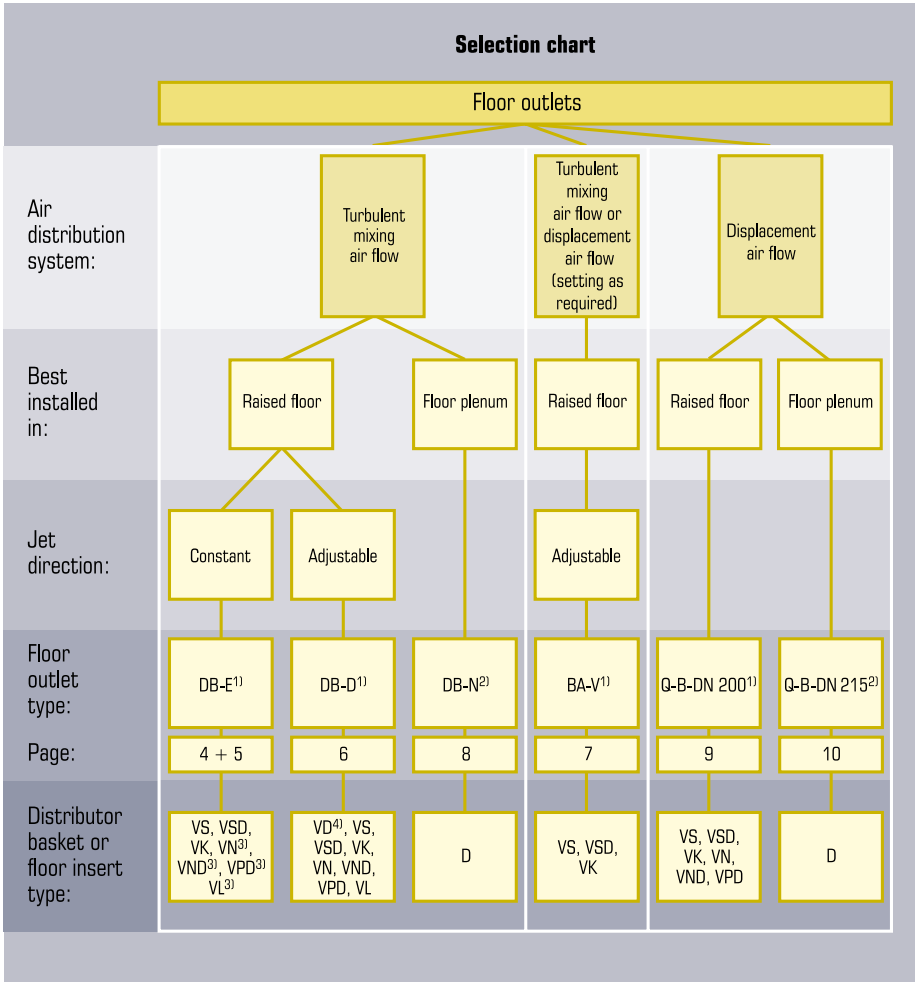




## Floor air outlets

# Floor outlets for a comfortable climate



Floor outlets from KRANTZ KOMPONENTEN have been in extremely successful use for decades. The air supplied by floor outlets flows up in the same direction as the buoyancy forces generated by occupants, machinery, lighting, etc. Heat, air pollutants and odorous substances are thus displaced from the occupied zone into the ceiling zone and removed with the exhaust air. The exchange of indoor air for conditioned supply air is most effective and the air quality in the occupied zone is extraordinarily high.

Positive experience with floor outlets and ongoing development have produced mature systems and new designs. Today, KRANTZ KOMPONENTEN can provide the right floor outlet for any requirement.

