



Circular diffuser faces with circular plenum box



Square diffuser face with square plenum box



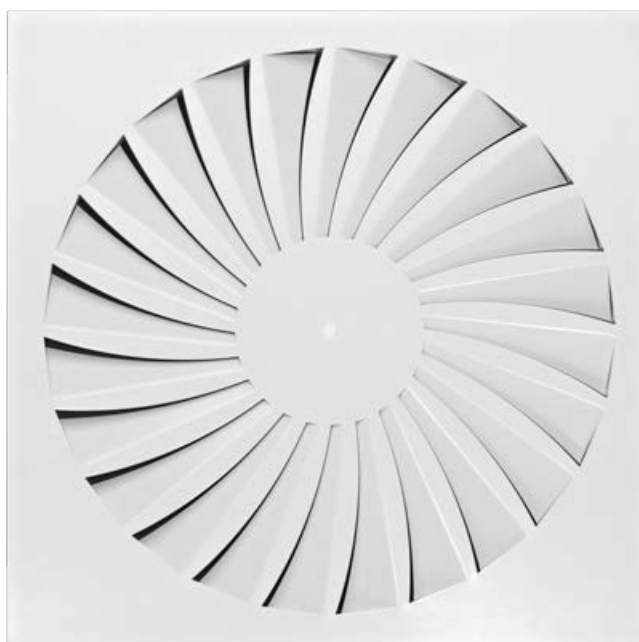
Twist-shaped, horizontal Air duct



Round diffuser face

Ceiling diffusers

TDF-SilentAIR



With very low sound power level for comfort zones, with fixed air control blades

Circular and square ceiling swirl diffusers

- Nominal sizes 300, 400, 500, 600, 625
- Volume flow rate range 10 – 265 l/s or 36 – 954 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
- Ideal for comfort zones

Optional equipment and accessories

- Exposed diffuser face available in RAL Classic colours
- Horizontal or vertical duct connection
- Plenum box with cord-operated damper blade and pressure tap

General information	2	Order code	8
Function	3	Variants	9
Technical data	5	Dimensions	13
Quick sizing	5	Product details	18
Specification text	7	Nomenclature	22

General information

Application

- 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 – +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
- Very high room air change rate possible thanks to row arrangement with a minimum pitch distance of 0.9 m

Nominal sizes

- 300, 400, 500, 600, 625

Variants

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

Connection

- Q-*-H: Square plenum box with horizontal duct connection
- R-*-H: Circular plenum box with horizontal duct connection
- V: Vertical duct connection

Accessories

Lip seal

- For circular plenum boxes with horizontal connection spigot, the lip seal is only available in combination with the flow adjustment damper. Otherwise, it can always be selected optionally.

Attachments

- M: Damper element for volume flow rate balancing
- MN: Pressure tap and cord-operated damper unit for volume flow rate balancing with the diffuser face in place (only possible with square plenum box)

Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal (only applies to galvanised spigots and lip seal accessories)

Materials and surfaces

- Grille face made of galvanised sheet steel
- Q; R: Plenum box made of galvanised sheet steel including galvanised sheet steel cross bar to support the diffuser face
- Plenum boxes with vertical connection and square plenum boxes with horizontal connection: for supply air always with galvanised perforated plate for air distribution
- Circular plenum boxes with horizontal spigot: Equipped as a plenum box for supply air with an equalising element made of polyester
- Square plenum boxes and plenum boxes with vertical spigot: Spigot made of galvanised sheet steel
- Circular plenum boxes with horizontal spigot: Spigot made of black ABS, according to UL94, V0 flame retardant
- Lip seal made of Evoprene
- Diffuser face powder-coated, RAL 9010, pure white
- P1: Powder-coated, RAL Classic colour

Standards and guidelines

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

Maintenance

- Low maintenance as construction and materials are not subject to wear
- Inspection and cleaning to VDI 6022

Disclosure of Chemicals

- RoHS EU Directive 2011/65/EU (RoHS)
 - This product or single variants comply with EU Directive 2011/65/EU (RoHS) on the restriction of the use of certain hazardous substances in electrical and electronic equipment. For more information, please refer to our Environmental Product Declarations.
- REACH 1907/2006 (EC Regulation REACH)
 - This product or single variants comply with the provisions of EC Regulation No. 1907/2006, also known as REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals). For more information, please refer to our Environmental Product Declarations.

