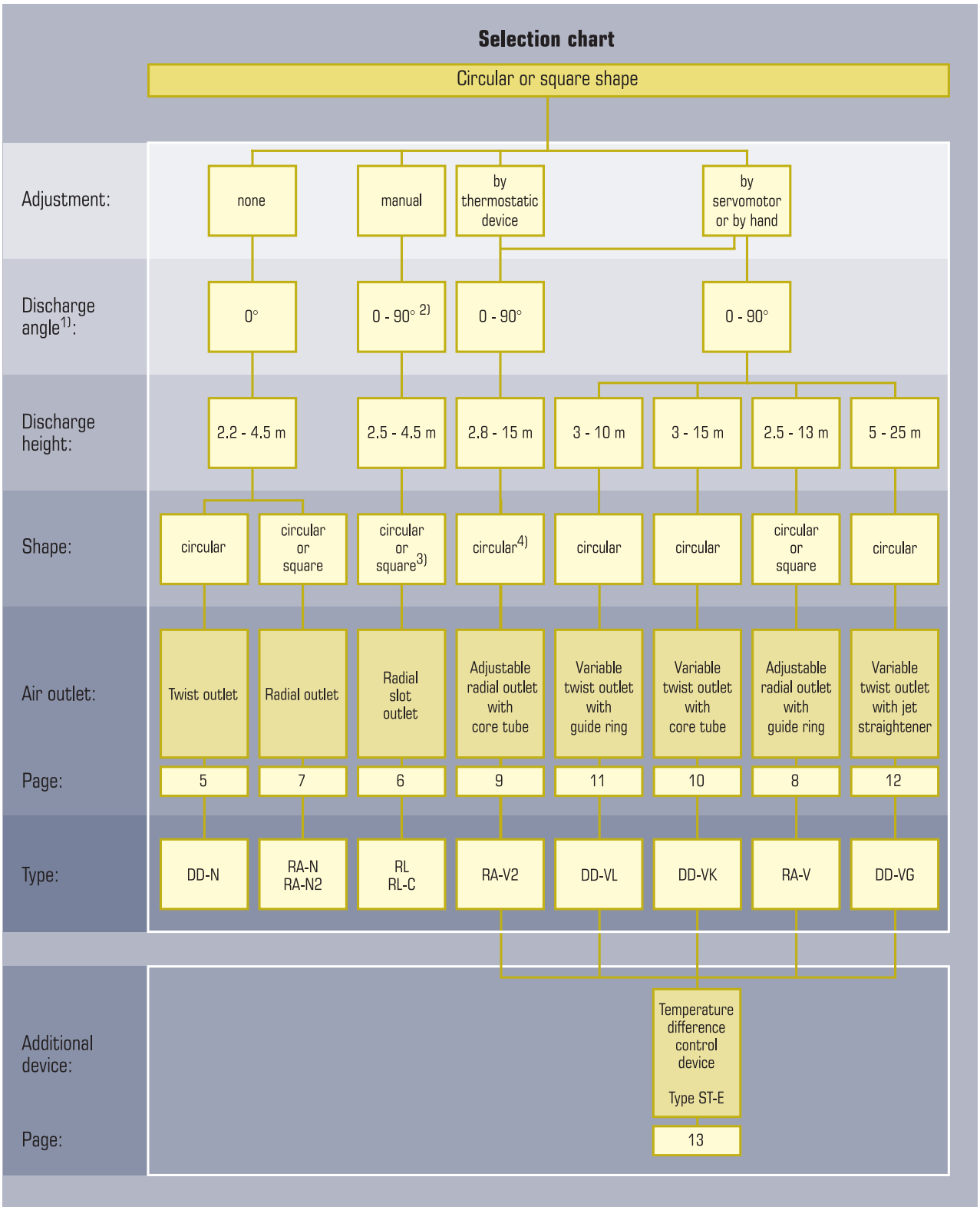
Krantz KOMPONENTEN®
Applied system solutions