Left cover photograph by:  
Luc Saalfeld FOTOGRAFIK,  
BBK / Sächsischer Künstlerbund, Dresden

<sup>1</sup> KRANTZ KOMPONENTEN supplies floor outlets for turbulent mixing air flow and for low-turbulence displacement ventilation

- <sup>1)</sup> Installation in floor plenum on request
- <sup>2)</sup> Installation in raised floor on request
- <sup>3)</sup> VN, VND, VPD and VL types available for size DN 200
- <sup>4)</sup> VD type for DN 125; VS, VSD, VK, VN, VND, VPD and VL types for DN 200

Floor outlets installed in floor tiles



2  
**Turbulent mixing air flow**  
Floor twist outlet  
DB-E-DN 200



3  
**Turbulent mixing air flow**  
Rotary floor twist outlet  
DB-D-DN 200



4  
**Displacement air flow**  
Floor displacement outlet  
Q-B-DN 200

### Key for all figures

- 1 Floor outlet
- 2 Distributor basket
- 3 Throttle device
- 4 Floor insert
- 5 Clamp insert
- 6 Protective collar
- 7 Connection box
- 8 Connection spigot
- 9 Raised floor / Floor plenum
- 10 Flexible branch duct
- 11 Supply air
- 12 Induced indoor air
- 13 Supply air jets
- 14 Return air
- 15 Main return air duct in ceiling zone

## Versatile applications

Floor air outlets from KRANTZ KOMponenten are installed in conventional raised floors or in floor plenums.

**There are two options for air supply (Fig. 5):**

### A) "Pressurized plenum" system

The supply air flows from the pressurized plenum beneath the floor into the air outlets (in raised floors and floor plenums).

### B) "Duct connection" system

The supply air flows from the duct system via flexible branch ducts and rectangular connection boxes into the air outlets (in raised floors).

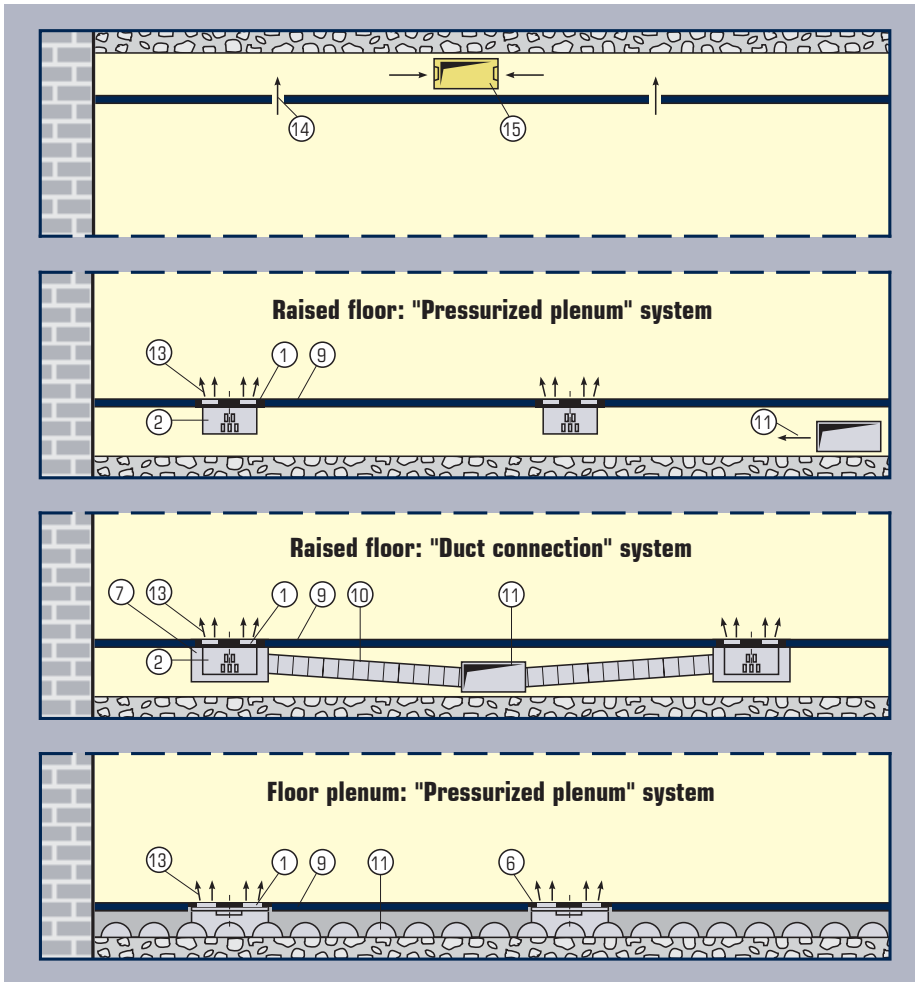
**The air outlet is installed:**

1. either in the stepped bore of a raised floor tile,
2. or in the through bore of a floor tile using a clamp insert, or using a floor insert in floor plenums. The clamp insert and the floor insert have a protective collar on their upper side for bordering the floor cutout around the outlet element. This is particularly suitable for carpeted floors.