Function

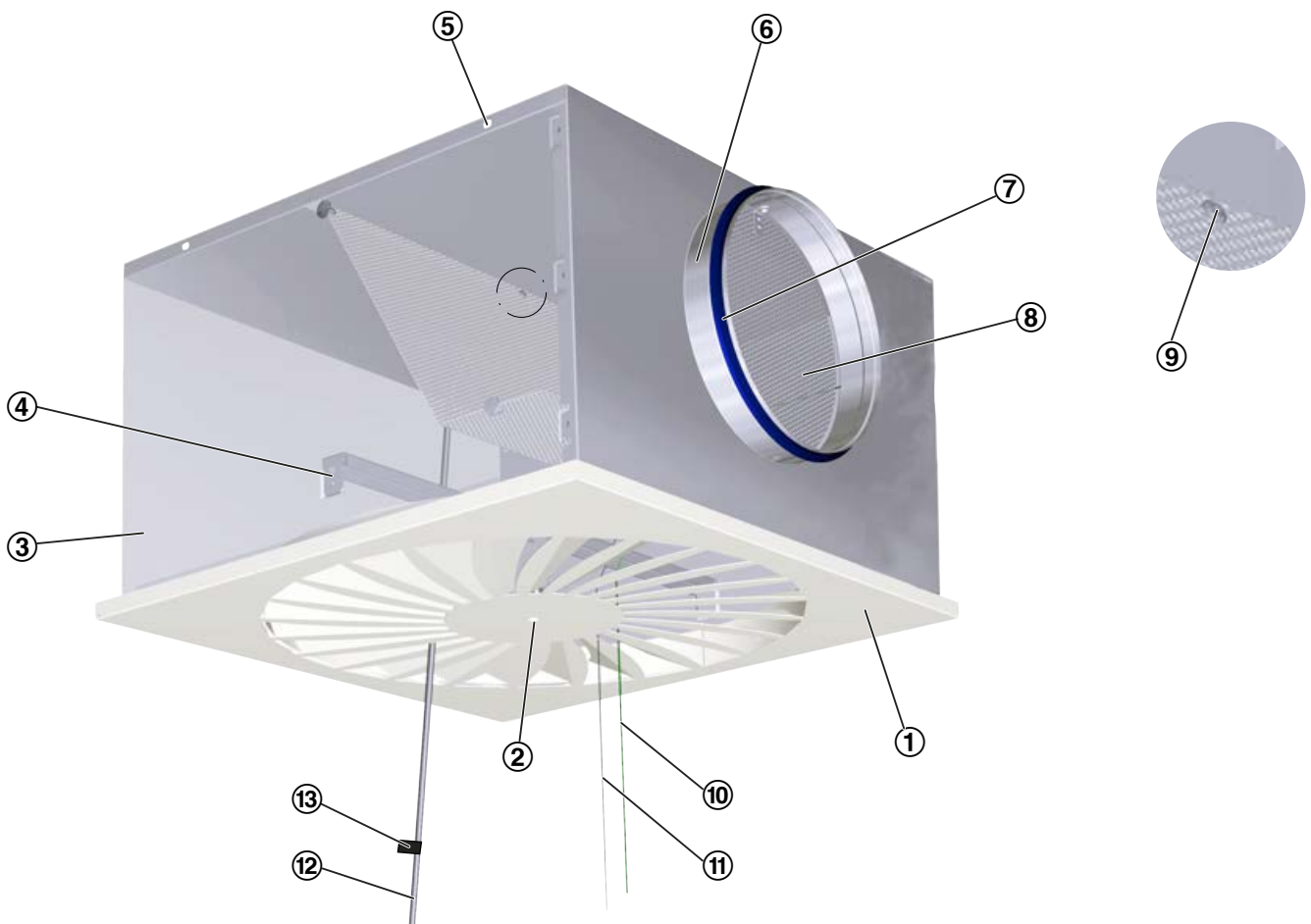
Ceiling swirl diffusers in air conditioning systems create a swirl to supply air to rooms. The resulting airflow induces high levels of room air, thereby rapidly reducing the airflow velocity and the temperature difference between supply air and room air. Ceiling swirl diffusers allow for large volume 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 TDF ceiling swirl diffusers have fixed blades. Air discharge is horizontal radial. The supply air to room air temperature difference can be -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 TDF diffusers may also be used for extract air.