Ceiling air outlets

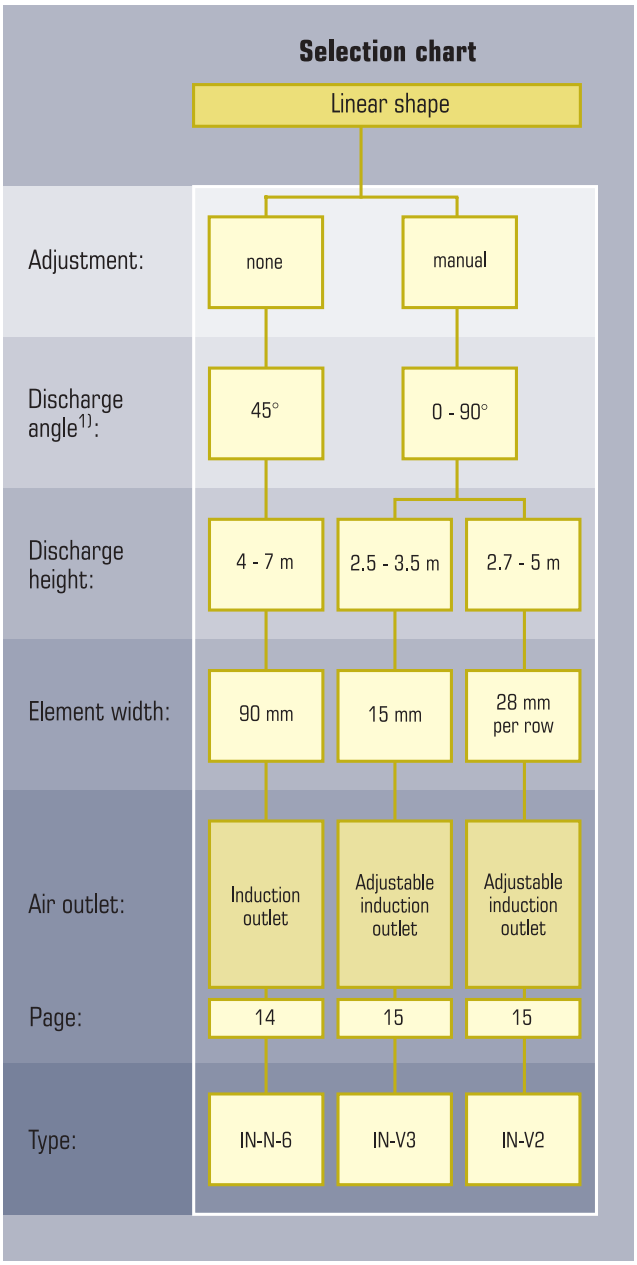
Turbulent mixing air flow

Turbulent mixing air flow
Ceiling air outlets

Circular or square shape



Linear shape

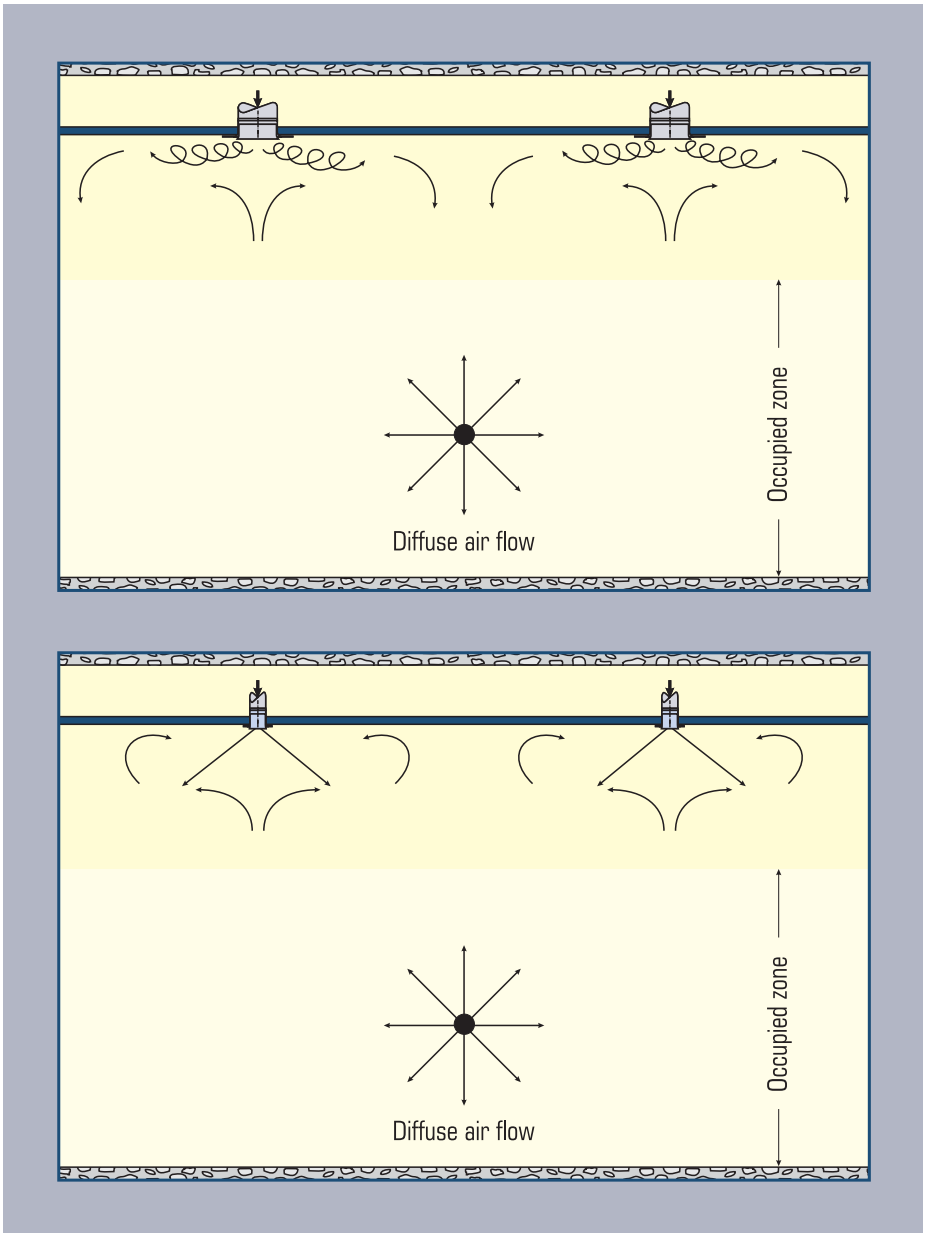


1) To horizontal
2) Best between 0 - 30°
3) RL-C only with circular visible surface
4) Square visible surface on request

KRANTZ KOMPONENTEN ceiling air outlets for turbulent mixing air flow have been in very successful use for decades.

We have continually extended our range of air outlets both in design and mode of operation. It now includes circular, square, and linear air outlets whose discharge direction is either constant or steplessly adjustable.
Our broad range of air outlets can be used at discharge heights varying from 2.2 to 25 m.

Our ceiling air outlets generate a diffuse air flow with the following features:
- **draught-free indoor air flow,**
- **intensive flushing of the occupied zone,**
- **even temperature distribution.**