Depending on the model, our floor outlets are fitted with a distributor basket or a floor insert; a throttle device for volume flow rate adjustment is available as an optional extra (see Fig. 1 "Selection chart" on page 2).

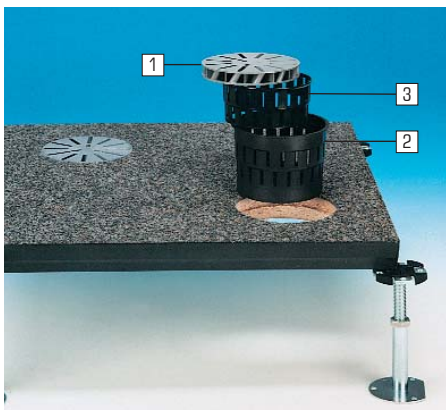
If the room layout is altered,

- in rooms with raised floors the tiles with outlets and those without outlets can be easily interchanged;
- in rooms with floor plenums it is usual to drill additional boreholes with standard drills, where necessary.

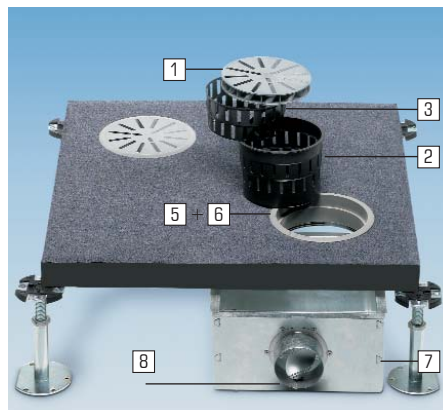


5  
Various systems of air supply to the floor outlets

Installation options for floor outlets showing the floor twist outlet DB-E-DN 150



6  
in stepped bore,  
"pressurized plenum" system

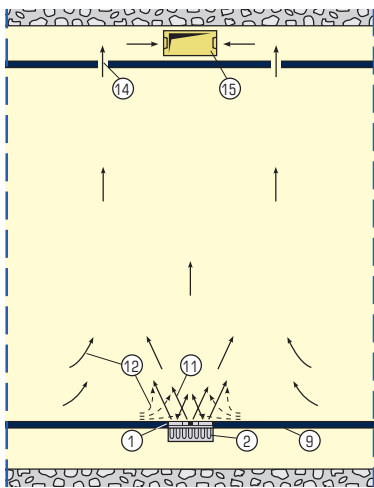


7  
in through bore, with clamp insert,  
"duct connection" system

# Floor outlets for turbulent mixing air flow

## Principle of turbulent mixing air flow

The supply air is discharged upwards at high turbulence; the indoor air around the outlet is intensively induced by the axial-discharge air jets. Due to the high induction effect, the jet velocity decays quickly. Supply air and indoor air temperatures equalize rapidly. Turbulent mixing air flow directed upwards is generated (see Fig. 8).



8 Mode of operation of "turbulent mixing air flow"

## Floor twist outlet

Types DB-E-DN 150 and -DN 200

The supply air is discharged vertically upwards via inclined radial slots. The slot incline generates the twist effect which enhances the turbulence and induction effect of the axial-discharge supply air jets.