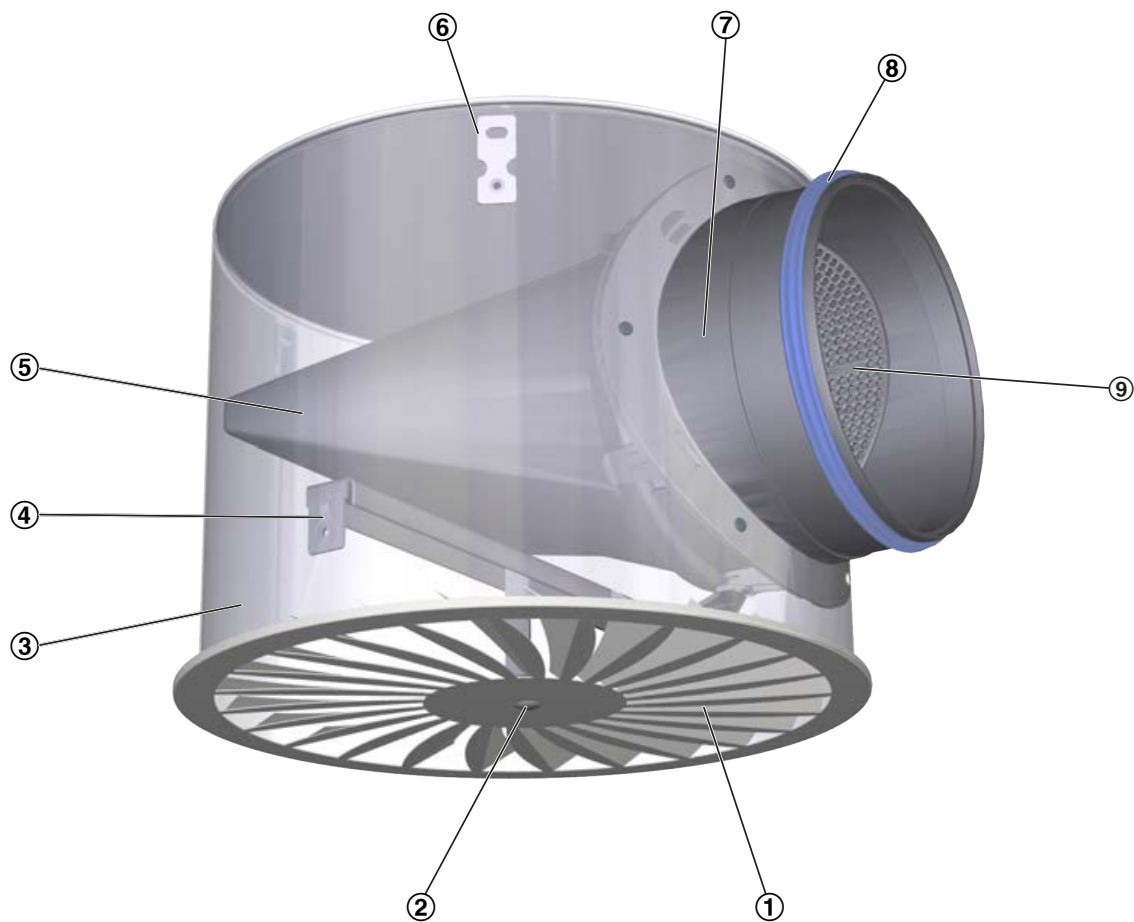
Schematic illustration of TDF-SA with square plenum box



- 1 Diffuser face
- 2 Central fixing screw
- 3 Plenum box
- 4 Cross bar
- 5 Suspension hole
- 6 Spigot
- 7 Lip seal (optional)

