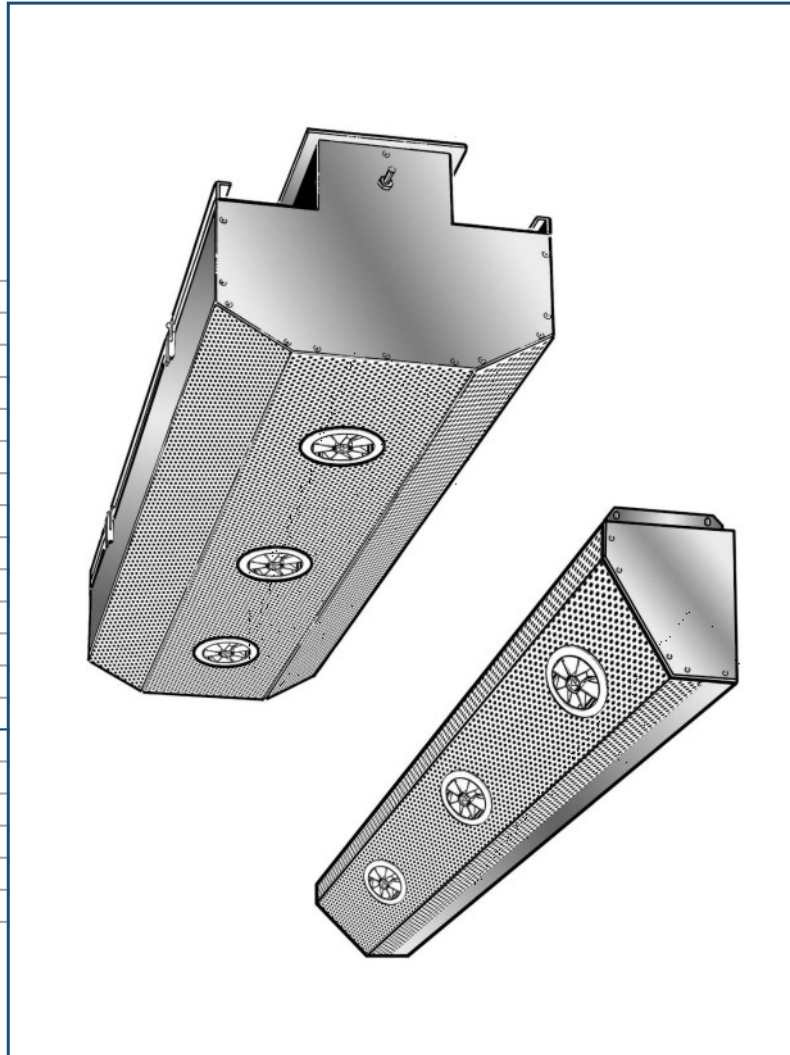


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see last page.

Technical Selection



Trapezoidal displacement outlet VA-T....
Semi-trapezoidal displacement outlet VA-TH....

Preliminary remarks

Where workplaces or production facilities have to be kept free of airborne dust and fibres or heavy pollutants, the supply air is best discharged above the occupied zone and the return air extracted from the floor zone. The dust and pollutants are displaced downwards with the indoor air to the return air openings. As far as possible, return flows to the ceiling have to be avoided.

This is where air outlets for low-turbulence air flow are used, whose discharge direction has a broad spread with a horizontal to vertically downward incline.

For these applications KRANTZ KOMponenten provides the trapezoidal and semi-trapezoidal displacement outlets.

While the trapezoidal displacement outlet is best installed above a production area – either flush with the ceiling or free-hanging – the semi-trapezoidal displacement outlet is used where the supply air is to be discharged from the side, e.g. from a room wall or a row of pillars. The outlet placement is also possible on either side of an assembly line, e.g. in car works, or along production machines, e.g. in printing shops.

Construction design

1. Trapezoidal displacement outlet

The trapezoidal displacement outlet is basically manufactured in three widths: 140, 290 and 500 mm, and in several lengths. Its main components are the housing 1 with trapezoidal inner and outer perforated plates 2 and the connection spigot 3.

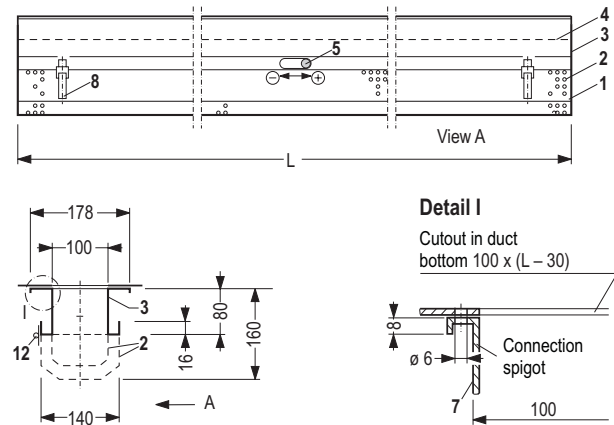
Built into the connection spigot is a volume flow damper 4 which can be adjusted from outside using a setting screw/slide 5. The ⊕ sign stands for higher volume flow rate, the ⊖ sign for lower volume flow rate.