### Features:

- High-induction, stable vertical jet with symmetric rotation
- For **raised floors**, for installation either in a stepped bore or - with clamp insert - in a through bore of the floor tile
- Twist element and clamp insert available in plastic and aluminium
- Depending on type, air outlet element fitted with lock against unauthorized removal
- Suitable for connection to a "pressurized plenum" system or - with connection box - to a "duct connection" system
- With distributor basket for even air supply, with or without throttle device for volume flow rate adjustment; type options VS, VSD, VK, VN, VND, VPD, VL (see Fig. 10-14)



9

Nominal diameter		DN 150	DN 200
Air volume flow rate	l/s (m <sup>3</sup> /h)	5.5 – 14 (20 – 50)	14 – 50 (50 – 180)
- when used by occupants, max.	l/s (m <sup>3</sup> /h)	12.5 (45)	42 (150)
Max. temperature difference supply air–return air	K	±10	±10
Supply air temperature	°C	18 – 30	18 – 30
Material <sup>1)</sup>			
- Air outlet element		Al <sup>3)</sup> or PC <sup>2)</sup>	
- Distributor basket		PC <sup>2)</sup>	PC <sup>2)</sup> or St
- Clamp insert		PC <sup>2)</sup>	Al <sup>3)</sup> or PC <sup>2)</sup>
- Connection box			St
Max. load-bearing capacity <sup>4)</sup>			
- Al	kg	2 500	1 400
- PC	kg	800	600
For tile size		Max. number of air outlets per floor tile	
- 500 mm x 500 mm		2	1
- 600 mm x 600 mm		4	1
Min. air outlet centre spacing, approx.	m	0.3	0.6
Min. spacing from seat to air outlet, approx.	m	1	1.5

<sup>1)</sup> PC = polycarbonate; Al = aluminium; St = galv. sheet metal

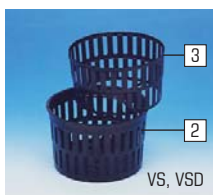
<sup>2)</sup> Other material on request

<sup>3)</sup> Powder coating on request

<sup>4)</sup> With reference to a vertical load applied onto the outlet centre, over 50 mm diameter

### Technical layout to DS 1146

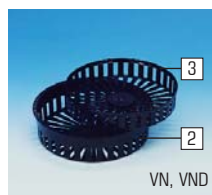
Air jet pattern of DB-E-DN 200



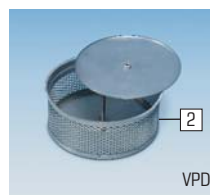
10 Distributor basket **Standard design**  
With throttle device: VSD type  
(Without throttle device: VS type)



11 Distributor basket **Short design**  
For raised floors with low pressurized plenum height; without throttle device: VK type



12 Distributor basket **Low design**  
Openable basket bottom for additional air intake from below, best used for raised floors with thicker tiles and low pressurized plenum height, with throttle device: VND type (Without throttle device: VN type); available for size DN 200



13 Distributor basket **Perforated sheet metal design**  
Best used for floor outlets made of aluminium, with throttle device: VPD type, available for size DN 200



14 Distributor basket **Short design with fixed damper**  
VL type, available for size DN 200; best used for assembly rooms



15 Connection box for duct connection

# Floor twist outlet - Field applications

As supplied to: Siemens AG, Transport Techn. Department, Berlin / D; Gemeentelijke Electriciteit Bedrijven, head office, Tilburg / NL; Lloyds of London, new building, London / GB

16

DN 150 in an office



DN 150 in an open-plan office (Section), Siemens in Milan / Italy



17

DN 200 at Windword Technology Center, Alharetta / USA



18

DN 200 in the administrative building of the First Boston Corp., New York / USA



19



20

DN 150 in the control centre of the Nederlandse Spoorwegen Verkeersleiding, Amsterdam / NL

# Rotary floor twist outlet

## Types DB-D-DN 125 and -DN 200

The rotary floor twist outlet has inclined, partly radial, partly semicircular air slots. The slot incline and the dissimilar slot shapes generate high-induction supply air jets inclined at about 30° to vertical. The jet direction can be individually adjusted by manually rotating the outlet element (Fig. 25-27); thus, the air velocity in the head zone of the person seated next to the outlet can be altered to suit personal requirements, from undetectable air flow to a refreshing breeze.