- 8 Damper blade for volume flow rate balancing (optional)
- 9 Pressure tap (optional)
- 10 Green cord for closing the damper unit (optional)
- 11 White cord for opening the damper unit (optional)
- 12 Measuring tube (optional)
- 13 Text label indicating plenum box variant (optional)

Schematic representation, TDF with round connection box and horizontal connection spigot



- 1 Diffuser face
- 2 Center screw attachment with decorative cap
- 3 Junction box
- 4 traverse
- 5 Air distribution element (Z: supply air)
- 6 Hanging tab
- 7 Connection piece
- 8 double lip seal (optional)
- 9 Throttle element for volume flow adjustment (optional)

Technical data

Nominal sizes	300, 400, 500, 600, 625 mm
Minimum volume flow rate, with $\Delta t_z = -6$ K	10 – 42 l/s or 36 – 151 m ³ /h
Maximum volume flow rate, with $L_{WA} \cong 50$ dB(A)	80 – 265 l/s from 288 – 954 m ³ /h
Supply air to room air temperature difference	-12 – +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 program.

TDF-SA-Q-Z-H (supply air), sound power level and total differential pressure

NS	q_v [l/s]	q_v [m ³ /h]	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	10	36	1	<15	1	<15	2	<15
	35	126	14	27	16	26	29	26
	60	216	40	40	46	39	86	41
	80	288	71	50	83	49	153	53
400	18	65	1	<15	1	<15	3	<15
	65	234	13	24	17	22	34	24
	115	414	40	39	52	39	107	41
	160	576	76	50	101	51	206	52
500	27	97	1	<15	2	<15	5	<15
	80	288	12	23	16	22	47	26
	135	486	34	37	45	37	134	43
	195	702	71	50	95	51	280	56
600, 625	42	151	2	<15	2	<15	5	<15
	115	414	12	23	16	22	39	26
	185	666	32	38	41	36	101	41
	260	936	62	50	82	49	200	52

0°, 45°, 90°: Damper blade position

TDF-SA-R-Z-H (supply air), variant, sound power level and total differential pressure

NS	q _v [l/s]	q _v [m ³ /h]	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	10	36	1	<15	1	<15	2	<15
	40	144	17	29	20	28	38	28
	70	252	53	45	63	45	118	45
	80	288	70	50	82	51	154	51
400	18	65	1	<15	1	<15	3	<15
	65	234	12	23	15	22	35	24
	115	414	39	38	45	38	110	41
	160	576	76	50	88	50	212	51
500	27	97	1	<15	2	<15	5	<15
	90	324	15	23	22	24	58	28
	155	558	45	39	65	40	171	45
	201	724	75	50	108	50	287	55
600, 625	42	151	2	<15	2	<15	5	<15
	130	468	16	26	21	25	50	30
	215	774	43	41	56	40	137	46
	265	954	65	50	86	48	208	53

0°, 45°, 90°: Damper blade position

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

NS	q _v [l/s]	q _v [m ³ /h]	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	10	36	1	<15	1	<15	2	<15
	35	126	14	26	16	25	29	25
	60	216	40	40	46	39	85	40
	80	288	71	50	83	50	153	51
400	18	65	1	<15	1	<15	3	<15
	65	234	12	23	16	25	35	24
	115	414	39	39	50	40	110	42
	155	558	71	50	91	51	200	53
500	27	97	1	<15	2	<15	5	<15
	80	288	12	23	16	25	46	28
	130	468	31	37	42	39	121	44
	180	648	59	50	81	53	232	55
600, 625	42	151	2	<15	2	<15	5	<15
	115	414	13	26	19	28	42	32
	185	666	35	41	48	44	108	48
	230	828	54	49	74	52	166	57

0°, 45°, 90°: Damper blade position

Specification text

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

Specification text

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 in suspended ceilings of all kinds. Ready-to-install component which consists of the diffuser face and a plenum box, side entry or top entry spigot, and suspension holes or suspension brackets.