The trapezoidal displacement outlet is installed length-wise below the supply air duct. For the outlet widths of 290 and 500 mm, an insertion frame 6 is additionally required to connect the outlet to the supply air duct; this additional frame will be put onto the inside of the duct bottom. The connection frame, the duct bottom and the air outlet will be riveted together.

The connection spigot of the 140 mm wide outlet is fitted with a flange 7 that can be screwed to the duct bottom from below. The two connection options are shown in Fig. 1, Details I and II.

The perforated plate of the housing can be pulled down for cleaning purposes after releasing a lock 8.

Nominal width 140

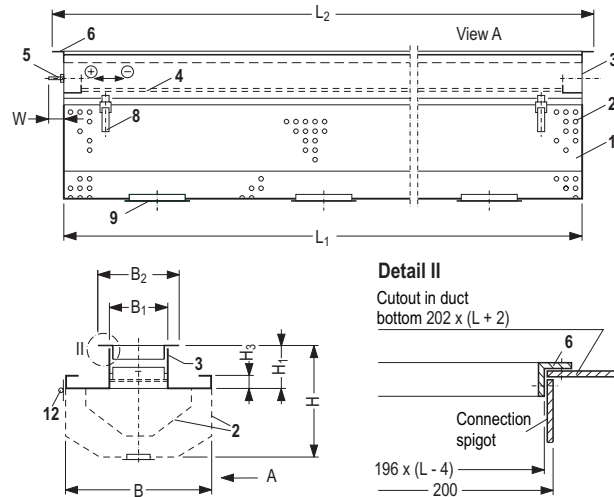


Nominal width B mm	Nominal length L mm	Volume flow rate range ¹⁾		Weight approx. kg
		\dot{V}_A l/s	\dot{V}_A m ³ /h	
140	800	70 – 165	250 – 600	6
	1250	110 – 265	400 – 950	8
	1600	140 – 330	500 – 1200	11
	1800	165 – 390	600 – 1400	13

1) Maximum flow rate when the setting screw/slide 5 is on the right in View A

- Key for all pages:**
- 1 Housing
 - 2 Perforated plate
 - 3 Connection spigot
 - 4 Volume flow damper
 - 5 Setting screw/slide
 - 6 Insertion frame
 - 7 Flange
 - 8 Housing lock
 - 9 Twist outlet
 - 10 Suspension strip
 - 11 Connection frame
 - 12 Hinge

Nominal widths 290 and 500

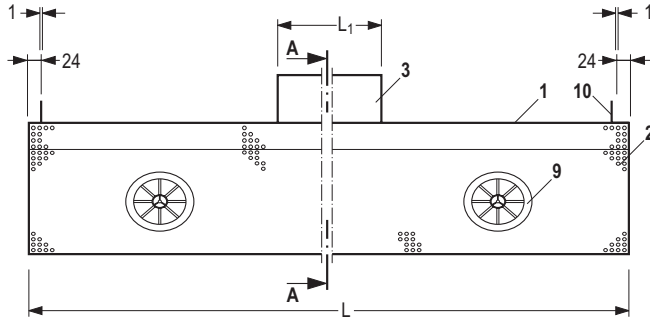


Nominal width B mm	Nominal length L mm	Volume flow rate range		Dimensions						Twist outlets units	Position ²⁾ of V damper W in mm		Weight approx. kg		
		\dot{V}_A l/s	\dot{V}_A m ³ /h	B1 mm	B2 mm	L1 mm	L2 mm	H mm	H1 mm		H3 mm	open		closed	
290	800	155 – 330	550 – 1200			804	834					2	41	19	15
	1250	235 – 530	850 – 1900	200	234	1254	1284	235	100	25		3	28	6	22
	1600	300 – 670	1100 – 2400			1604	1634					3	38	16	27
	1800	350 – 750	1250 – 2700			1804	1834					4	45	22	31
500	800	265 – 550	950 – 2000			804	834					2	41	19	24
	1250	415 – 830	1500 – 3000	200	234	1254	1284	350	120	30		3	28	6	34
	1600	540 – 1100	1950 – 4000			1604	1634					3	38	16	42
	1800	610 – 1220	2200 – 4400			1804	1834					4	45	22	47

