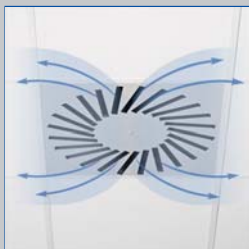




Horizontal swirling air discharge



Horizontal one-way air discharge



Horizontal two-way air discharge



Plenum box with damper blade (optional)



Circular diffuser face with white air control blades

Ceiling swirl diffusers

Type VDW



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
- Plenum box with cord-operated damper blade and pressure tap

Type		Page
VDW	General information	VDW – 2
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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
- MN: Pressure tap and cord-operated damper blade for volume flow rate balancing with the

diffuser face in place

Accessories

- Lip seal

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal (if accessory lip seal has been ordered)

Materials and surfaces

- Diffuser face made of galvanised sheet steel
- V, H: Plenum box and cross bar made of galvanised sheet steel
- X: Plenum box made of plastic and galvanised sheet steel
- Air control blades made of plastic, UL 94, V-0, flame retardant
- Lip seal made of rubber
- 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

Standards and guidelines

- Sound power level of the air-regenerated noise

measured according to EN ISO 5135

Maintenance

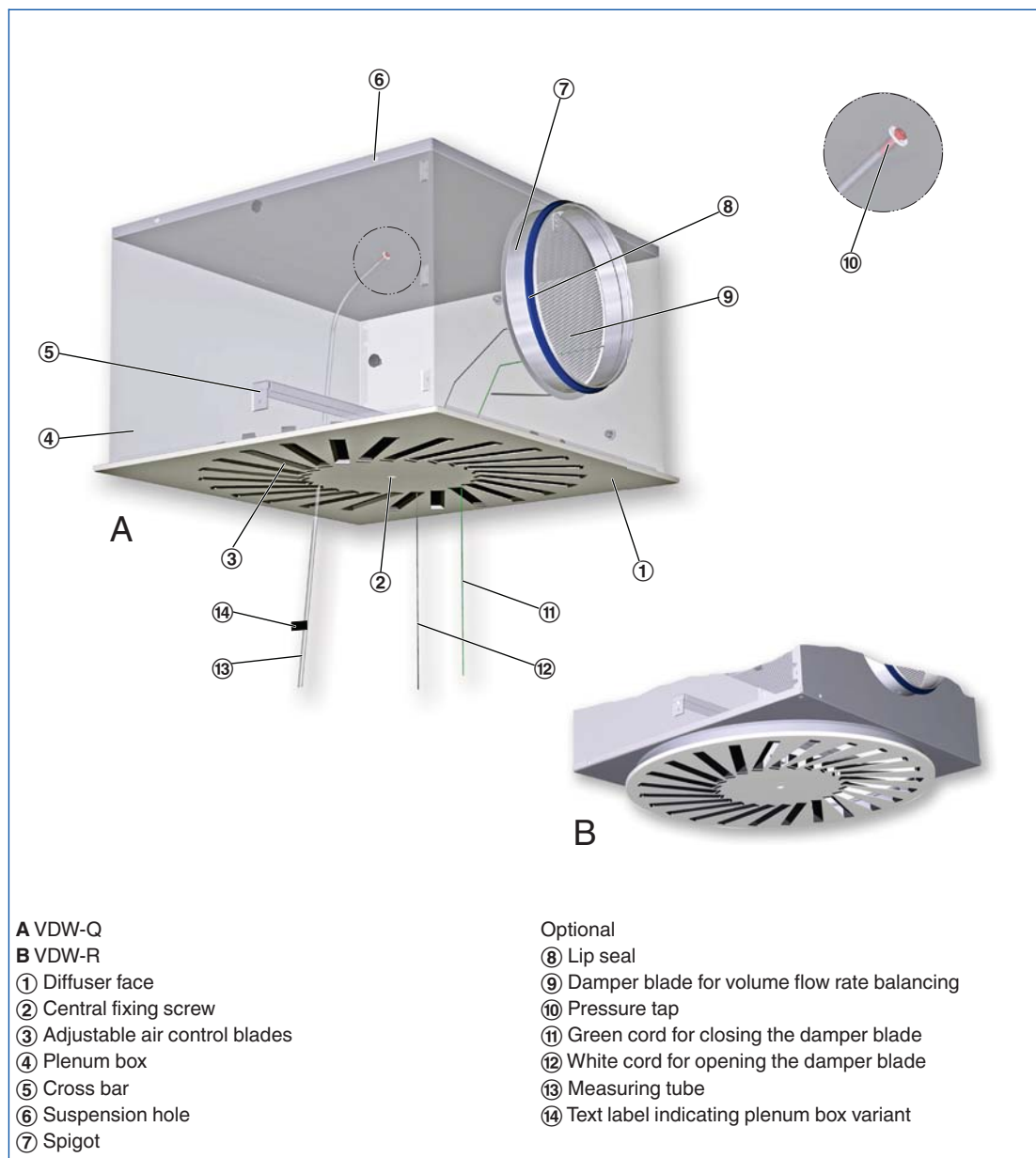
- Maintenance-free as construction and materials are not subject to wear
- Inspection and cleaning to VDI 6022