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
- Very high room air change rate possible thanks to row arrangement with a minimum pitch distance of 0.9 m

Materials and surfaces

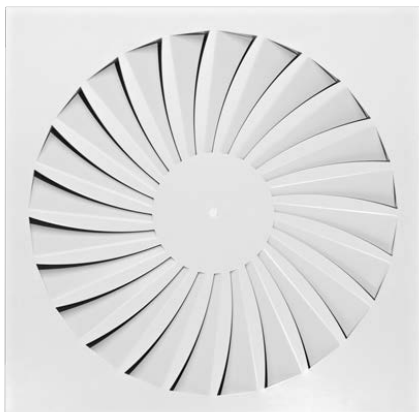
- Grille face made of galvanised sheet steel
- Q; R: Plenum box made of galvanised sheet steel including galvanised sheet steel cross bar to support the diffuser face
- Plenum boxes with vertical connection and square plenum boxes with horizontal connection: for supply air always with galvanised perforated plate for air distribution
- Circular plenum boxes with horizontal spigot: Equipped as a plenum box for supply air with an equalising element made of polyester
- Square plenum boxes and plenum boxes with vertical spigot: Spigot made of galvanised sheet steel
- Circular plenum boxes with horizontal spigot: Spigot made of black ABS, according to UL94, V0 flame retardant
- Lip seal made of Evoprene
- 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: 10 – 42 l/s or 36 – 151 m³/h
- Maximum volume flow rate, at $L_{wA} \cong 50$ dB(A): 80 – 265 l/s or 288 – 954 m³/h
- Supply air to room air temperature difference: -12 to +10 K

Variants

TDF-SA-Q-Z



TDF-SA-Q-*-H

Variant

- With square plenum box for horizontal duct connection

Nominal sizes

- 300, 400, 500, 600, 625

Parts and characteristics

- Square diffuser face
- Square 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)
-

TDF-SA-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
- 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)
-

TDF-SA-R-Z/600**TDF-SA-R-*-H****Variant**

- Ceiling swirl diffuser with circular diffuser face
- With circular plenum box and 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)
- 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)

TDF-SA-R-*-V**Variant**

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

Nominal sizes

- 300, 400, 500, 600, 625

Parts and characteristics

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

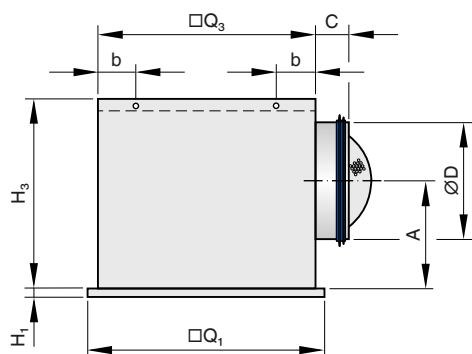
- Equalising element that ensures a uniform airflow through the diffuser face (supply air variant)
- Simple installation of the diffuser face due to central fixing screw with decorative cap
- Damper blade for volume flow rate balancing (optional)
- Lip seal (optional)

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)

Dimensions

Square diffuser face with plenum box for horizontal duct connection

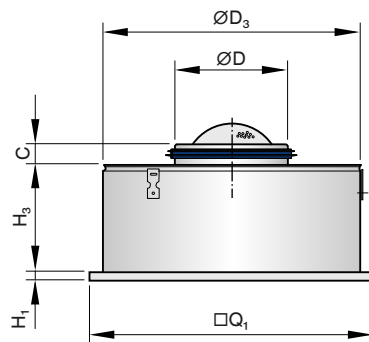


TDF-SA-Q-*-H

NS	□Q ₁	H ₁	H ₃	□Q ₃	ØD	A	C	①	m kg
300	298	8	250	290	158	139	50	AKUni001	4
400	398	8	295	372	198	164	50	AKUni002	6,2
500	498	8	295	476	198	164	50	AKUni003	8,5
600	598	8	345	567	248	199	48	AKUni004	11,6
625	623	8	345	567	248	199	48	AKUni004	11,9

Weights apply to the supply air variant.