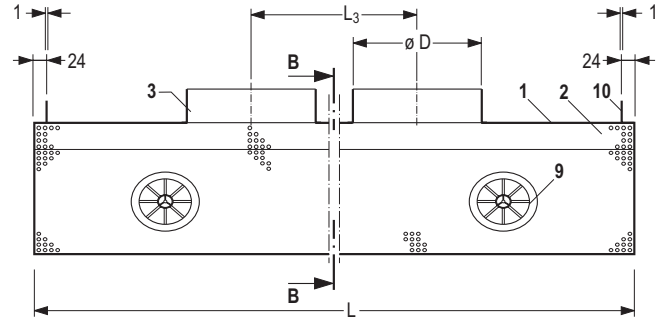
2) Related to setting screw/slide 5 being on the left in View A

Figure 1: Trapezoidal displacement outlet - Dimensions

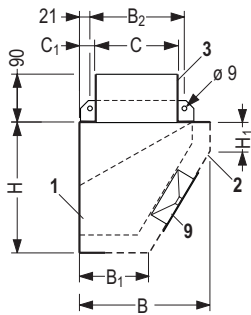
Design with rectangular connection spigot



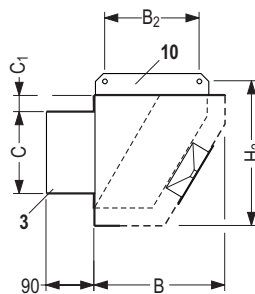
Design with (two) circular connection spigots



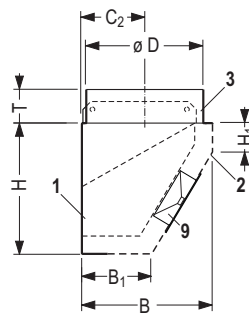
Section A – A: Smooth connection spigot at the top



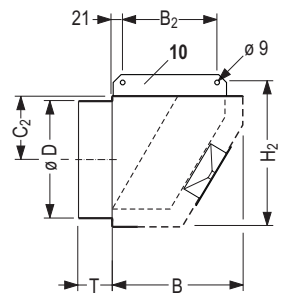
at the rear



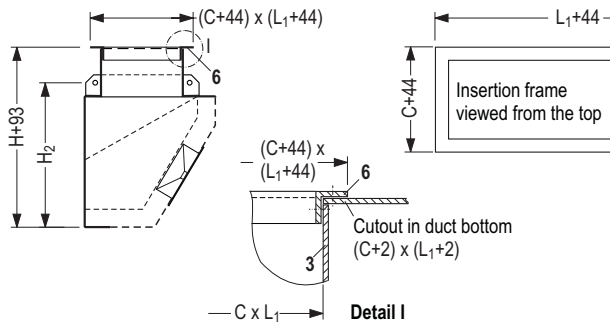
Section B – B: Spigot for connection to circular duct at the top



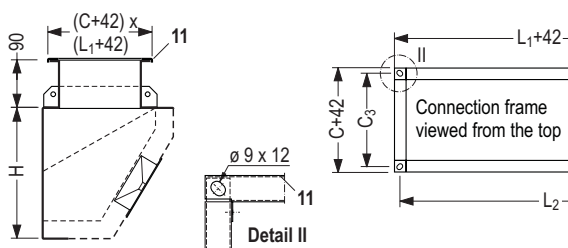
at the rear



Insertion frame for connection to supply air duct



Connection frame to fit 20 mm corner flanges (optional)



2. Semi-trapezoidal displacement outlet

Its main components are the same as those of the trapezoidal displacement outlet, yet with different geometric shapes. The semi-trapezoidal displacement outlet is available in sizes (widths) of 250 and 500 mm and in several lengths. It can be fitted with one rectangular or two circular connection spigots placed at the top or at the rear (see Figure 8).

The semi-trapezoidal displacement outlet is supplied as standard with a fixed damper.

Size	Nominal length L mm	Volume flow rate range		Dimensions				Twist outlets units	Weight approx. kg
		\dot{V}_A l/s	\dot{V}_A m ³ /h	L1 mm	L2 mm	L3 mm	$\varnothing D$ mm		
250	1200	85 - 235	300 - 850	446	468	600	199	3	15
	1500	110 - 300	400 - 1100	556	578	750	223	3	19
	1800	125 - 360	450 - 1300	626	648	900	223	4	23
500	1200	195 - 500	700 - 1800	626	648	600	279	3	36
	1500	250 - 625	900 - 2250	796	818	750	314	3	45
	1800	300 - 750	1100 - 2700	896	918	900	354	4	54

Size	Dimensions in mm										
	B	B1	B2	C	C1	C2	C3	H	H1	H2	T
250	250	134	180	156	32	125	178	250	55	275	40
500	500	280	430	220	50	195	242	500	116	525	60

Figure 2: Semi-trapezoidal displacement outlet - Dimensions

Trapezoidal / Semi-trapezoidal displacement outlet



Figure 3: Trapezoidal displacement outlet - Jet dispersion made visible with smoke tracer



Figure 5: Trapezoidal displacement outlets below the supply air duct in a weaving mill



Figure 4: Semi-trapezoidal displacement outlet in a test room of the automotive industry

Mode of operation

The perforated plate generates low-turbulence air jets that discharge horizontally to vertically downwards owing to the trapezoidal shape of the housing. Depending on the displacement outlet length, 2 to 4 twist outlets **9** are built into the perforated plates of the 290 and 500 mm wide trapezoidal displacement outlets as well as into the perforated plate of the semi-trapezoidal displacement outlet. These twist outlets generate a high-momentum air flow that induces the supply air from the surrounding perforated plate surface. The result is a very stable total air flow with a coverage of approx. 8 m.