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

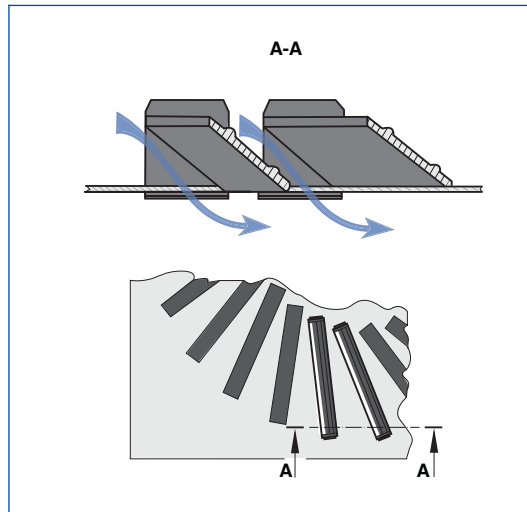
discharge is one-way, two-way or omni directional. Vertical air discharge is possible but only for heating. The supply air to room air temperature difference may range from -12 to $+10$ K. A damper blade (optional) simplifies volume flow rate balancing for commissioning. Pressure tap and cord-operated damper blade (optional) allow for volume flow rate balancing with the diffuser face in place. 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.

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

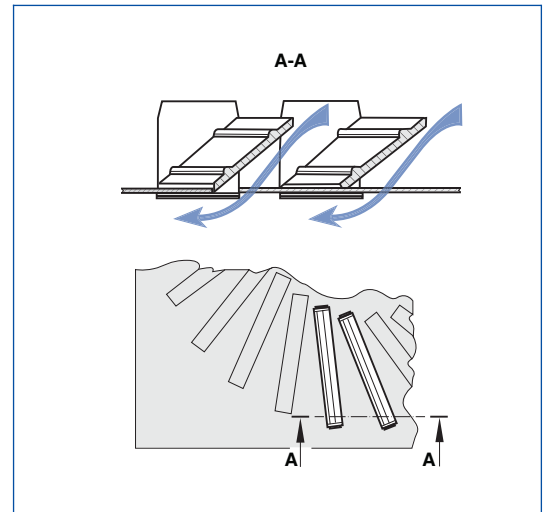


Air patterns

Air control blades set to external swirl

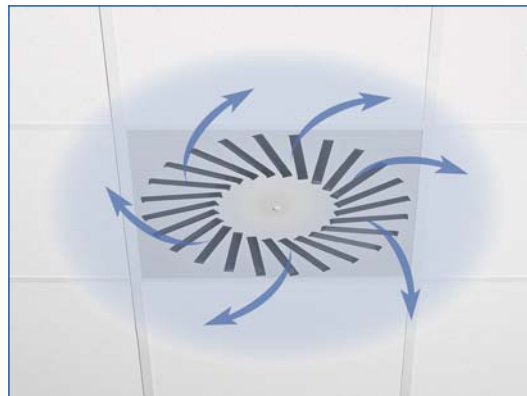


Air control blades set to internal swirl



Horizontal air discharge

Horizontal omni directional air discharge

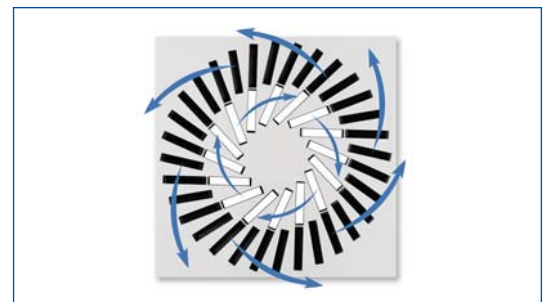


Setting of the air control blades



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

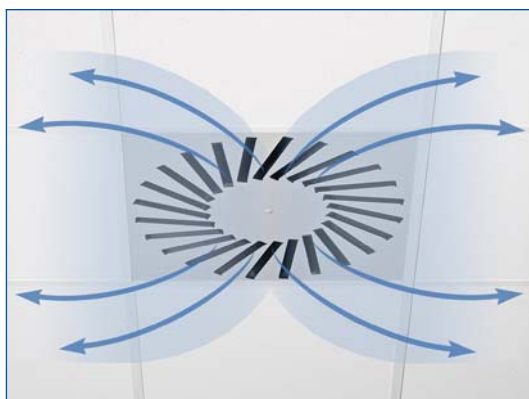


Setting of the air control blades

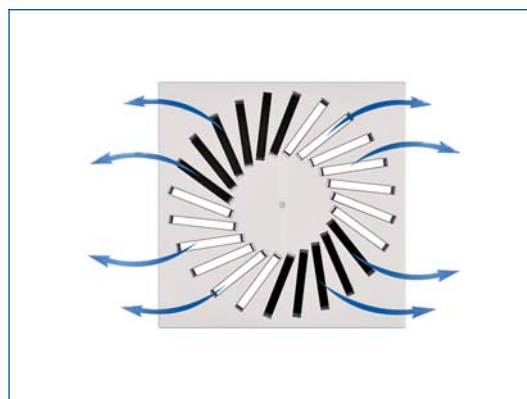


Air control blades set to internal and external swirl per half circle

Horizontal two-way air discharge



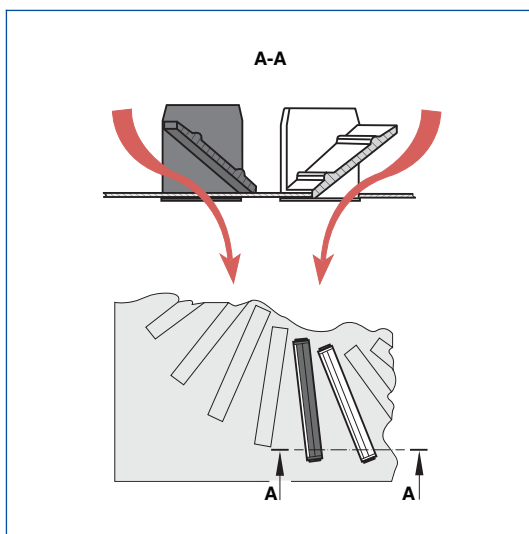