### Features:

- High-induction air jet inclined at 30° to vertical; rotatable outlet element
- For **raised floors**, for installation with clamp insert in a through bore of the floor tile; type DN 200 also designed for installation in a stepped bore
- Twist element and clamp insert available in plastic and aluminium
- Depending on type, air outlet element fitted with lock against unauthorized removal
- Suitable for connection to a "pressurized plenum" system or - with connection box - to a "duct connection" system
- With distributor basket for even air supply, with or without throttle device for volume flow rate adjustment; type VD for DN 125 (Fig. 21-22) and type options VS, VSD, VK, VN, VND, VPD, VL for DN 200 (Fig. 10-14)

Nominal diameter		DN 125	DN 200
Air volume flow rate	l/s	5.5 – 16.5	14 – 50
	m <sup>3</sup> /h	20 – 60	50 – 180
	- when used by occupants, max.	14 50	42 150
Max. temperature difference supply air–return air	K	±10	±10
Supply air temperature	°C	18 – 30	18 – 30
Material <sup>1)</sup>			
- Air outlet element		PC <sup>2)</sup>	Al <sup>3)</sup> or PC <sup>2)</sup>
- Distributor basket		PC <sup>2)</sup>	PC <sup>2)</sup> or St
- Clamp insert		PC <sup>2)</sup>	Al <sup>3)</sup> or PC
- Connection box			St
Max. load-bearing capacity <sup>4)</sup>			
- Al	kg	–	1 200
- PC	kg	600	400
For tile size		Max. number of air outlets per floor tile	
- 500 mm x 500 mm		4	1
- 600 mm x 600 mm		4	1
Min. air outlet centre spacing, approx.	m	0.25	0.6
Min. spacing from seat to air outlet, approx.	m	0.5	0.5

DN 125  
With clamp insert and VD distributor basket



21

DN 125  
As in Fig. 21 but with floor tile for 4 air outlets



22

DN 200  
With clamp insert



23

- 1) PC = polycarbonate; Al = aluminium;  
St = galv. sheet metal  
2) Other material on request  
3) Powder coating on request  
4) With reference to a vertical load applied onto the outlet centre, over 50 mm diameter

### Technical layout to DS 4074

### Rotary floor twist outlet in an office



24



25



26



27

Jet pattern at various settings of the outlet

As supplied for the SDS building  
of Samsung Corp., Seoul / Korea

## Adjustable floor outlet Type BA-V-DN 150

The air outlet element is fitted with 12 outer slots and 6 inner slots as well as an adjustment disc at its bottom. The adjustment disc enables to change the discharge pattern from "floor twist outlet" type to "floor displacement outlet" type and vice versa.

If the adjustment disc is in top position, all inner slots are closed. The outlet operates as a floor twist outlet for turbulent mixing air flow, with vertical upflow.

If the adjustment disc is in bottom position, the supply air is discharged through all of the slots. Thanks to the special shape of the slots, the air jets are deflected to horizontal. The outlet then operates as a floor displacement outlet.

The outlet is installed in the floor according to Fig. 6 + 7 (page 3).

### Features:

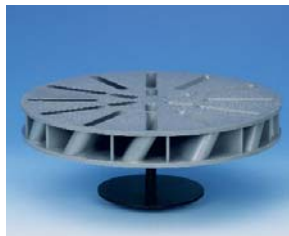
- Operates as a floor twist outlet or floor displacement outlet
- For **raised floors**, for installation in a stepped bore or - with clamp insert - in a through bore of the floor tile
- Twist element and clamp insert made of plastic
- Suitable for connection to a "pressurized plenum" system or - with connection box - to a "duct connection" system
- With distributor basket for even air supply, with or without throttle device for volume flow rate adjustment, type options VS, VSD, VK (Fig. 10-11)



28

Adjustable floor outlet, type BA-V-DN 150, in the VARA Studios, Hilversum / NL

Outlet element with adjustment disc



29

Air jet pattern "displacement flow"



30

Air jet pattern "turbulent mixing air flow"



31

Nominal diameter		<b>DN 150</b>
Air volume flow rate	l/s m <sup>3</sup> /h	5.5 – 14 20 – 50
Operation as		
<b>Floor twist outlet</b>		
Max. temperature difference supply air–return air	K	±10
Supply air temperature	°C	18 – 30
<b>Floor displacement outlet</b>		
Max. temperature difference supply air–indoor air <sup>1)</sup>	K	–1 to –4
Supply air temperature	°C	≥ 20
Coverage radius	m	4 – 5
Material <sup>2)</sup>		
- Air outlet element		PC
- Distributor basket		PC
- Clamp insert		PC
Min. spacing from seat to air outlet	m	1
Max. load-bearing capacity <sup>3)</sup>	kg	800

