[dB(A)]



ENVIRONMENTAL AIR SOLUTIONS

VDW

VDW – Q – Z – H – M – L1 / 500 x 24 / 0 / P1- RAL...

1

2

3

4

5

6

7

8

9

- 1

Type
VDW 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 x 8
400 x16
500 x 24
600 x 24
600 x 48
625 x 24
VDW-Q only
625 x 54
825 x 72
- 8

Colour of air control blades

No entry : supply air – black air control blades, extract air – no air control blades
Q11 Extract air – black air control blades
Q21 Supply air – white air control blades
Extract air – white air control blades
- 9

Exposed surface

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



Order example : VDW-Q-Z-H-M-L1/600x24/Q21/P1-RAL9006
Construction style Square System Supply air Connection Horizontal Damper blade for volume flow rate balancing with damper blade Internal lining 6mm thick rubber foam lining Nominal size 600 x 24 Colour of air control blades White Exposed surface RAL 9006, white aluminium

VDW-Q-Z/300x8 VDW-Q-Z/400x16



VDW-Q-Z/500x24



VDW-Q-Z/600x24



VDW-Q-Z/600x48 VDW-Q-Z/625x24



VDW-Q-Z/625x54



VDW-Q-Z/825x72



VDW-Q-..._H

Variant

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

Nominal sizes

- 300 × 8, 400 × 16, 500 × 24, 600 × 24, 600 × 48, 625 × 24, 625 × 54, 825 × 72

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



VDW-Q-...-V

Variant

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

Nominal sizes

- 300 × 8, 400 × 16, 500 × 24, 600 × 24, 600 × 48, 625 × 24, 625 × 54, 825 × 72

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)

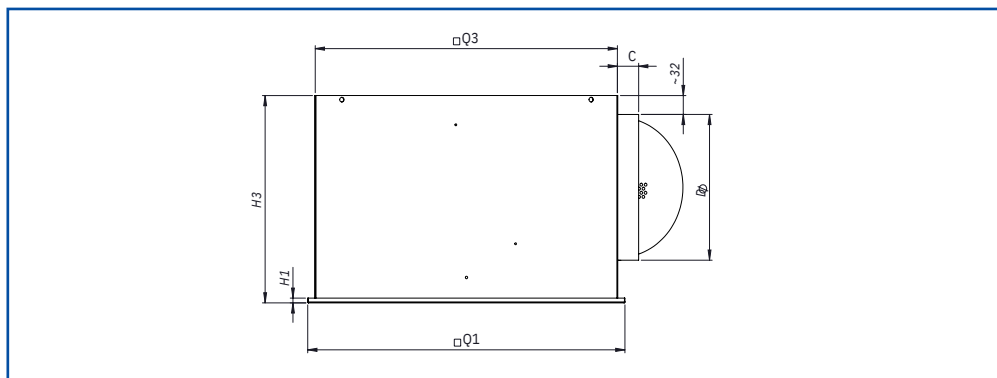
- Simple installation of the diffuser face due to central fixing screw with decorative cap

- Damper blade for volume flow rate balancing (optional)

Construction features

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

Square diffuser face with plenum box for horizontal duct connection



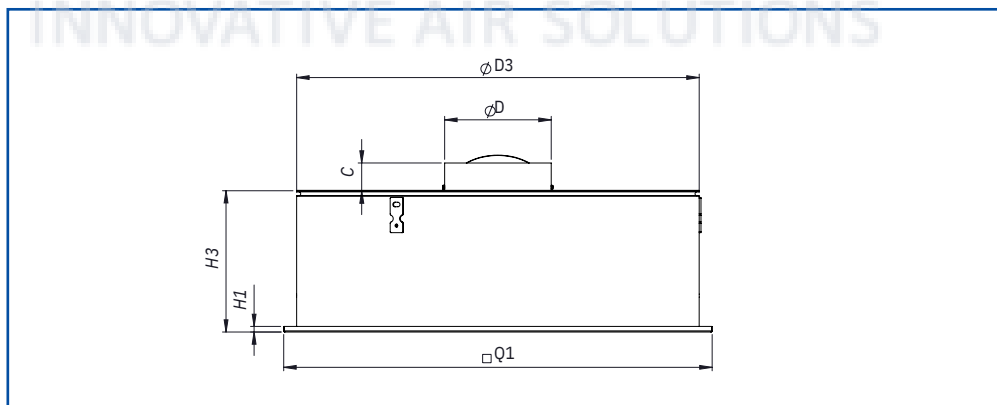
VDW-Q-...-H

Nominal size	□Q1	H1	□Q3	H3	ØD	C	Plenum box (kg)	Weight
300 x 8	298				8 290	250 158 40	AK-001	3.7
400 x 16	398				8 372	295 198 40	AK-002	5.7
500 x 24	498				8 476	295 198 40	AK-003	7.8
600 x 24	598				8 567	345 248 40	AK-004	11.1
600 x 48	598				8 590	345 248 40	AK-005	11.4
625 x 24	623				8 567	345 248 40	AK-004	11.3
625 x 54	623				8 615	345 248 40	AK-006	12.0
825 x 72	825				8 806	410 313 40	AK-007	21.2