Discharge pattern of diffuse air distribution systems

top: twist or radial outlets
bottom: linear induction outlets

Circular or square shape

Twist outlet
Type DD-N

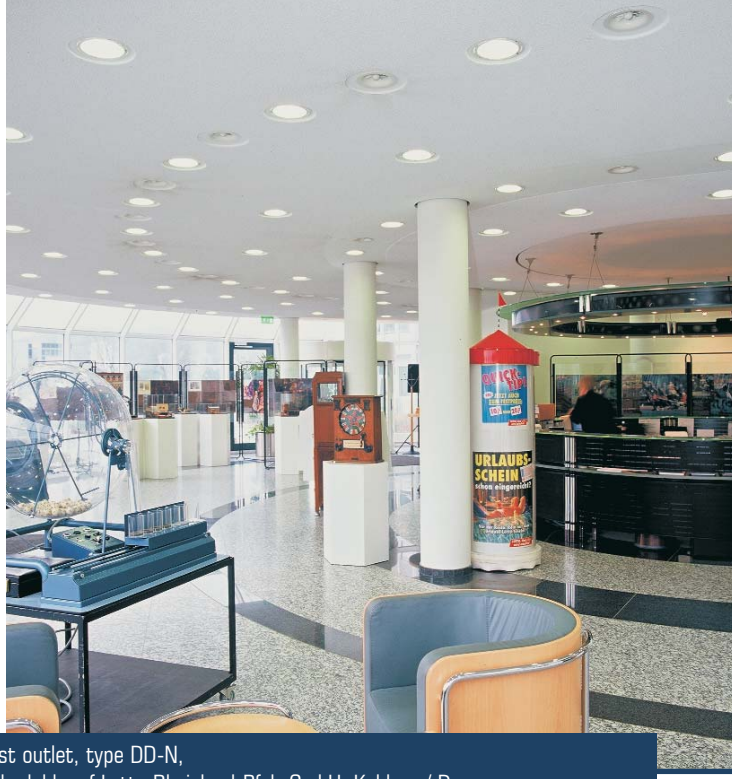
For installation flush with the ceiling or free-hanging, or placement above open grid ceilings.

The air outlet has fixed, non-adjustable twist vanes and a curved exit. It generates twisted high-turbulence air jets that are subject to the Coanda effect owing to the curved exit, i.e. the supply air jets slide along the outlet exit and enter the room with a radial, horizontal flow.

Features:
- Radial, horizontal jet dispersion
- Connection to flexible duct or spiral seam duct via reducer or connection box
- Convenient screw fastening from below
- Perforated cover screen available on request
- Also available as return air inlet

Volume flow rate range:	11 – 265 l/s 40 – 950 m³/h
Nominal sizes:	DN 100 to DN 355
Discharge height:	2.2 – 4.5 m
Max. temperature difference supply air – indoor air:	–12 K when cooling +5 K when heating

Technical layout to DS 1175



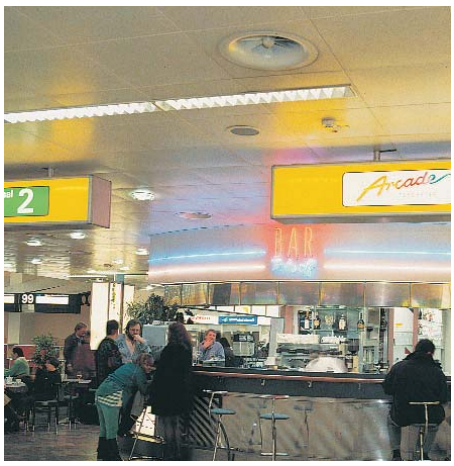
Twist outlet, type DD-N,
in the lobby of Lotto Rheinland-Pfalz GmbH, Koblenz / D

Twist outlet, type DD-N,
with perforated cover screen

Twist outlet, type DD-N

Air jet pattern of DD-N

Twist outlet, type DD-N, in the canteen
at 'Swarovski Kristallwelten', Wattens / A



Twist outlet, type DD-N, in a terminal
at the Vienna Airport / A

Radial slot outlet
Type RL and type RL-C

For installation flush with the ceiling or free-hanging from the ceiling.

The linear slot bars in radial array are adjustable to enable manual alteration of the discharge direction. The best discharge direction is horizontal. The bars are almost flush with the visible surface.

Features:
- Discharge direction manually adjustable from horizontal to a downward incline
- Radial jet dispersion
- Individual slots can be closed, thus enabling asymmetric jet dispersion
- Convenient screw fastening from below
- Also available as return air inlet

Type RL
- With square visible surface
- With square or circular bar array
- With rectangular connection box

Type RL-C
- With circular bar array
- Circular-type air outlet element and connection box

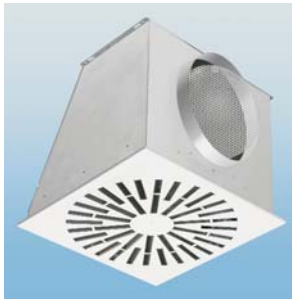
Volume flow rate range:	
Type RL	20 – 330 l/s 75 – 1 200 m³/h
Type RL-C	22 – 235 l/s 80 – 850 m³/h
Nominal sizes:	
Type RL	300 – 800
Type RL-C	375, 470, 600 and 750
Discharge height:	2.5 – 4.5 m
Max. temperature difference supply air – indoor air:	–12 K when cooling +5 K when heating

Technical layout to DS 4081 and DS 4121

Radial slot outlets

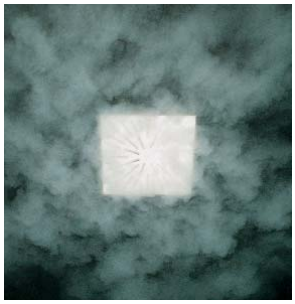
Type RL-Q
(square bar array)

Type RL-R
(circular bar array)



Type RL-C
(circular design)

Air jet pattern of RL



Radial slot outlet, type RL-Q,
in the canteen at Maul-Belser Media Group, Nuremberg / D

Radial slot outlet, type RL-Q, at the Radisson SAS Hotel, Cologne / D

Radial outlet

Type RA-N and type RA-N2 in new design

For installation flush with the ceiling or free-hanging, or placement above open grid ceilings.

The radial vanes of this air outlet are bent and end flush with the discharge plane. In conjunction with the slanting outlet exit they generate radial, high-turbulence and horizontal-discharge supply air jets. A high level of thermal comfort is thus achieved.

