Air distribution systems

for the industrial and commercial sector

Krantz

Krantz
Air is our passion

Industrial production facilities are challenging in terms of ventilation and air conditioning. When planning industrial ventilation systems, the air distribution system should primarily match the heat load and pollutant volume to protect the staff, the manufacturing process and the product. In addition, an even balance between supply and exhaust air must be ensured, especially with decentralized exhaust air extraction systems.

Thorough planning of the optimum ventilation system for the respective application allows workplaces to be effectively supplied with the required amount of air in an energy-saving manner. This ensures the physical and mental performance of employees as well as the quality of the products from the manufacturing process.

With its expertise and decades of experience, Krantz is an ideal partner for customer-oriented solutions. Our application-specific air distribution systems are the basis for efficient and economically optimized solutions in the industrial sector thanks to their diverse properties, e.g. high penetration depth or air temperature-dependent adjustment

What we can provide: ...

- dimensioning
- individual advice
- and much more

... in cooperation with our Research & Development Center

- performance tests
- numerical flow simulation (CFD studies)
- acoustic measurements
- thematic workshops
- and much more

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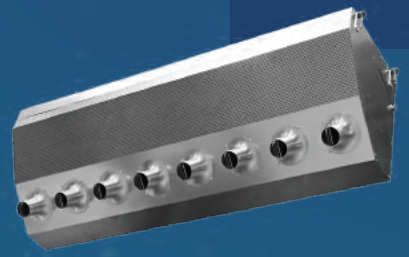

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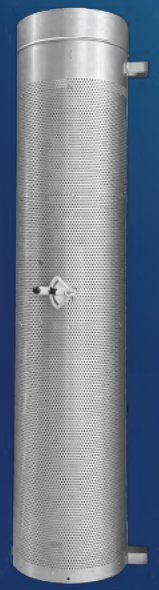

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Air distribution systems
for the industrial sector

In the industrial sector, three airflow systems are particularly suitable: low-turbulence displacement flow, turbulent mixing ventilation or hybrid displacement mixing ventilation.

Low-turbulence displacement flow safely removes pollutants, cools heated work areas and supplies the entire production hall with fresh air.

The displacement flow is characterized by low momentum and low induction effect of the introduced supply air. As a result, the supply air is hardly mixed with the room air and the heat- and substance-loaded room air is moved towards the return air system. Depending on the requirements of the respective industrial area, the flow can be realized from top to bottom or vice versa.

Turbulent mixing ventilation is an alternative for areas with low levels of pollutants, as the high induction causes the room and supply air to mix strongly. This renews the room air and quickly dissipates thermal loads.

Air outlets for turbulent mixing ventilation offer the advantage of an adjustable discharge direction, which means that the air flow can be optimally aligned to the respective load case. In addition, large coverage areas or installation heights are possible.

Hybrid displacement mixing ventilation combines the advantages of displacement ventilation with mixing ventilation. The turbulent part induces air from the displacement flow arranged above it, which means that the supply air hardly mixes with polluted room air. The ratio of mixed ventilation and displacement ventilation can be adjusted and adapted to the respective load case. If required, air volumes with a higher air velocity can be introduced into the occupied zone in a targeted manner and ensure cooling with forced convection.

Features of Krantz air distribution for the industrial sector

- effective removal of heavy or light pollutants
- adjustable air diffusers for heating and cooling operation
- air diffusers for installation on the floor, in front of walls or above the occupied zone
- air diffusers for the protection of individual workstations as well as for large-scale room coverage
- large installation heights possible