The 140 mm wide trapezoidal displacement outlet is designed for a smaller coverage of 2 to 3 m. Here, the necessary jet stability is obtained without adding twist outlets.

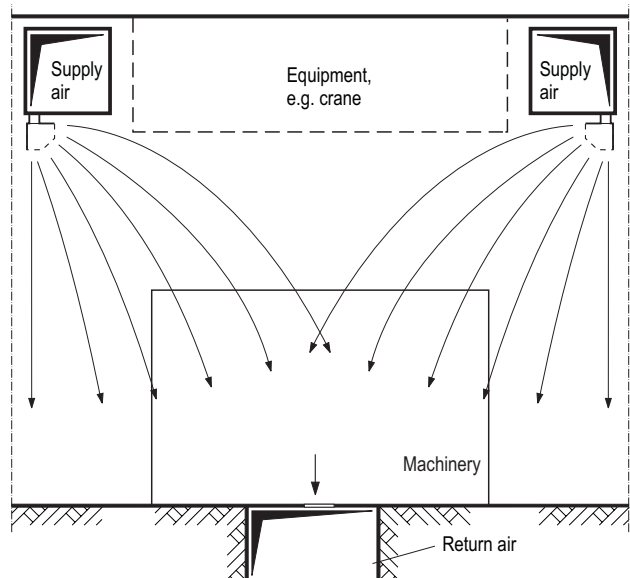
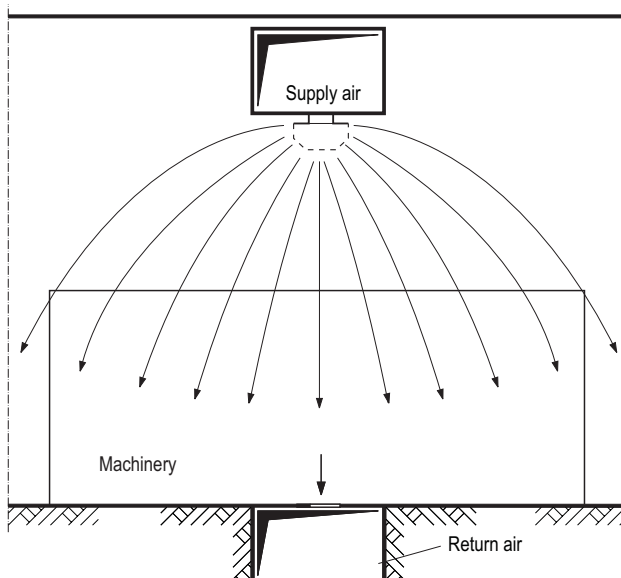


Figure 6: Air jet pattern of trapezoidal / semi-trapezoidal displacement outlet

As shown in Figure 6, dust and pollutants are displaced downwards to the return air openings and extracted from the room. This largely prevents air upflow, which considerably reduces the time solid particles remain in the indoor air. Tests made in spinning mills have proved that dust concentration in air flow generated by trapezoidal displacement outlets is 50% less than is in indoor air when conventional air outlets are used. It must be noted that even indoor air conditions (room temperature and relative humidity) are obtained in both the machinery area and the occupied zone.

Placement and connection

1. Trapezoidal displacement outlet

The trapezoidal displacement outlet can be placed free-hanging or flush with the ceiling. The 140 mm wide outlet can also be installed along or very close to a wall. In this case the inside of the perforated segment facing the wall is to be covered. As a result, the air flow rate decreases by 50%. Figure 7 shows the different installation options.