Setting of the air control blades



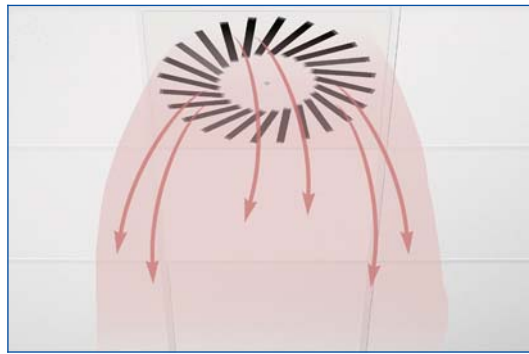
Air control blades set to internal and external swirl per quadrant

Vertical air discharge

Air control blades set to vertical air discharge



Vertical air discharge



Setting of the air control blades



Air control blades set alternately to internal and external swirl

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 m ³ /h
Maximum volume flow rate, with $L_{WA} \cong 50 \text{ dB(A)}$	80 – 470 l/s or 288 – 1692 m ³ /h
Supply air to room air temperature difference	–12 to +10 K

VDW-Q-Z/300×8



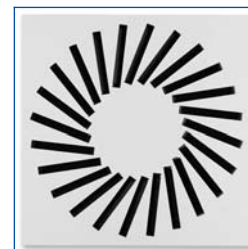
VDW-Q-Z/400×16



VDW-Q-Z/500×24



VDW-Q-Z/600×24



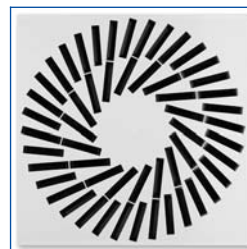
VDW-Q-Z/600×48



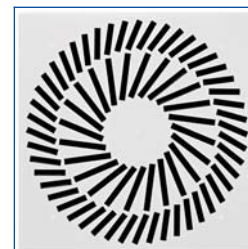
VDW-Q-Z/625×24



VDW-Q-Z/625×54



VDW-Q-Z/825×72



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)
- Pressure tap and cord-operated damper blade for volume flow rate balancing (optional)
- Lip seal (optional)

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal (if accessory lip seal has been ordered)

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
- 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)
- Lip seal (optional)