Features:

- Radial, horizontal jet dispersion
- With circular or square visible surface
- Low height
- Connection to flexible duct or spiral seam duct via reducer or connection box
- Convenient screw fastening from below
- Also available as return air inlet

Type RA-N2

- New design - 24 radial vanes

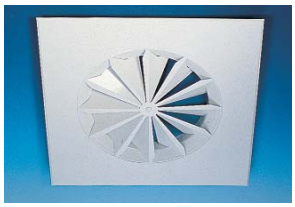
Volume flow rate range:	
Type RA-N	11 – 555 l/s 40 – 2 000 m³/h
Type RA-N2	28 – 395 l/s 100 – 1 420 m³/h
Nominal sizes:	
Type RA-N	DN 100 to DN 500
Type RA-N2	DN 250 to DN 500
Discharge height:	2.2 – 4.5 m
Max. temperature difference supply air – indoor air:	–12 K when cooling +5 K when heating

Technical layout to DS 4012 and DS 4120

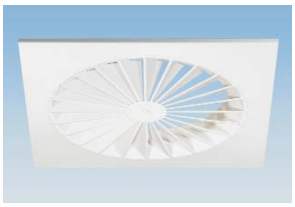
Radial outlet, type RA-N, in the counter hall of the Hamburger Bank, branch office Osterstraße, Hamburg / D

Radial outlets

Type RA-N
top: circular visible surface
bottom: square visible surface



Type RA-N2
top: square visible surface
bottom: with connection box



Air jet pattern of RA-N and RA-N2

Radial outlet, type RA-N, in a shop of Gerich KG, Wiesbaden / D

Adjustable radial outlet
Type RA-V with guide ring

For installation flush with the ceiling or free-hanging in high halls, particularly suitable for large thermal load fluctuations.

This outlet is fitted with a fixed diaphragm positioned under the radial vanes. The discharge direction can be adjusted by rotating a vertically mobile guide ring. If the guide ring is in upper position, the air jets deflected by the radial vanes slide along the outlet exit and are discharged horizontally. If the guide ring is moved downwards, the supply air jets shift progressively to a vertical direction.

Features:

- Discharge direction steplessly adjustable from horizontal to vertical, manually or with servomotor
- Radial jet dispersion
- Shorter heating-up period with vertical discharge direction
- Connection to spiral seam duct or connection box
- Low height

Volume flow rate range:	33 – 1 530 l/s 120 – 5 500 m³/h
Nominal sizes:	DN 200 to DN 500
Discharge height:	2.5 – 13 m
Max. temperature difference supply air – indoor air:	–12 K when cooling +15 K when heating

Technical layout to DS 4063

Adjustable radial outlet,
type RA-V

Air jet pattern of RA-V
below: horizontal discharge
(cooling mode)
left: vertical discharge
(heating mode)

Adjustable radial outlet, type RA-V,
in the restaurant at Holland Casino, Valkenburg / NL

Adjustable radial outlet, type RA-V,
in the Mercedes-Benz Customer Centre, Rastatt / D

Adjustable radial outlet with core tube
Type RA-V2

For installation flush with the ceiling or free-hanging, suitable for commercial or industrial applications.
Continuous adjustment of the discharge direction for both cooling and heating.
Adjustment occurs via a self-acting, temperature-related adjusting unit positioned inside the outlet. Motorized or manual adjusting device available as an option.

Features:
- Discharge direction steplessly adjustable from horizontal to vertical
- With self-acting thermostatic adjusting unit, or adjustment via electric servomotor or manual device
- Circular visible surface[1)]
- Radial jet dispersion when cooling
- Shorter heating-up period with vertical discharge direction
- Connection to spiral seam duct or connection box

Volume flow rate range:	83 – 3 055 l/s 300 – 11 000 m³/h
Nominal sizes:	DN 250 to DN 710
Discharge height:	2.8 – 15 m
Max. temperature difference supply air – indoor air:	–12 K when cooling +12 K when heating

[1)] Square visible surface on request

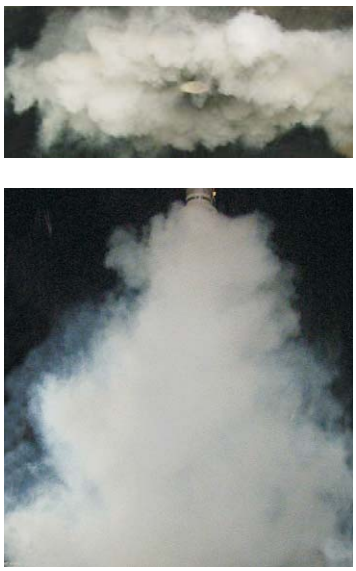
Technical layout to DS 4122

Radial outlet, type RA-V2, at Kintex Fairgrounds, Goyang City / ROK

Adjustable radial outlet, type RA-V2, for duct connection

Adjustable radial outlet, type RA-V2, with connection box

Adjustable radial outlet, type RA-V2 (visible surface)



Air jet pattern of RA-V2
top: cooling mode
bottom: heating mode

Variable twist outlet with core tube
Type DD-VK

For installation flush with the ceiling or free-hanging in high halls, particularly suitable for large thermal load fluctuations.

The air outlet consists of a circular casing with moulded exit, a core tube, and fixed twist vanes in-between. The discharge direction can be steplessly adjusted from horizontal (cooling mode) to vertical (heating mode).

Features:

- Discharge direction steplessly adjustable from horizontal to vertical, manually or with servomotor
- Radial jet dispersion
- Shorter heating-up period with vertical discharge direction
- Connection to spiral seam duct or connection box
- Also available with rounded intake for high acoustic requirements

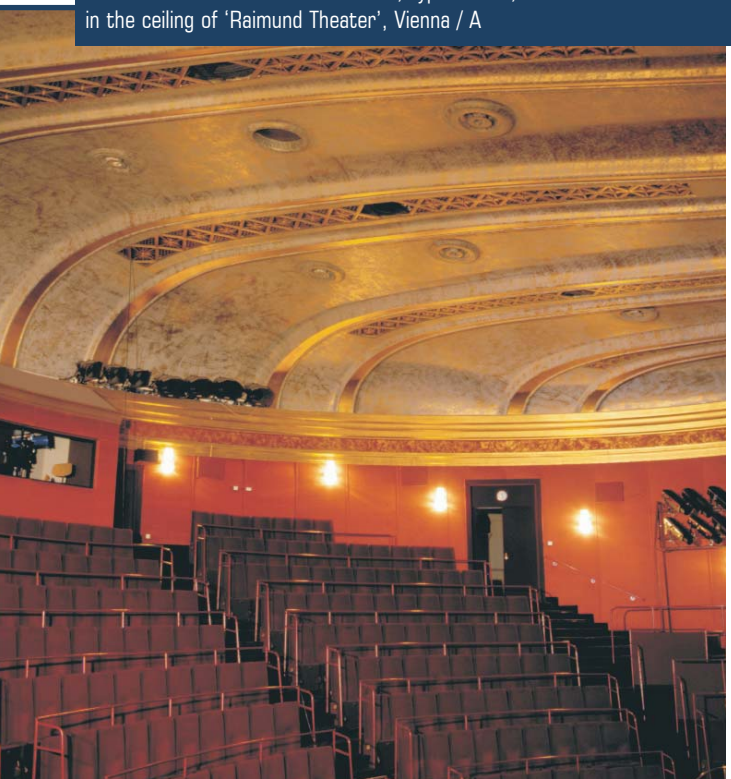
Volume flow rate range:	125 – 3 050 l/s 450 – 11 000 m³/h
Nominal sizes:	DN 315, 400, 600 and 710
Discharge height:	3 – 15 m
Max. temperature difference supply air – indoor air:	–12 K when cooling +15 K when heating