Square diffuser face with plenum box for vertical duct connection

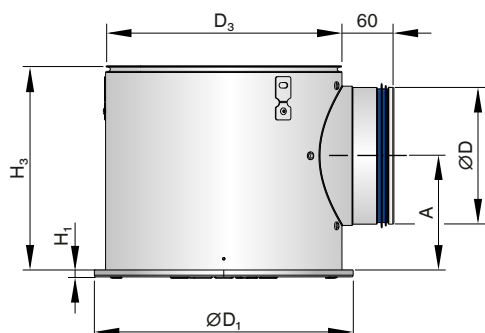


TDF-SA-Q-*-V

NS	$\square Q_1$	H_1	$\varnothing D_3$	H_3	$\varnothing D$	C	m kg
300	298	8	275	200	158	50	3
400	398	8	364	200	198	50	4,7
500	498	8	462	200	198	50	6,7
600	598	8	559	200	248	48	8,9
625	623	8	559	200	248	48	9,2

Weights apply to the supply air variant.

Circular diffuser face with circular plenum box for horizontal duct connection

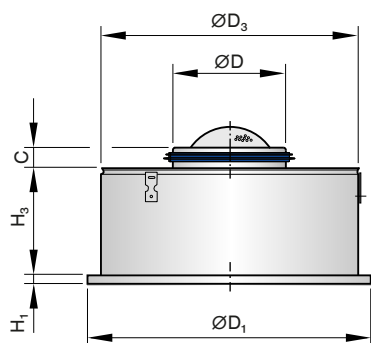


TDF-SA-R*-H

NS	ØD ₁	H ₁	H ₃	ØD ₃	ØD	A	①	m
	kg							
300	300	8	243	274	158	139	AKR-01	2,4
400	400	8	290	363	198	166	AKR-02	3,8
500	500	8	290	461	198	166	AKR-03	5,2
600	600	8	344	574	248	195	AKR-05	7,4
625	625	8	344	574	248	195	AKR-05	7,6

Weights apply to the supply air variant.

Circular diffuser face with plenum box for vertical duct connection

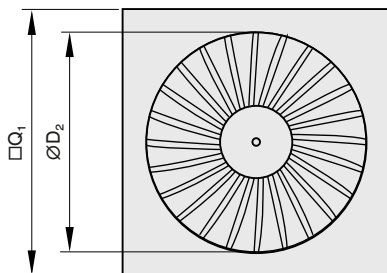


TDF-SA-R*-V

NS	$\varnothing D_1$	H_1	H_3	$\varnothing D_3$	$\varnothing D$	C	m kg
300	300	8	200	275	158	50	2,8
400	400	8	200	364	198	50	4,4
500	500	8	200	462	198	50	6,3
600	600	8	200	559	248	48	8,5
625	625	8	200	559	248	48	8,7

Weights apply to the supply air variant.

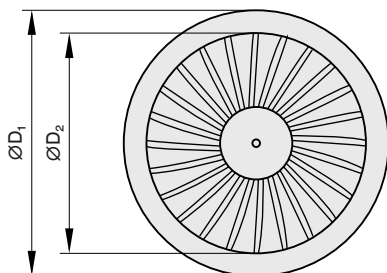
Diffuser face TDF-SA-Q



TFD-Q

NS	$\square Q_1$	$\varnothing D_2$	A_{eff}
			m^2
300	298	254	0.0108
400	398	336	0.0193
500	498	440	0.0280
600	598	530	0.0400
625	623	530	0.0400

Diffuser face TDF-SA-R



TDF-R

NS	$\varnothing D_1$	$\varnothing D_2$	A_{eff}
			m^2
300	300	250	0.0088
400	400	350	0.0180
500	500	450	0.0251
600	600	538	0.0295
625	625	538	0.0295

Product details

Installation in T-bar ceilings



Installation in T-bar ceilings, arrangement in a row



Installation in continuous ceilings

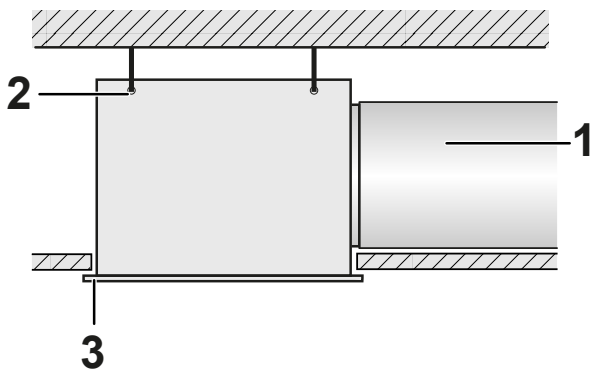


Installation and commissioning

- 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 element

Note: The illustrations are schematic and serve to create a better understanding of the installation details.