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal (if accessory lip seal has been ordered)

VDW-R-Z/300×8



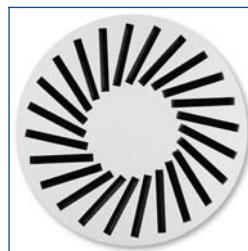
VDW-R-Z/400×16



VDW-R-Z/500×24



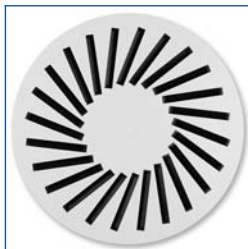
VDW-R-Z/600×24



VDW-R-Z/600×48



VDW-R-Z/625×24



VDW-R*-H

Variant

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

Nominal sizes

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

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)
- Pressure tap and cord-operated damper blade for volume flow rate balancing (optional)
- Lip seal (optional)

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal (if accessory lip seal has been ordered)

VDW-R*-V

Variant

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

Nominal sizes

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

Parts and characteristics

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

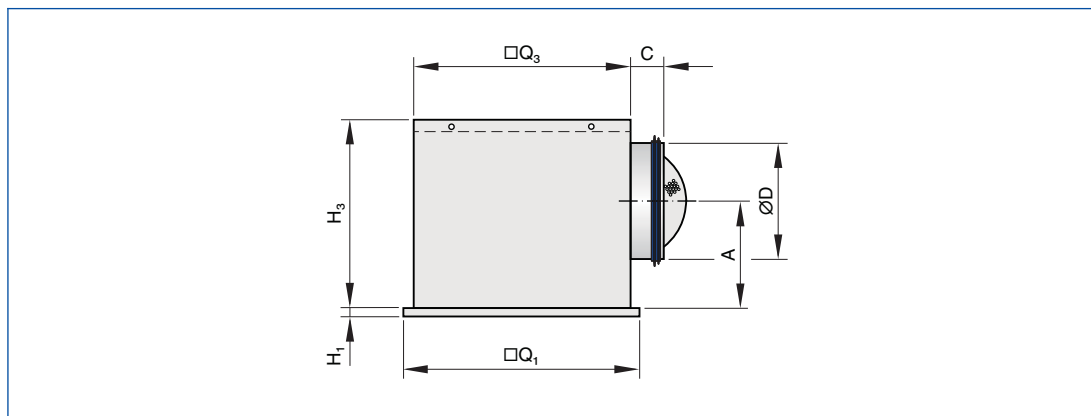
– Equalising element that ensures a uniform airflow through the diffuser face (supply air variant)

- Simple installation of the diffuser face due to central fixing screw with decorative cap
- Damper blade for volume flow rate balancing (optional)
- Lip seal (optional)

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal (if accessory lip seal has been ordered)

Square diffuser face with plenum box for horizontal duct connection

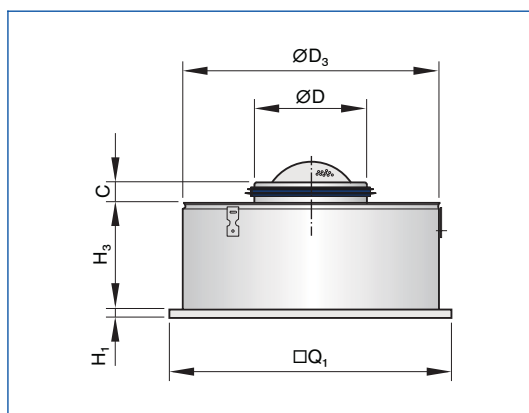


VDW-Q-*-H

Nominal size	$\square Q_1$	H_1	$\square Q_3$	H_3	$\varnothing D$	A	C	Plenum box	m
	mm	mm	mm	mm	mm	mm	mm		kg
300 × 8	298	8	290	250	158	139	50	AK-Uni-001	3.7
400 × 16	398	8	372	295	198	164	50	AK-Uni-002	5.7
500 × 24	498	8	476	295	198	164	50	AK-Uni-003	7.8
600 × 24	598	8	567	345	248	199	48	AK-Uni-004	11.1
600 × 48	598	8	590	345	248	189	48	AK-Uni-005	11.4
625 × 24	623	8	567	345	248	199	48	AK-Uni-004	11.3
625 × 54	623	8	615	345	248	189	48	AK-Uni-006	12.0
825 × 72	825	8	806	410	313	222	50	AK-Uni-007	21.2