Technical layout to DS 1256

Variable twist outlet
with core tube, type DD-VK

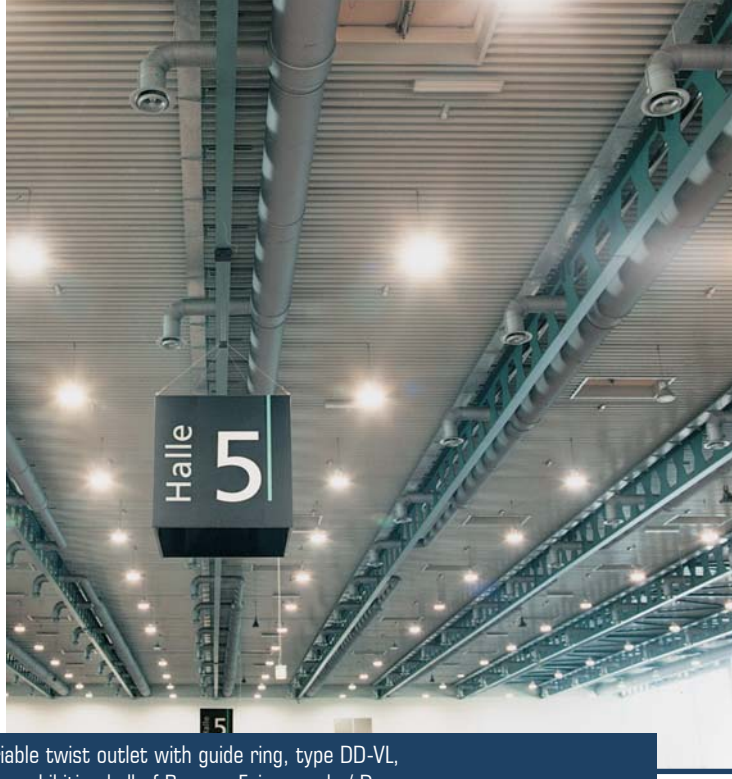
Air jet pattern of DD-VK
below: horizontal discharge
(cooling mode)
left: vertical discharge
(heating mode)

Variable twist outlet with core tube, type DD-VK,
in the ceiling of 'Raimund Theater', Vienna / A



Variable twist outlet with core tube, type DD-VK,
in a production hall at Alcatel SEL, Gunzenhausen / D

Variable twist outlet with guide ring
Type DD-VL



Variable twist outlet with guide ring, type DD-VL,
in an exhibition hall of Bremen Fairgrounds / D

For installation flush with the ceiling or free-hanging in high halls, particularly suitable for large thermal load fluctuations and high acoustic requirements.

The air outlet consists of a circular casing with moulded exit and built-in twist vanes. A vertically mobile guide ring is fitted under the vanes. If the guide ring is moved downwards, part of the supply air glides along the curved exit and flows out horizontally (Coanda effect); the vertical penetration depth decreases. When the guide ring is in bottom position, all of the supply air is discharged horizontally. This discharge direction corresponds to the cooling mode.

When the guide ring is in its uppermost position and touches the outlet exit, this prevents the Coanda effect, and twisted high-turbulence air jets are discharged vertically. This discharge direction corresponds to the heating mode.

Thanks to the good aerodynamic properties of the twist vanes, the sound power level is low.

Features:

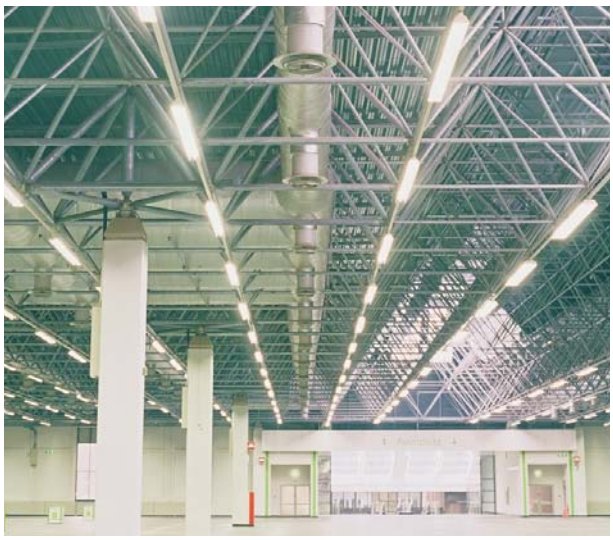
- Discharge direction adjustable from horizontal to vertical, manually or with servomotor
- Radial jet dispersion
- Shorter heating-up period with vertical discharge direction
- Connection to spiral seam duct or connection box
- Low sound power level

Volume flow rate range:	170 – 2 500 l/s 600 – 9 000 m³/h
Nominal sizes:	DN 315, DN 400 and DN 630
Discharge height:	3 – 10 m
Max. temperature difference supply air – indoor air:	–10 K when cooling +15 K when heating

Technical layout to DS 4033

Variable twist outlet with guide ring, type DD-VL

Air jet pattern of DD-VL
below: horizontal discharge (cooling mode)
left: vertical discharge (heating mode)



Variable twist outlet with guide ring, type DD-VL,
in an exhibition hall of Cologne Fairgrounds / D

Variable twist outlet with jet straightener
Type DD-VG

For installation flush with the ceiling or free-hanging in very high halls, particularly suitable for large thermal load fluctuations combined with a high temperature difference between supply air and indoor air when heating.