Weights apply to the supply air variant

Square diffuser face with plenum box for vertical duct connection

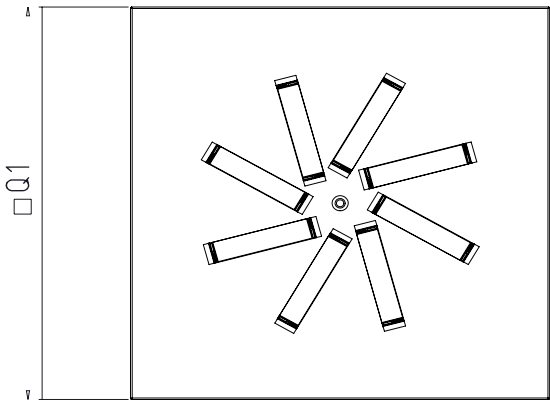


VDW-Q-...-V

size mm (kg)			Nominal□Q1 H1 □D3 H3 ØD C Weight					
				300 x	8298	8 280	200 158	40 2.7
				400 x	16398	8 364	200 198	40 4.2
				500 x	24498	8 462	200 198	40 6.0
				600 x	24598	8 559	200 248	40 8.4
				600 x	48598	8 580	300 248	40 9.6
				625 x	24623	8 559	200 248	40 8.6
				625 x	54623	8 605	300 248	40 10.3
				825 x	72825	8 796	300 313	40 16.2

Weights apply to the supply air variant

Diffuser face VDW-Q



Standard

Nominal size	□ Q	n	Aef
	1		f
300 x 8	mm	298 8 0.0070	m²
400 x		398 16 0.0140	
16 500		498 24 0.0210	
x 24	598 24 0.0295		
600 x	598 48 0.0390	623 24	
24 600	0.0295 623 54 0.0470 825		
x 48	72 0.0730		
625 x			
24 625			
x 54			
825 x			
72			

Standard Plus

Nominal size	□ Q	n	Aef
	1		f
400 x 8 398 500 x	8 0.0070 m²	8	
8 498 600 x 8 598	0.0070		
500 x 16 498 600 x	8 0.0070		
16 598	16 0.0140		
	16 0.0140		

Note
n = no. of air control blade

Installation and commissioning

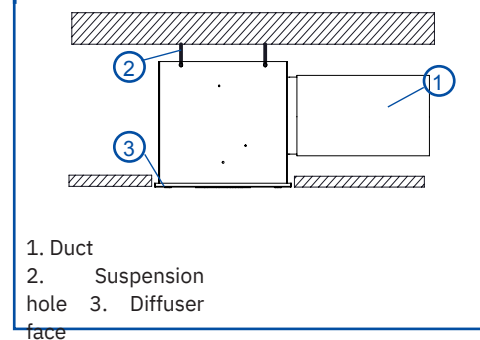
- Preferably for rooms with a clear height up to 4.0 m
- Flush ceiling installation
- Freely suspended installation only with an extended border (supply air variant)
- Horizontal or vertical duct connection
- If necessary, carry out volume flow rate balancing with the damper blade

These are only schematic diagrams to

illustrate

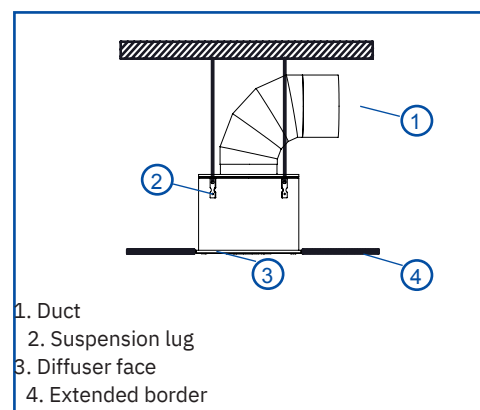
installation details.