Weights apply to the supply air variant

Square diffuser face with plenum box for vertical duct connection

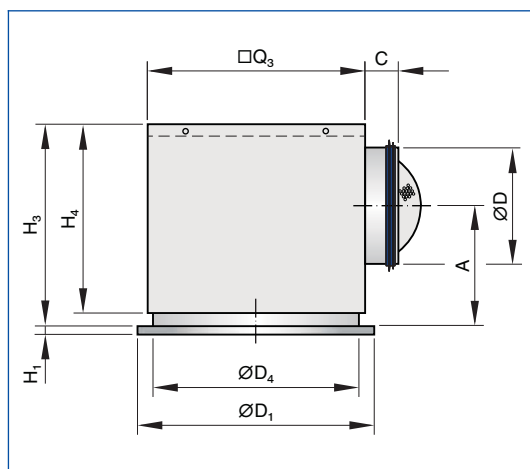


VDW-Q-*-V

Nominal size	□Q ₁	H ₁	ØD ₃	H ₃	ØD	C	m
	mm	mm	mm	mm	mm	mm	kg
300 × 8	298	8	275	200	158	50	2.7
400 × 16	398	8	364	200	198	50	4.2
500 × 24	498	8	462	200	198	50	6.0
600 × 24	598	8	559	200	248	48	8.4
600 × 48	598	8	575	300	248	48	9.6
625 × 24	623	8	559	200	248	48	8.6
625 × 54	623	8	600	300	248	48	10.3
825 × 72	825	8	796	300	313	50	16.2

Weights apply to the supply air variant

Circular diffuser face with plenum box for horizontal duct connection

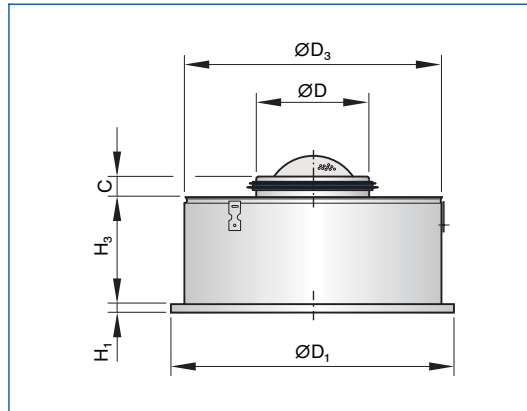


VDW-R-*-H

Nominal size	ØD ₁	H ₁	□Q ₃	H ₃	ØD ₄	H ₄	ØD	A	C	Plenum box	m
	mm	mm	mm	mm	mm	mm	mm	mm	mm		kg
300 × 8	300	8	290	285	278	250	158	174	50	AK-Uni-013	3.9
400 × 16	400	8	372	330	362	295	198	199	50	AK-Uni-014	6.0
500 × 24	500	8	476	330	460	295	198	199	50	AK-Uni-015	8.3
600 × 24	600	8	567	380	557	345	248	234	48	AK-Uni-016	11.3
600 × 48	600	8	590	380	578	345	248	224	48	AK-Uni-017	11.6
625 × 24	625	8	567	380	557	345	248	234	48	AK-Uni-016	11.5

Weights apply to the supply air variant

Circular diffuser face with plenum box for vertical duct connection

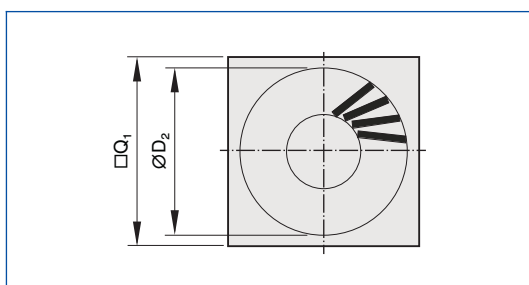


VDW-R*-V

Nominal size	ØD ₁ mm	H ₁ mm	ØD ₃ mm	H ₃ mm	ØD mm	C mm	m kg
300 × 8	300	8	275	200	158	50	2.5
400 × 16	400	8	364	200	198	50	3.9
500 × 24	500	8	462	200	198	50	5.6
600 × 24	600	8	559	200	248	48	7.5
600 × 48	600	8	575	300	248	48	8.7
625 × 24	625	8	559	200	248	48	7.7