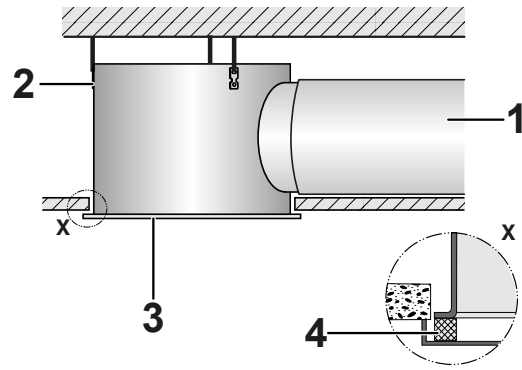
Installation flush with the ceiling with a square connection box



- 1 Air duct
- 2 Suspension hole
- 3 Diffuser face

- Horizontal duct connection
- 4 suspension holes
- Customer-side suspension with ropes, suspension wires or nonius hangers

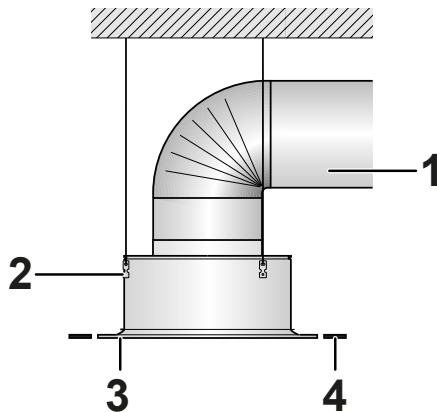
Installation flush with the ceiling with round junction box



- 1 Air duct
- 2 Suspension bracket
- 3 Diffuser face

- Horizontal duct connection
- 3 suspension brackets
- Customer-side suspension with ropes, suspension wires or nonius hangers

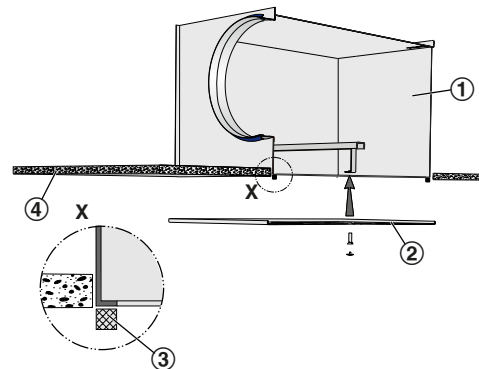
Freely suspended installation



- 1 Air duct
- 2 Suspension bracket
- 3 Diffuser face
- 4 Extended border

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

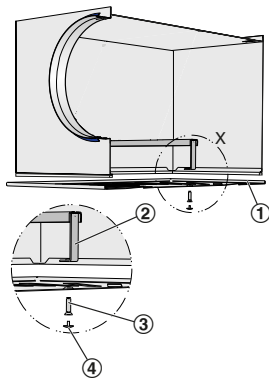
Diffuser face – sealing



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

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

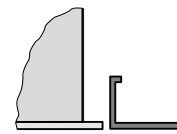
Diffuser face – central screw fixing



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

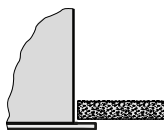
- Using the central fixing screw, fix the diffuser face to the cross bar of the plenum box
- Attach the decorative cap

Installation in metal ceilings



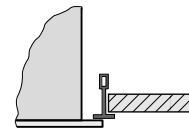
- Fix the plenum box to the ceiling
- Ceiling tile of the metal ceiling is independent of the air terminal device
- Fix the diffuser face after the ceiling has been completed

Installation in continuous ceilings



- Fix the plenum box (possibly with diffuser face) to the ceiling
- Adjust plasterboard ceiling tile as required (flush mounted or offset)
- If necessary, fix the diffuser face after the ceiling has been completed

Installation in T-bar ceilings



- Installation in T-bar ceiling. Attach the connection box to the ceiling
- T-bar ceiling is independent of the air passage
- Fasten the diffuser face below the T-bar profile after completing the ceiling work

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 as the damper blade can be set with two cords (white and green).