This air outlet is similar to the DD-VL type, with its guide ring being fitted with a jet straightener. The jet straightener significantly raises the jet penetration depth when heating.

When cooling, the jet pattern is identical with that of the DD-VL type.

Features:

- Discharge direction adjustable from horizontal to vertical, manually or with servomotor
- Radial jet dispersion
- Shorter heating-up period with vertical discharge direction
- Connection to spiral seam duct or connection box
- Same construction as DD-VL, but in addition with jet straightener
- Very large penetration depth when heating

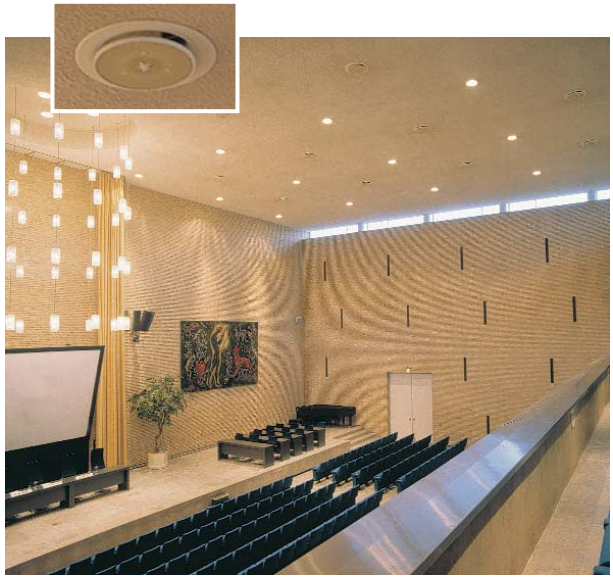
Volume flow rate range:	170 – 2 500 l/s 600 – 9 000 m³/h
Nominal sizes:	DN 315, DN 400 and DN 630
Discharge height:	5 – 25 m
Max. temperature difference supply air – indoor air:	–10 K when cooling +20 K when heating

Technical layout to DS 4033

Variable twist outlet with jet straightener, type DD-VG

Air jet pattern of DD-VG (heating mode)

Variable twist outlet with jet straightener, type DD-VG, in the Lufthansa aircraft painting hangar, Hamburg / D



Variable twist outlet with jet straightener, type DD-VG, in a lecture hall of the 'Katholieke Universiteit Brabant', Tilburg / NL

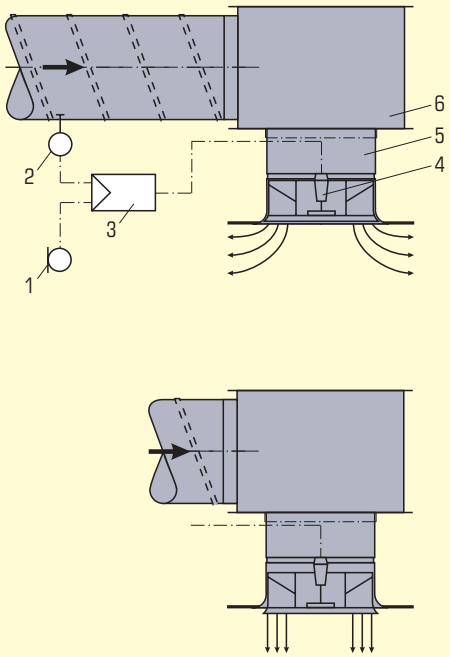
Temperature difference control device
Type ST-E

For automatic adjustment of the discharge direction of adjustable air outlets in response to the temperature difference between supply air and indoor air.

The discharge direction of motor-adjusted air outlets can be automatically controlled by this electronic device responding to the temperature difference between supply air and indoor air. If the supply air is colder than the indoor air, the supply air discharge varies from horizontal to a downward incline; with the supply air temperature rising, the air jets are discharged at a steeper downward incline up to vertical.

Features:
- Automatic adjustment of discharge direction to cooling or heating load
- Setpoint curve with a maximum of 11 breakpoints
- Two setpoint curves, e.g. for lowering the volume flow rate
- Operating range for a temperature difference of ± 20 K
- Fixed-position control easy to set, e.g. for heating-up operation
- Minimum and maximum limitation of control signal
- For electric servomotors 0-10 V
- For single air outlets or groups of outlets

Technical layout to DS 1282

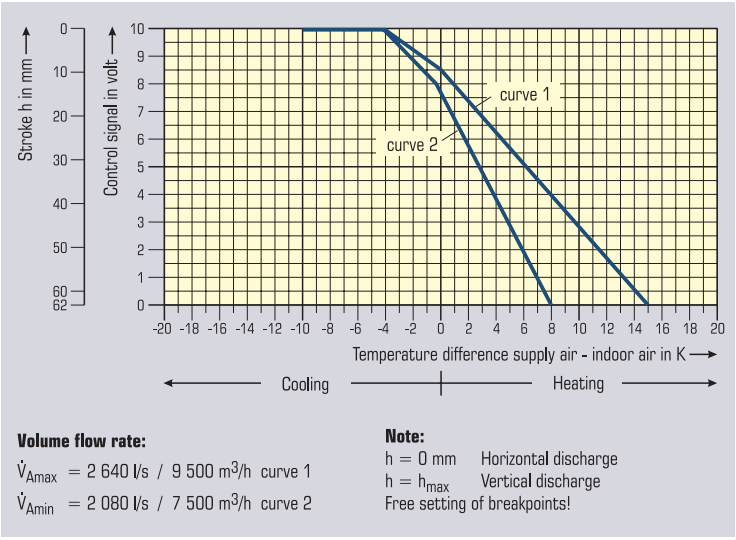


Temperature difference control device, type ST-E

Key:
1 Temperature sensor for indoor air
2 Temperature sensor for supply air
3 Controller
4 Servomotor
5 Adjustable air outlet
6 Connection box

Discharge pattern
Horizontal discharge: maximum cooling (top)
Vertical discharge: maximum heating (bottom)

All jet directions between horizontal and vertical are adjusted automatically depending on temperature difference.