Weights apply to the supply air variant

Diffuser face VDW-Q

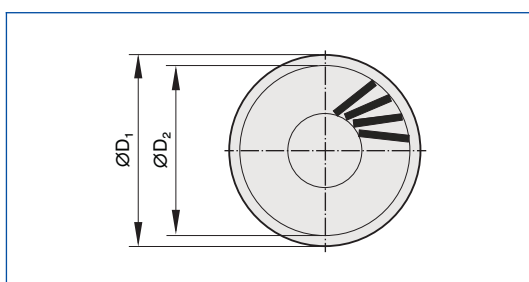


VDW-Q

Nominal size	$\square Q_1$ mm	$\varnothing D_2$ mm	n	A_{eff} m ²
300 × 8	298	269	8	0.0070
400 × 16	398	352	16	0.0140
500 × 24	498	440	24	0.0210
600 × 24	598	546	24	0.0295
600 × 48	598	568	48	0.0390
625 × 24	623	546	24	0.0295
625 × 54	623	594	54	0.0470
825 × 72	825	773	72	0.0730

n = no. of air control blades

Diffuser face VDW-R

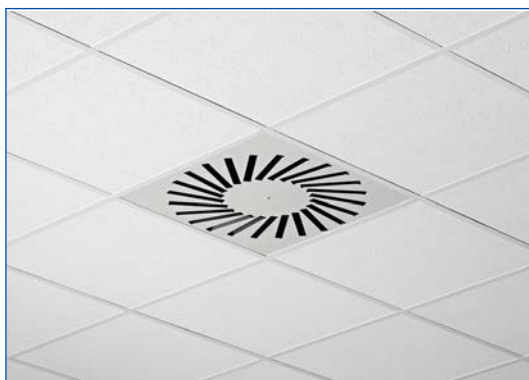


VDW-R

Nominal size	$\varnothing D_1$ mm	$\varnothing D_2$ mm	n	A_{eff} m ²
300 × 8	300	269	8	0.0070
400 × 16	400	352	16	0.0140
500 × 24	500	440	24	0.0210
600 × 24	600	546	24	0.0295
600 × 48	600	568	48	0.0390
625 × 24	625	546	24	0.0295

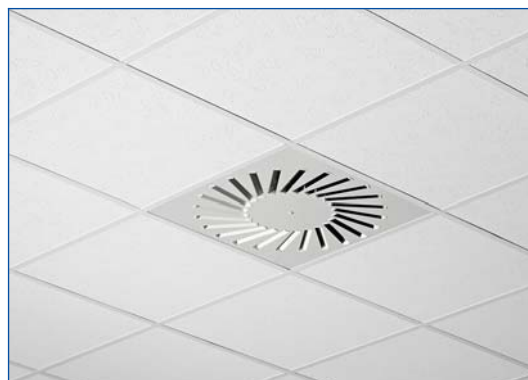
n = no. of air control blades

Installation in T-bar ceilings



VDW-Q with black air control blades

Installation in T-bar ceilings

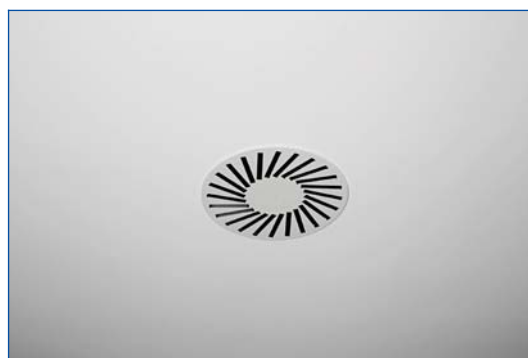


VDW-Q with white air control blades

Installation in T-bar ceilings, arrangement in a row



Installation in continuous ceilings

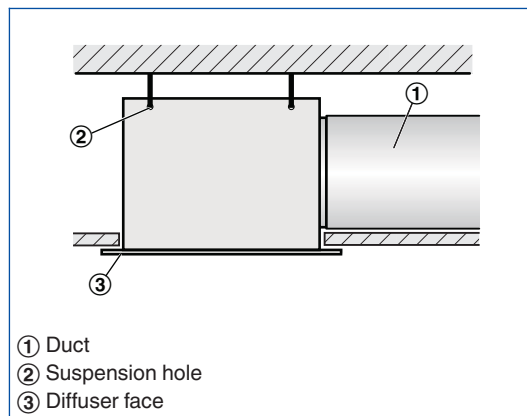


Installation and commissioning

- 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

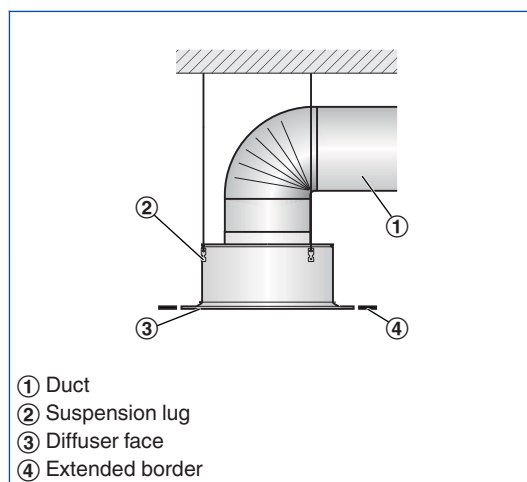
These are only schematic diagrams to illustrate installation details.