<sup>1)</sup> At head level of seated person

<sup>2)</sup> PC = polycarbonate

<sup>3)</sup> With reference to a vertical load applied onto the outlet centre, over 50 mm diameter



32

Adjustable floor outlet, type BA-V-DN 150, in a slot machine hall at "Holland Casino" in Utrecht / NL

Technical layout to DS 4047

# NTK floor twist outlet

## Type DB-N-DN 215

Outlet designed for installation in floor plenums. The supply air is discharged upwards by the twist element fitted with a number of inclined slots arranged radially on its periphery. The circular outlet centre has a recess for insertion of carpeting.

### Features:

- Slim vertical jet with intensive admixture of indoor air
- For low-height **floor plenums**, for installation in a floor opening
- Twist element and floor insert made of plastic
- For connection to a "pressurized plenum" system
- Floor insert fitted with perforated throttle disc of type D (Fig. 33-34) easy to adjust during system tuning
- Central recess for insertion of carpeting; as an option, recess fitted with lid

Nominal diameter		DN 215
Air volume flow rate	l/s m <sup>3</sup> /h	8,5 – 16,5 30 – 60
Max. temperature difference supply air–return air <sup>1)</sup>	K	±10
Supply air temperature	°C	18 – 30
Material <sup>2)</sup>		PC
Mounting diameter	mm	214
Min. air outlet centre spacing, approx.	m	0.6
Min. spacing from seat to air outlet, approx.	m	0.8
Max. load-bearing capacity <sup>3)</sup>	kg	200

<sup>1)</sup> At head level of seated person

<sup>2)</sup> PC = polycarbonate

<sup>3)</sup> With reference to a vertical load applied onto the outlet centre, over 50 mm diameter

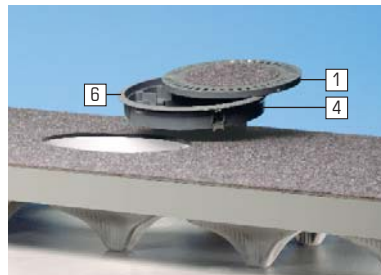
### Technical layout to DS 1277

DB-N-DN 215-D



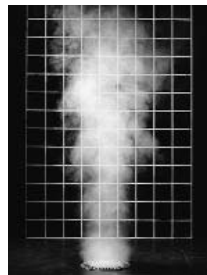
33

DB-N-DN 215-D prior to installation  
Floor insert with throttle device of type D,  
and floor plenum with opening



34

Air jet pattern of  
DB-N-DN 215



35

NTK floor twist outlet in a corridor at  
Gruner und Jahr AG & Co. KG, Hamburg / D



36

NTK floor twist outlet in the office building of DEKRA in Stuttgart / D



37



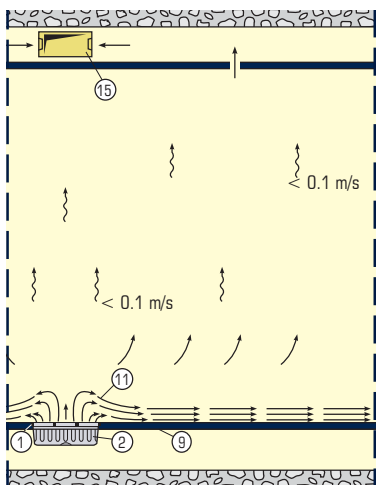
38

NTK floor twist outlet in an open-plan office of  
Carl Schenk AG, Darmstadt / D

# Floor outlets for displacement ventilation

## Principle of displacement ventilation

In displacement ventilation, the supply air is discharged at low turbulence at 1 to 4 K under the room air temperature. The cooler supply air flows downwards to the floor and spreads horizontally, in circles, creating a thin layer of cool air. Following the buoyancy forces generated by occupants, electrical equipment, etc., the air moves upwards, at very low velocity, through the occupied zone to the ceiling area where it is exhausted as warm, contaminated air (Fig. 39).