Controller performance chart (example)

Linear shape

Induction outlet with fixed discharge direction
Type IN-N-6

For installation flush with the ceiling.

The discharge element of the air outlet has several jet channels (slots) in a line that are inclined at 45° to horizontal in alternate directions. This generates stable, thin single jets whose velocity and temperature difference to indoor air rapidly decrease.
The supply air is usually discharged in two alternate directions.

Optionally, for reduced air volume flow rate, the cross-section of the jet channels can be diminished by fitting the outlet with a momentum control device. Thus, the supply air can be discharged in one direction only.

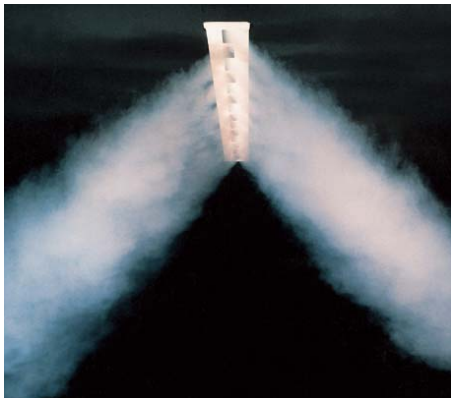
Features:
- Stable single jets independent of the ceiling, with alternate 2-way discharge or 1-way discharge for halved volume flow rate
- Fixed discharge angle of 45° to horizontal
- With connection box and circular connection spigot

Volume flow rate range:	28 – 85 l/(s · m) 100 – 300 m³/(h · m)
Element width:	90 mm
Standard lengths:	1; 1.2 and 1.6 m
Discharge height:	4 – 7 m
Max. temperature difference supply air – indoor air:	–10 K when cooling +6 K when heating

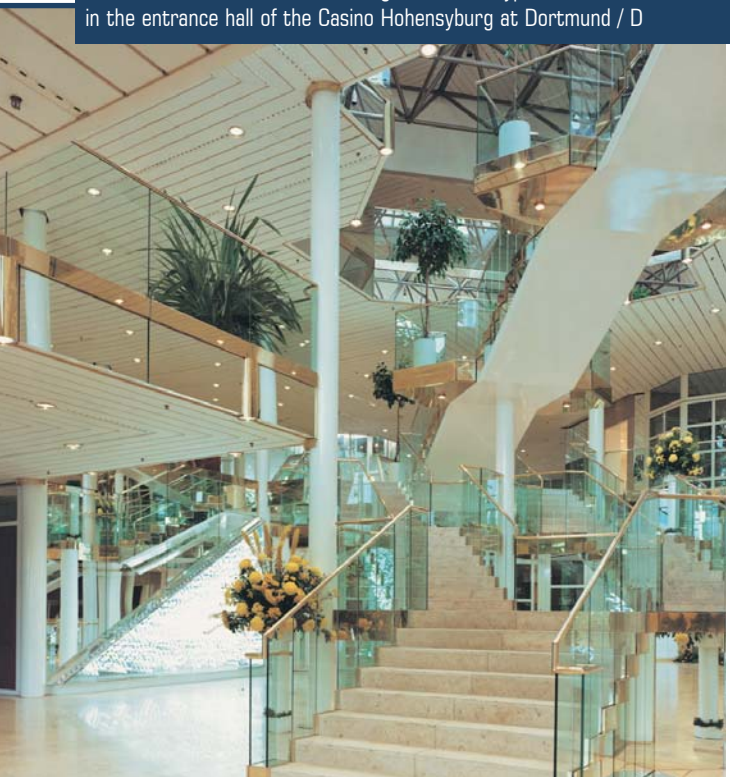
Technical layout to DS 1125

Induction outlet with fixed discharge direction, type IN-N-6

Air jet pattern of IN-N-6



Induction outlet with fixed discharge direction, type IN-N,
in the entrance hall of the Casino Hohensyburg at Dortmund / D



Induction outlet with fixed discharge direction, type IN-N,
in the restaurant of 'Steigenberger Grandhotel Petersberg',
Königswinter near Bonn / D

Adjustable induction outlet
Type IN-V

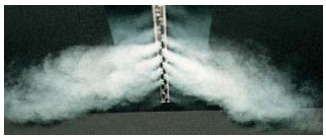
Adjustable induction outlet, type IN-V, at the Audi Forum, Ingolstadt / D

For installation flush with the ceiling where manual adjustment of the discharge direction is required.
The difference to the induction outlet with fixed discharge direction is that the discharge element is made up of single, rotatable, cylindrical elements. Rotating these elements alters the incline of the jet channels; the jet direction can thus be adjusted from horizontal to nearly vertical. This enables to vary the spread of the entire supply air jet as desired. If required, the supply air can be discharged in one direction only, at half the volume flow rate, by rotating some elements to closure.

Features:

- Stable single jets independent of the ceiling, with alternate 2-way discharge or 1-way discharge
- Discharge direction adjustable from horizontal to nearly vertical
- Type IN-V2
  Element width of 28 mm per row;
  also available in 2, 3, or 4 rows
- Type IN-V3
  Element width of 15 mm, 1 row only
- With connection box and circular connection spigot
- Also available as return air inlet

Air jet pattern of IN-V
top: discharge angle approx. 20°
middle: discharge angle approx. 35°
bottom: discharge angle approx. 45°