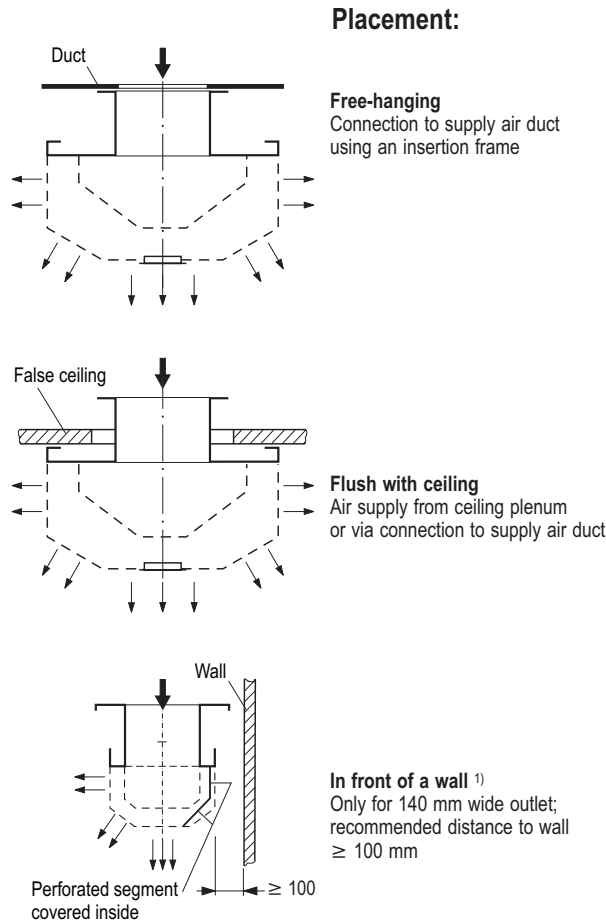


Figure 7: Trapezoidal displacement outlet - Placement and connection types

2. Semi-trapezoidal displacement outlet

As a rule, the semi-trapezoidal displacement outlet is placed along a wall or on either side of an assembly line. There are several ways to connect the outlet to the supply air duct as is shown in Figure 8.

Placement: Free-hanging in front of a wall or pillar

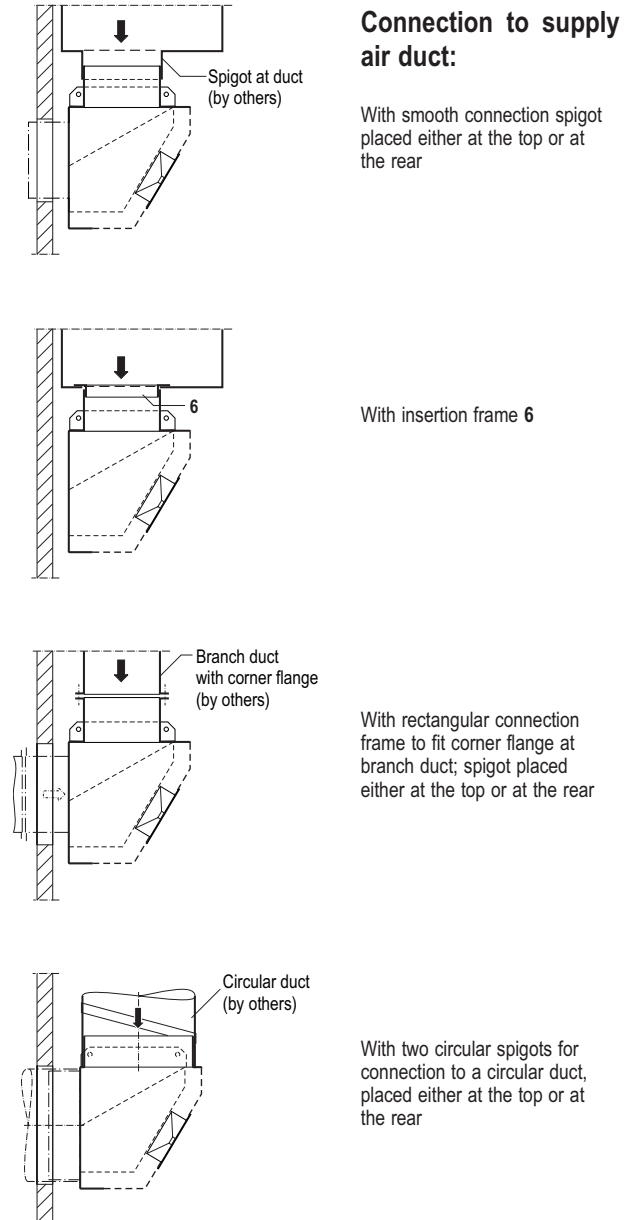


Figure 8: Semi-trapezoidal displacement outlet - Placement and connection types

¹⁾ With halved air flow rate; alternatively select semi-trapezoidal displacement outlet

Selection and layout

Typical applications for the trapezoidal or semi-trapezoidal displacement outlet are textile factories such as carding, spinning and weaving mills, different areas in car works, e.g. painting shops and assembly lines, as well as printing shops.