39 Mode of operation of displacement ventilation (low-turbulence displacement air flow)

## Floor displacement outlet Type Q-B-DN 200

The air outlet element has slots arranged like a star as well as perforations in its centre. Thanks to the special shape of the slots, the air jets are deflected to horizontal.

### Features:

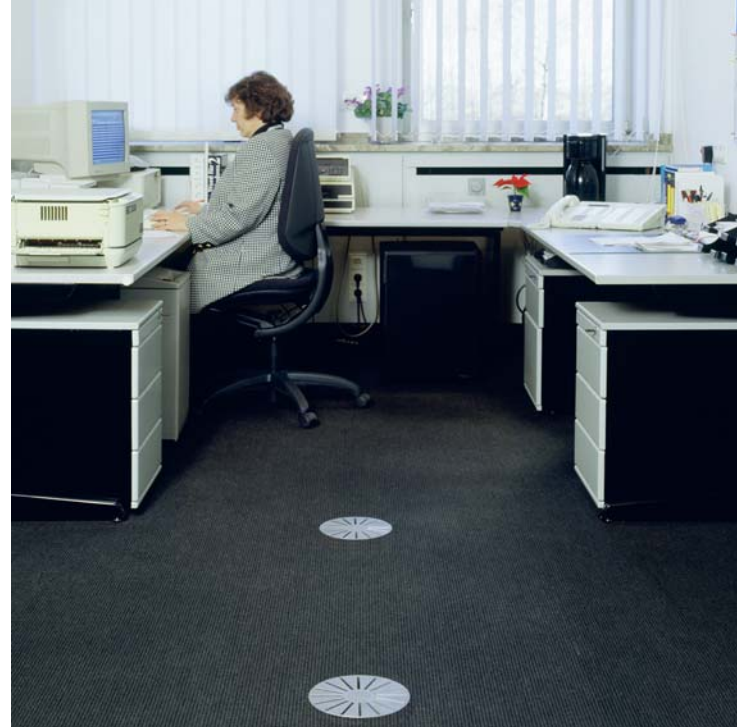
- Radial, horizontal jet dispersion
- For **raised floors**, for installation in a stepped bore or - with clamp insert - in a through bore of the floor tile
- Twist element and clamp insert made of aluminium
- Suitable for connection to a "pressurized plenum" system or - with connection box - to a "duct connection" system
- With distributor basket for even air supply, with or without throttle device for volume flow rate adjustment, type options VS, VSD, VK, VN, VND, VPD (Fig. 10-13)

Nominal diameter		DN 200
Air volume flow rate	l/s	≤ 28
	m <sup>3</sup> /h	≤ 100
Max. temperature difference supply air–indoor air <sup>1)</sup>	K	- 1 to - 4
Supply air temperature	°C	≥ 20
Coverage radius	m	4 – 5
Material <sup>2)</sup>		
- Air outlet element		Al <sup>3)</sup>
- Distributor basket		PC or St
- Clamp insert		Al
Min. spacing from seat to air outlet	m	0.8
Max. load-bearing capacity <sup>4)</sup>	kg	1 500

- 1) At head level of seated person
- 2) PC = polycarbonate; Al = aluminium; St = galv. sheet metal
- 3) With powder coating on request
- 4) With reference to a vertical load applied onto the outlet centre, over 50 mm diameter

### Technical layout to DS 4062

As supplied for:  
Union Krankenversicherung AG, Saarbrücken / D;  
Congress Center Messe Frankfurt, Frankfurt am Main / D



40

Q-B-DN 200 in an office

Q-B-DN 200 in floor tile with stepped bore

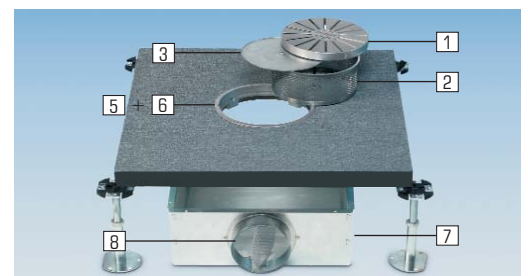


41

Q-B-DN 200 with clamp insert in floor tile



42



43

Q-B-DN 200 with clamp insert, distributor basket with throttle device of type VPD, and connection box for duct connection



44

Air jet pattern of Q-B-DN 200

# Floor displacement outlet

## Type Q-B-DN 215

The supply air is discharged by a number of radial slots arranged on the periphery of the outlet element. Since the slot outer edges are inclined at alternate angles to horizontal, the supply air jets are more or less broadly spread and their velocity reduced accordingly.