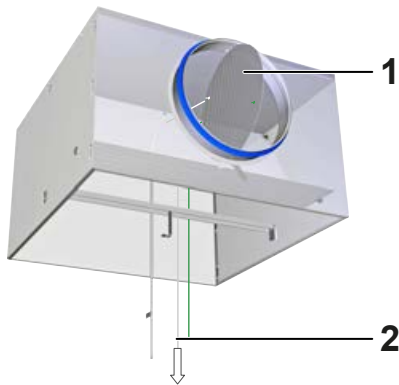
Volume flow rate measurement

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.

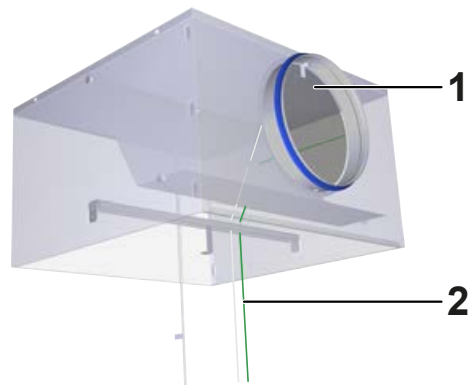
AK-Uni-...-MN Volume flow rate balancing



- 1 Damper blade
- 2 White cord for opening the damper blade

Open, 0°

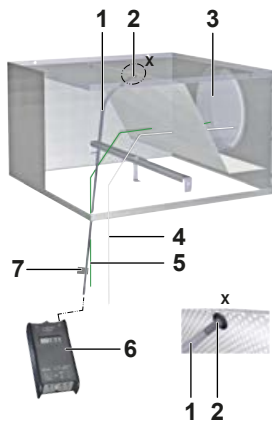
AK-Uni-...-MN Volume flow rate balancing



- 1 Damper blade
- 2 Green cord for closing the damper blade

Closed (maximum restriction), 90°

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



- 1 Measuring tube
- 2 Pressure tap
- 3 Damper blade for volume flow rate balancing
- 4 White cord for opening the damper blade
- 5 Green cord for closing the damper blade
- 6 Digital manometer
- 7 Text label indicating plenum box variant (to be provided by others)

Volume flow calculations

$$\textcircled{1} q_v = C \times \sqrt{\Delta p_w}$$

$$\textcircled{2} q_v = C \times \sqrt{\Delta p_w} \times \sqrt{\frac{1.2}{\rho}}$$

- 1 For an air density of 1.2 kg / m
- 2 For other air densities

Nomenclature

A [mm]

Position of the spigot, defined by the distance of the spigot centre line to the lower edge of the plenum box.

A_{eff} [m²]

Effective air discharge area

C [mm]

Length of the spigot

∅D [mm]

Outer diameter of the spigot

∅D₁ [mm]

Outer diameter of a circular diffuser face

∅D₂ [mm]

Diameter of a circular diffuser face style

∅D₃ [mm]

Diameter of a circular plenum box

H₁ [mm]

Height of diffuser face

H₃ [mm]

Height of plenum box

L_{WA} [dB(A)]

A-weighted sound power level of air-regenerated noise

m [kg]

Weight

NS [mm]

Nominal size

Δp_t [Pa]

Total differential pressure

□Q₁ [mm]

Outer diameter of a square diffuser face

□Q₃ [mm]

Dimensions of a square plenum box

q_v [m³/h]; [l/s]

Volume flow rate

Δt_z [K]

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

Lengths

All lengths are given in millimetres [mm] unless stated otherwise.

All sound power levels are based on 1 pW.