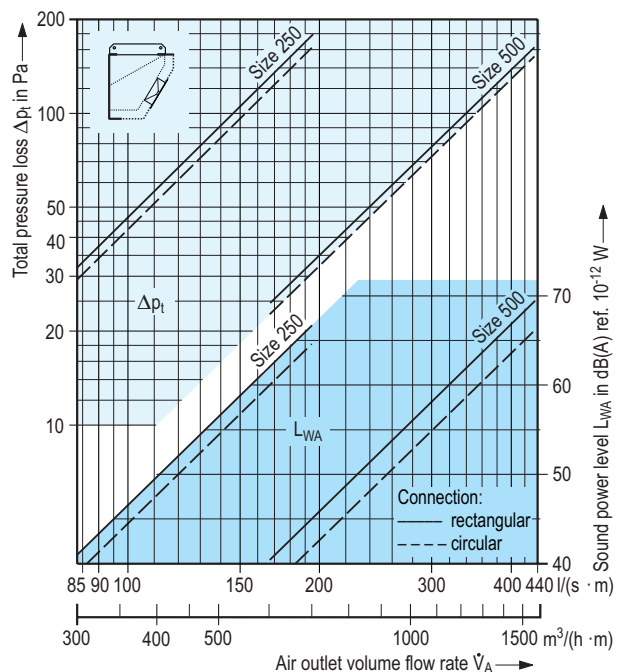
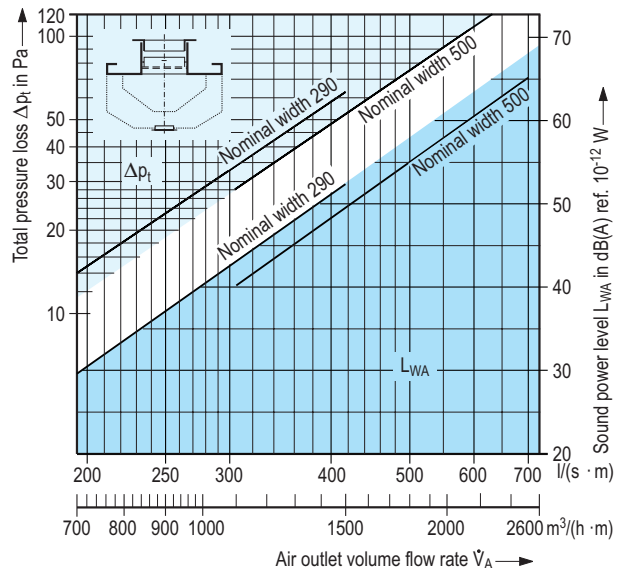
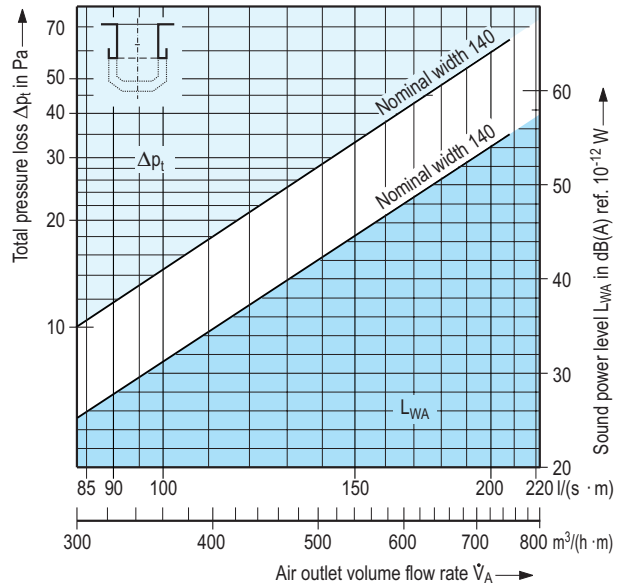
The main technical data is shown in the following table and graphs.

Technical data		Trapezoidal displacement outlet	Semi-trapezoidal displacement outlet
Air outlet width:	mm	140 290 500	250 500
Air outlet length:	mm	800 1250 1600 1800	1200 1500 1800
Volume flow rate in l/(s · m) for width of			
	140 mm	85 to 210	—
	250 mm	—	70 to 195
	290 mm	195 to 415	—
	500 mm	335 to 695	165 to 415
Volume flow rate in m ³ /(h · m) for width of			
	140 mm	300 to 750	—
	250 mm	—	250 to 700
	290 mm	700 to 1500	—
	500 mm	1200 to 2500	600 to 1500
Discharge height:	m	3 to 4	
Duct spacing for air outlet width of			
– 140 mm (trapezoidal):	m	3.5 to 6	
– 290 and 500 mm (trapezoidal):	m	7 to 10	
– 250 and 500 mm (semi-trapezoidal):	m	7 to 10	
Coverage zone of supply air jets:	m	2 to 8	2 to 3
Temperature difference supply air-indoor air K			–3 to –6
– for width 140:	K	–3 to –6	—
– for widths 290 and 500:	K	–3 to –8	—
Material		galvanized sheet metal polystyrene	
– Outlet housing and perforated plate			
– Twist outlets			