Flush ceiling installation with square plenum box



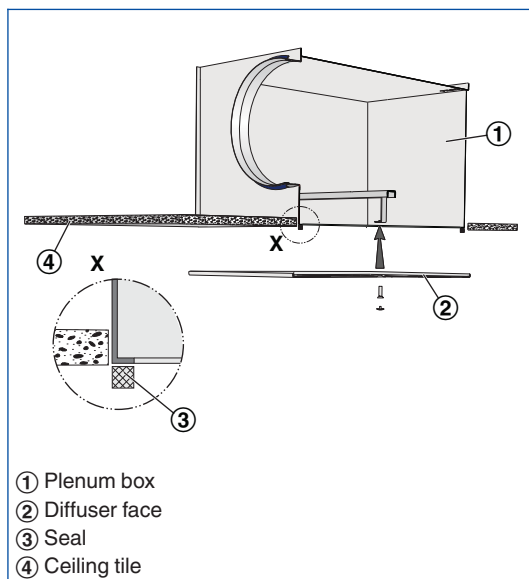
- Horizontal duct connection
- Four suspension holes
- Suspension with cords, wires or hangers, to be provided by others

Freely suspended installation



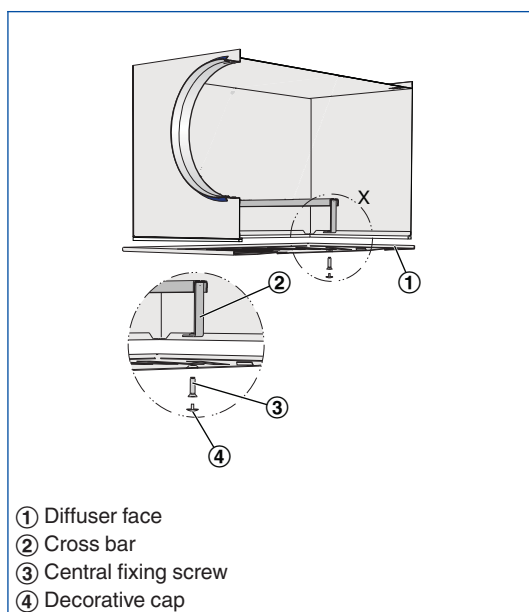
- Vertical duct connection
- Three suspension lugs
- Suspension with cords, wires or hangers, to be provided by others

Diffuser face – sealing



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

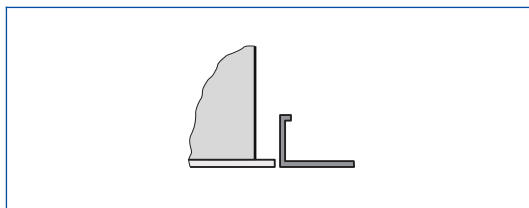
Diffuser face – central screw fixing



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

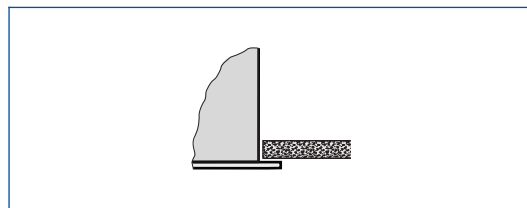
Ceiling systems

Installation into grid ceilings



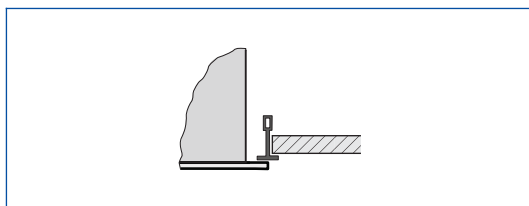
- Fix the plenum box to the ceiling
- The ceiling tile of the grid ceiling is independent of the ceiling diffuser
- Fix the diffuser face after the ceiling has been completed

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

Volume flow rate balancing

When several diffusers are connected to just one volume flow controller, it may be necessary to balance the volume flow rates.