Adjustable induction outlet, type IN-V

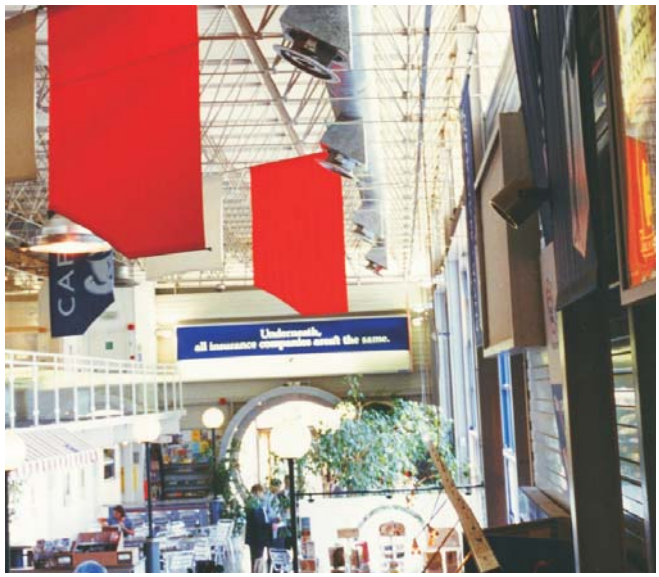
Volume flow rate range:	
IN-V2 - 1 row	11 – 36 l/(s · m)
	40 – 130 m³/(h · m)
- 2 rows	20 – 65 l/(s · m)
	70 – 240 m³/(h · m)
- 3 rows	33 – 90 l/(s · m)
	120 – 320 m³/(h · m)
- 4 rows	45 – 110 l/(s · m)
	160 – 400 m³/(h · m)
IN-V3 - 1 row	2.8 – 16.5 l/(s · m)
	10 – 60 m³/(h · m)
Element width:	
IN-V2	28 mm per row
IN-V3	15 mm
Standard lengths:	1 050, 1 200, 1 350 and 1 500 mm
Discharge height:	2.5 – 5 m
Max. temperature difference supply air – indoor air:	–10 K when cooling +6 K when heating

Technical layout to DS 4082

Adjustable induction outlet, type IN-V, at Wolford AG, Bregenz / A

Customized ceiling air outlets

Variable twist outlet with core tube, type DD-VK,
in the Channel Tunnel



Radial outlet of type RA-N, chrome-plated,
at the Hamburger Bank, branch office Osterstraße, Hamburg / D

Twist outlet of type DD-VG, with jet straightener,
in the auditorium of ARLBERG-well.com, St. Anton am Arlberg / A

Adjustable induction outlet, type IN-N,
at the 'Atrium Medisch Centrum', Heerlen / NL

Radial outlet, type RA-N,
Luxor Theater, Rotterdam / NL

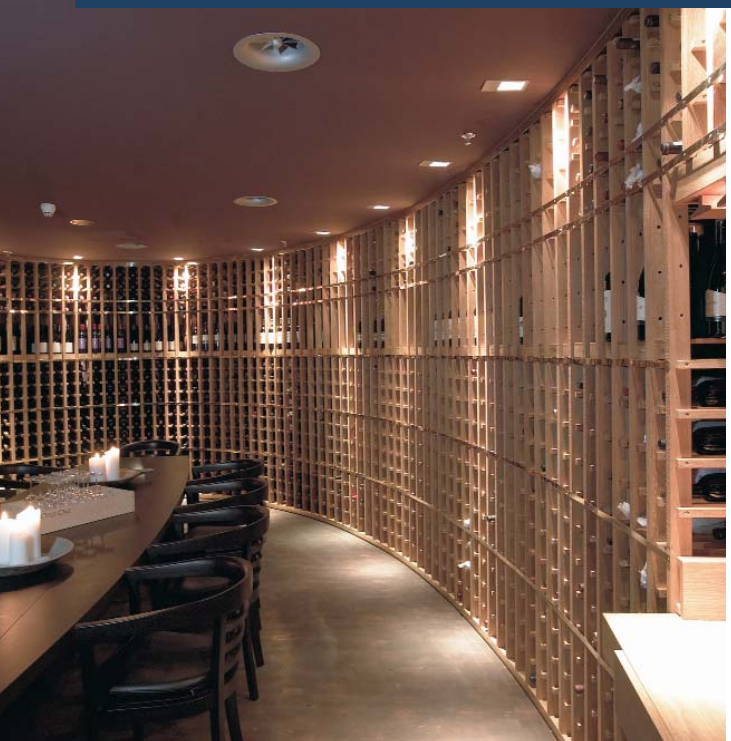
Adjustable radial outlet, type RA-V,
at ARLBERG-well.com, St. Anton am Arlberg / A

Radial displacement outlet with guide ring
at Scheyer Verpackungstechnik GmbH, Klaus-Weiler / A

Adjustable induction outlet, type IN-V2, in the passenger terminal at ASTANA Airport /Kazakhstan

Twist outlet, type DD-N, at Beiersdorf AG, Hamburg / D

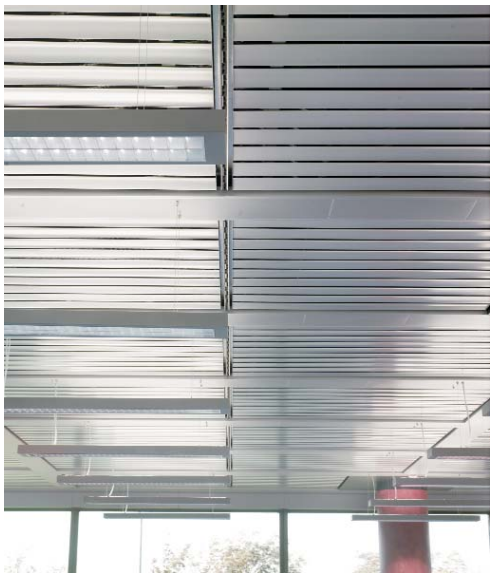
Twist outlet, type DD-N, at the InterContinental Hotel, Cologne / D



Twist outlet, type DD-N,
at 'Raimund Theater', Vienna / A

Radial slot outlet, type RL, at the Radisson SAS Hotel, Cologne / D

Adjustable induction outlet, type IN-V, at
'Reifenhäuser GmbH & Co. KG Maschinenfabrik',
Troisdorf / D



Adjustable radial outlet, type RA-V, at the Radisson SAS Hotel, Cologne / D

Twist outlet, type DD-N, at the InterContinental Hotel, Cologne / D

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Applied system solutions

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- Japan
- Kuwait
- Qatar
- Singapore
- South Korea
- Taiwan
- Thailand
- United Arab Emirates

Oceania

- Australia
- New Zealand