Figure 9: Semi-trapezoidal displacement outlet of size 500 in a production facility

Sound power level and pressure loss ¹⁾



1) The graph values apply for damper "open"

Trapezoidal / Semi-trapezoidal displacement outlet

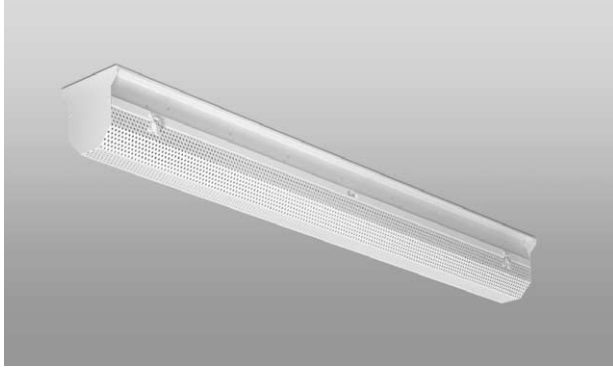


Figure 10: Trapezoidal displacement outlet of nominal width 140

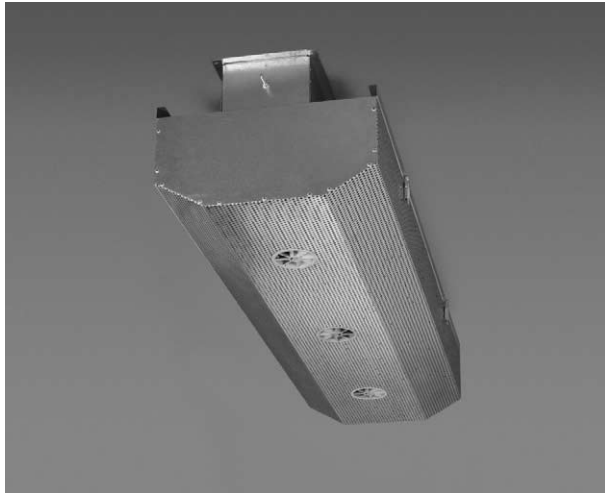


Figure 11: Trapezoidal displacement outlet of nominal width 290 or 500



Figure 12: Semi-trapezoidal displacement outlet of size 250 or 500

Type code

Trapezoidal displacement outlet

VA - T - ____ / ____ - ____

Displacement outlet
Function/Kind
Nominal width
Nominal length
Placement

Please note,
type code is new,
see last page.

Function/Kind

T = trapezoidal

Nominal width: 140, 290 and 500 mm

Nominal length: 800, 1250, 1600 and 1800 mm

Placement

F = free-hanging

D = flush with ceiling

W = along a wall

Example:

Trapezoidal displacement outlet, 140 mm in width, 1250 mm in length, free-hanging from ceiling.

Type: **VA - T - 140 / 1250 - F**

Semi-trapezoidal displacement outlet

VA - TH - ____ / ____ - ____ - ____

Displacement outlet
Function/Kind
Size
Nominal length
Connection type
Connection arrangement

Please note,
type code is new,
see last page.

TH = semi-trapezoidal

Size
250 or 500

Nominal length
1200, 1500 and 1800 mm

Connection type

A1 = Rectangular connection spigot for insertion into a supply air duct (standard)

A2 = Rectangular connection spigot with insertion frame for connection to supply air duct (spigot at the top)

A3 = Rectangular connection spigot with connection frame to fit 20 mm corner flange

R = Connection to circular duct (with 2 spigots whose nominal diameter depends on outlet size)

Connection arrangement

O = Connection at the top (standard)

H = Connection at the rear

Example:

Semi-trapezoidal displacement outlet, size 250, nominal length 1200 mm, connection to spiral seam duct, connection spigot at the top.

Type: **VA - TH - 250 / 1200 - R - O**

Features

- Low-turbulence displacement flow with air discharge at a downward incline
- Well suited for spaces where heavy pollutants are emitted
- For applications with permanent cooling
- Discharge height: 3 to 4 m
- Temperature difference between supply air and indoor air: -3 to -6 K or -3 to -8 K
- Even, constant indoor air temperature in both the machinery area and the occupied zone
- Supply air connection for
 - trapezoidal outlet: rectangular spigot at the top
 - semi-trapezoidal outlet: one rectangular or two circular spigots placed at the top or at the rear
- Volume flow rate range of
 - trapezoidal outlet: 85 – 695 l/(s · m)
[300 – 2500 m³/(h · m)]
 - semi-trapezoidal outlet: 70 – 415 l/(s · m)
[250 – 1500 m³/(h · m)]
- Available in several widths and lengths
- Coverage zone of supply air jets: 2 to 8 m