- Ceiling diffusers with universal plenum box and damper blade (variant -M): The diffuser face can be removed to access the damper blade; the damper blade can then be set to any position between 0 and 90°
- Ceiling diffusers with universal plenum box, damper blade and pressure tap (variant -MN): The diffuser face need not be removed since the damper blade can be set with two cords (white and green).

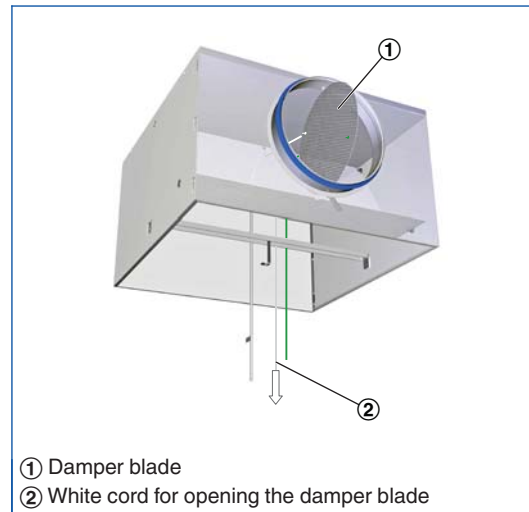
Volume flow rate measurement

Ceiling diffusers with universal plenum box, damper blade and pressure tap (variant -MN) allow for volume flow rate balancing even with the diffuser face in place.

- Connect the measuring tube to the digital manometer
- Read the effective pressure
- Read the volume flow rate off the characteristic or calculate it
- If necessary, adjust the damper blade position with the cords

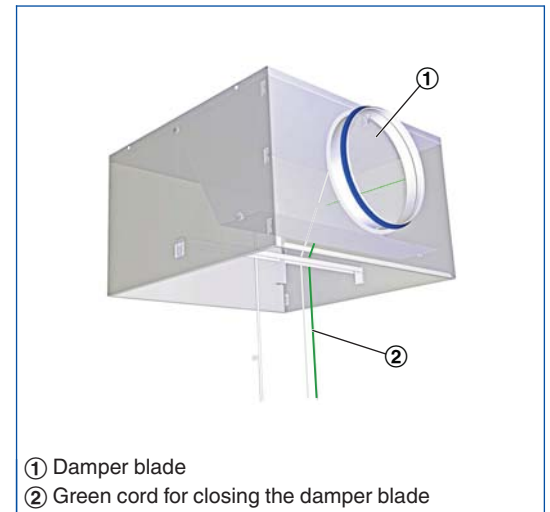
A characteristic is included with each AK-Uni plenum box.

AK-Uni-...-MN Volume flow rate balancing



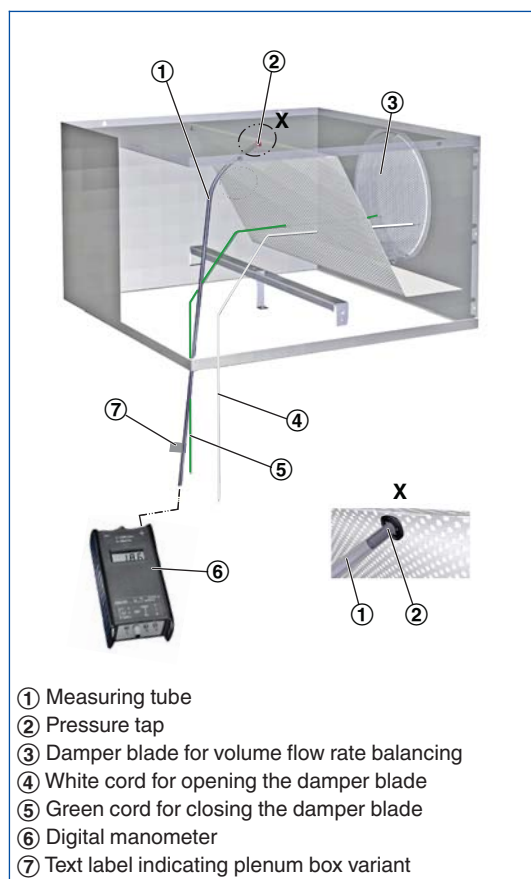
Open, 0°

AK-Uni-...-MN Volume flow rate balancing



Closed, 90°

AK-Uni-...-MN volume flow rate measurement



Volume flow rate calculation for air density 1.2 kg/m³

$$\dot{V} = C \times \sqrt{\Delta p_w}$$

Volume flow rate calculation for other air densities

$$\dot{V} = C \times \sqrt{\Delta p_w} \times \sqrt{\frac{1.2}{\rho}}$$