### Features:

- Radial, horizontal jet dispersion
- For low-height **floor plenums**, for installation in a floor opening
- Twist element and floor insert made of plastic
- For connection to a "pressurized plenum" system
- Floor insert fitted with perforated throttle disc of type D (Fig. 45)
- Central recess for insertion of carpeting; as an option, recess fitted with lid

Nominal diameter	<b>DN 215</b>	
Air volume flow rate	l/s m <sup>3</sup> /h	≤ 14 ≤ 50
Max. temperature difference supply air–indoor air <sup>1)</sup>	K	–1 to –4
Supply air temperature	°C	≥ 20
Coverage radius	m	4 – 5
Material <sup>2)</sup>	PC	
Mounting diameter	mm	214
Min. spacing from seat to air outlet	m	1
Max. load-bearing capacity <sup>3)</sup>	kg	150

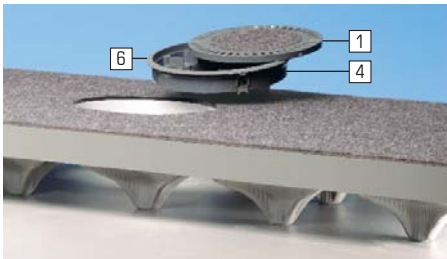
<sup>1)</sup> At head level of seated person

<sup>2)</sup> PC = polycarbonate

<sup>3)</sup> With reference to a vertical load applied onto the outlet centre, over 50 mm diameter

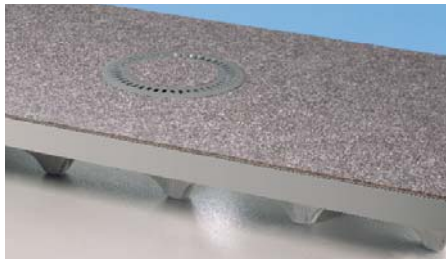
### Technical layout to DS 4007

Q-B-DN 215 prior to installation  
Floor insert with throttle device of type D,  
and floor plenum with opening



45

Q-B-DN 215 installed in floor plenum



46

Air jet pattern of Q-B-DN 215



47

Q-B-DN 215 in an open-plan office of the Bayerische Vereinsbank,  
Frankfurt/Main / D



48



49

Q-B-DN 215 in a meeting room at Lotto Rheinland-Pfalz, Koblenz / D

# Customized floor air outlets



The challenge here was to skilfully fit the outlets into the marble tiles and to match up the outlet colour with the tile colour



50

Floor twist outlet of type DB-E-DN 200 in the marble floor of the multi-purpose room of the Oesterreichische Kontrollbank AG, Vienna / A

Floor twist outlet of type DB-E-DN 200 in the "KOSMOS UFA-Palast" cinema in Berlin / D, placed under the seating surface



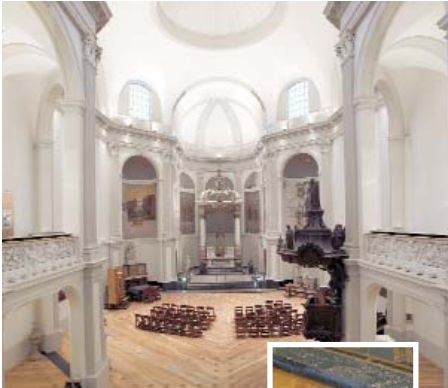
51

Floor twist outlet of type DB-EA-DN 150 at "Holland Casino", Utrecht / NL



52

Floor twist outlet of type DB-EA-DN 200 in the church of Oecumenische Basissgemeente De Duif, Amsterdam / NL



53



Fig. 54: Crosstalk silencer for reducing sound transmission from room to room where there is a common raised floor

For installation under the distributor basket and fastening to the floor tile

Available for air outlets to be installed in raised floors with adequate plenum height

Details on dimensions and insertion loss on request



54  
Crosstalk silencer



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