Tender text

..... units

Trapezoidal displacement outlet

with little induction effect for minimum mixing of supply air with indoor air so as to achieve optimum displacement of dust particles and pollutants from the occupied zone, air downflow, consisting of:

- Nominal width 140
Housing with trapezoidal discharge surface made of perforated sheet metal to be pulled down for cleaning, and top rectangular spigot for duct connection, with flange and built-in volume flow damper adjustable from outside.
Placement: free-hanging. flush with ceiling.
 along a wall.
- Nominal widths 290 and 500
Housing with trapezoidal discharge surface made of perforated sheet metal and built-in twist outlets - discharge surface to be pulled down for cleaning -, top rectangular spigot for duct connection with built-in volume flow damper adjustable from outside, and insertion frame.
Placement: free-hanging. flush with ceiling.

Technical data:

Volume flow rate: l/s (m³/h)
Sound power level: dB(A) ref. 10⁻¹² W
Pressure loss: Pa

Material: Housing and perforated plate made of galvanized sheet metal
 Twist outlets¹⁾ made of polystyrene
 painted to RAL

Dimensions: Nominal width: mm
Nominal length: mm

Make: KRANTZ KOMPONENTEN

Type: VA - T - ____ / ____ - __

..... units

Semi-trapezoidal displacement outlet

with little induction effect for minimum mixing of supply air with indoor air so as to achieve optimum displacement of dust particles and pollutants from the occupied zone, air downflow, consisting of:

housing with semi-trapezoidal discharge surface made of perforated sheet metal, built-in twist outlets, and connection spigot.

- Spigot arrangement at the top. at the rear.
Spigot design **rectangular**
 smooth
 with insertion frame ²⁾
 with connection frame to fit 20 mm corner flanges
 circular, 2 pieces, to fit spiral seam or flexible duct.

Technical data:

Volume flow rate: l/s (m³/h)
Sound power level: dB(A) ref. 10⁻¹² W
Pressure loss: Pa

Material: Housing and perforated plate made of galvanized sheet metal
Twist outlets made of polystyrene
 painted to RAL

Size: 250 mm 500 mm

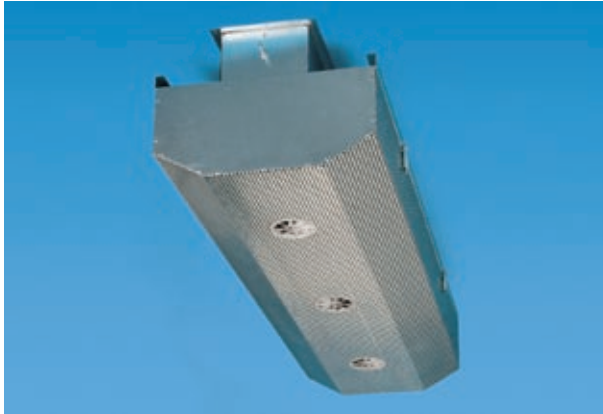
Nominal length: mm

Make: KRANTZ KOMPONENTEN

Type: VA - TH - ____ / ____ - __ - __

- Subject to technical alteration -

1) Only for nominal widths 290 and 500
2) For connection spigot placed at the top

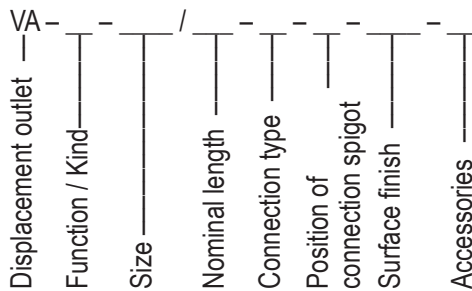


Trapezoidal displacement outlet



Semi-trapezoidal displacement outlet

Type code



Function / Kind

- T = Trapezoidal displacement outlet
- TH = Semi-trapezoidal displacement outlet

Size

	VA-T	VA-TH
140 = Size 140	•	
250 = Size 250		•
290 = Size 290	•	
500 = Size 500	•	•

Nominal length

	VA-T	VA-TH
800 = Nominal length 800	•	
1200 = Nominal length 1200		•
1250 = Nominal length 1250	•	
1600 = Nominal length 1600	•	
1500 = Nominal length 1500		•
1800 = Nominal length 1800	•	•

Connection type (VA-TH only)

- A1 = Rectangular connection spigot for insertion into a supply air duct
- A2 = Rectangular connection spigot with frame for duct mounting (spigot on top)
- A3 = Rectangular connection spigot to fit corner flange 20 mm
- RU = Circular duct connection with 2 round spigots

Position of connection spigot (VA-TH only)

- O = Connection spigot on top
- H = Connection spigot at the rear

Surface finish

- galv = galvanized
- = Face painted to RAL

Accessories (VA-T-140 only)

- C = Cover plate for wall mounting

Subject to technical alteration.