Flush ceiling installation with square plenum box



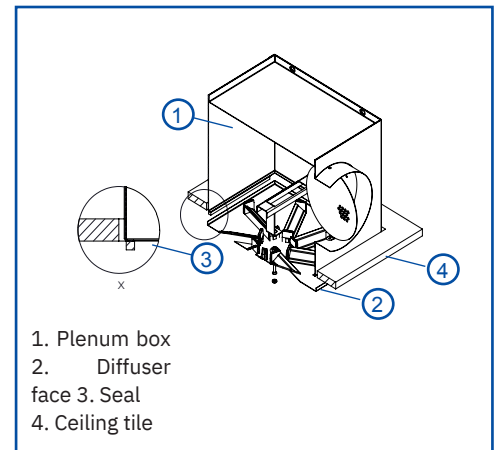
- Horizontal duct connection
- Four suspension holes
- Suspension with cords, wires or hangers, to be provided by others

Freely suspended installation



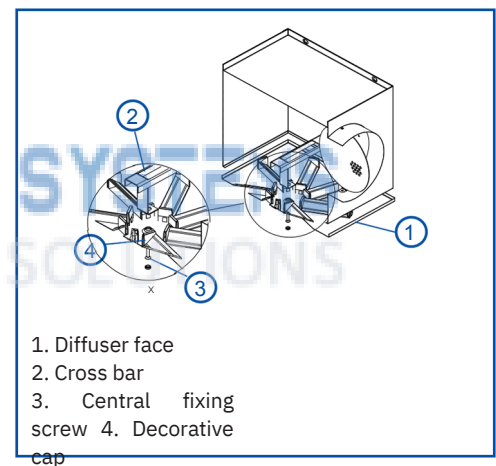
- Vertical duct connection
- Three suspension lugs
- Suspension with cords, wires or hangers, to be provided by others

Diffuser face – sealing



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

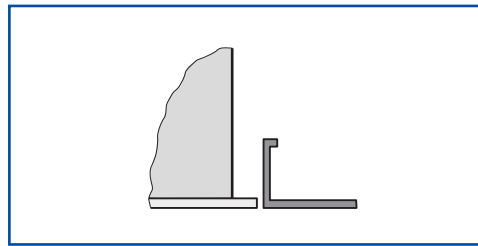
Diffuser face – central screw fixing



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

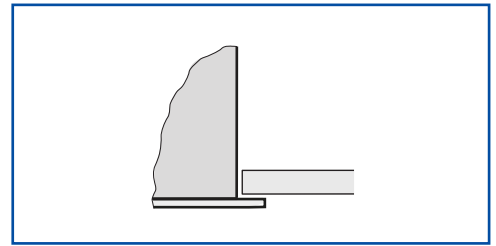
Ceiling systems

Installation into grid ceilings



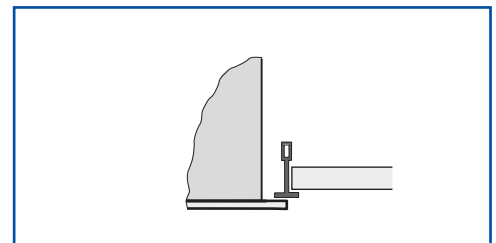
- Fix the plenum box to the ceiling
- The ceiling tile of the grid ceiling is independent of the ceiling diffuser
- Fix the diffuser face after the ceiling has been completed

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



ECOVENT AIR SYSTEMS
INNOVATIVE AIR SOLUTIONS

Installation examples

Installation in T-bar ceilings



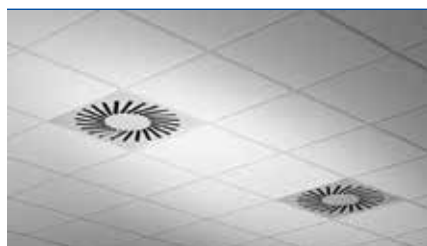
VDW-Q with black air control blades

Installation in T-bar ceilings



VDW-Q with white air control blades

Installation in T-bar ceilings, arrangement in a row



Principal dimensions

$\varnothing D$ (mm)

Outer diameter of the spigot

$\varnothing D_3$ (mm)

Diameter of a circular plenum box

$\square Q_1$ (mm)

Outer diameter of a square diffuser face

$\square Q_3$ (mm)

Dimensions of a square plenum box

H_1 (mm)

Distance (height) from the lower edge of the suspended ceiling to the lower edge of the diffuser face

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.

C (mm)

Length of the spigot

Nomenclature

LWA dB(A)

A weighted sound power level of air-regenerated noise

ΔPt [Pa]

Total differential pressure

V (m³/h) and l/s

Volume flow rate

A_{eff} [m²]

Effective air discharge area

$\Delta t Z$ (K)

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

All sound power levels are based on 1 pW.



ECOVENT AIR SYSTEMS
INNOVATIVE AIR SOLUTIONS