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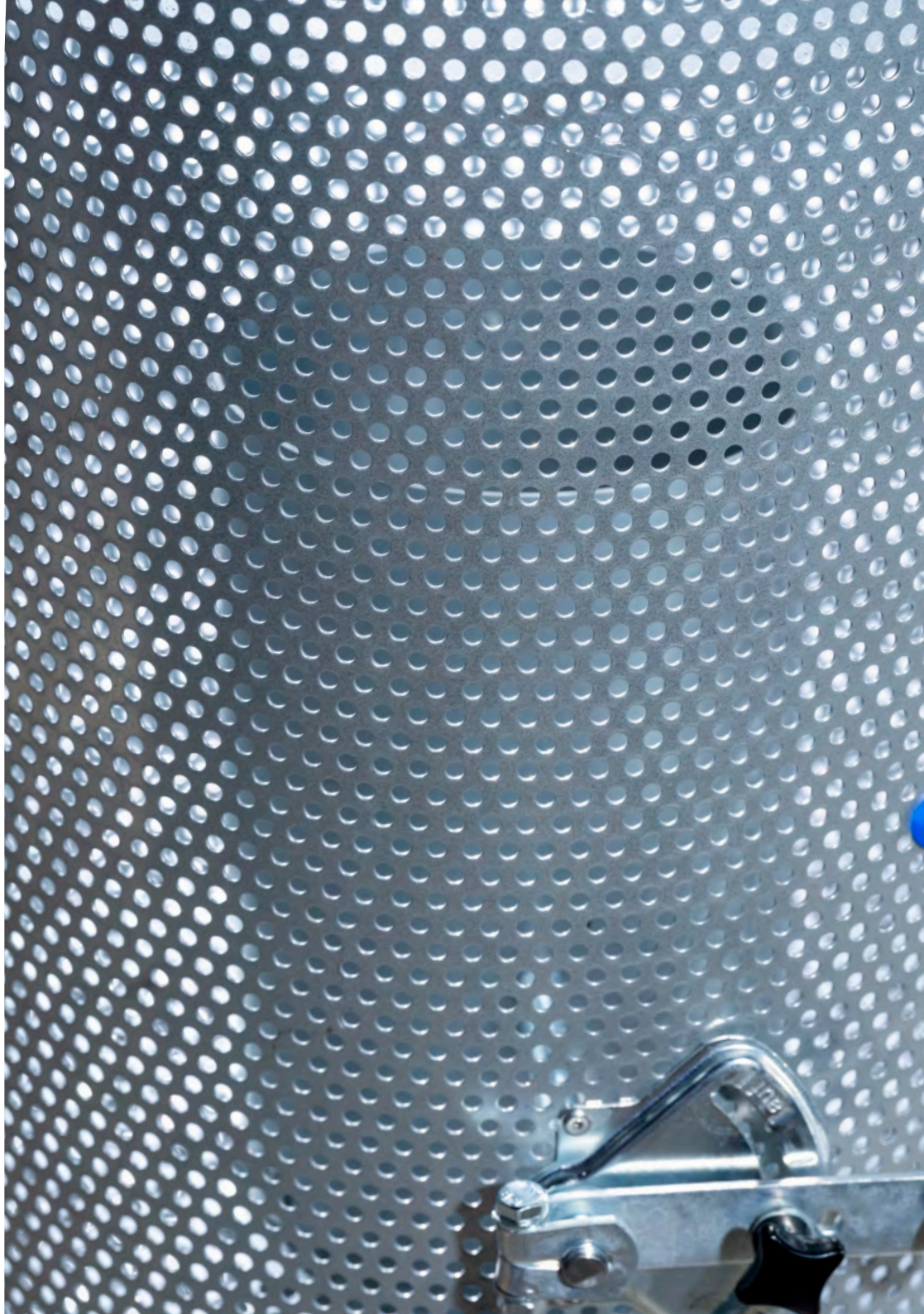


Circular Displacement Diffuser
VA-ZD

VA-ZD

VA-ZD-L

The VA-ZD is suitable for industrial areas in which the supply air is introduced at specific points. To ensure that the effects of the displacement air flow develop optimally, the VA-ZD can be installed freely in the room or directly on a wall or pillar, as well as at a height of three meters or directly on the floor of the area of application. For floor installation, the VA-ZD is installed with an enlarged casing surface (VA-ZD-L), which results in a more uniform discharge velocity and increases the detection area.

The VA-ZD has an integrated air guiding device that allows the air discharge direction to be changed continuously from slightly upwards to vertically downwards. This makes the VA-ZD ideal for both cooling and heating applications. In cooling mode, a horizontal to slightly upward discharge direction supports the cooling effect of the supply air. In heating mode, the heating effect can be optimized by discharging the warm air vertically downwards.

Three adjustment options are available for the air guiding device: manually by lever, by integrated servomotor or by an autonomous thermal control device.

Range of applications
Automotive industry, foundries, press shops, metal-cutting production plants, dye works, electroplating baths, etc.

VA-ZD		
Volume flow rate range	in 3 m height	≤ 10 000 m³/h | 2 700 l/s
	in floor installation	≤ 7 000 m³/h | 1 900 l/s
Sizes		DN 250, DN 315, DN 355, DN 450, DN 560, DN 630
Max. supply air coverage		20 m
Max. temp. difference supply air-room air		±10 K

Features VA-ZD

- Low-turbulence displacement flow
- Installation at a height of approx. 3 m or directly above the floor, free-standing in the room, in front of a pillar or wall
- Radial discharge direction
- Stepless adjustment of the discharge direction from almost horizontal to vertical downwards
- Manual adjustment, with servomotor or thermal control unit
- Well suited for cooling and heating operation
- Connection to pipes according to DIN 24145

Rectangular Displacement Diffuser
VA-RV/-RN

The VA-RV/-RN was developed for rooms with high specific heat loads and light pollutant loads. The air diffuser is available in a non-adjustable (type VA-RN) or adjustable (type VA-RV) installation. The air diffuser is installed upright on the floor, ideally directly on a wall or parapet. Several VA-RV/-RN can be arranged next to each other in a row.

In the non-adjustable version (type VA-RN), the supply air is discharged horizontally. If the supply air is colder than the room air, it flows deep into the room in a layer close to the floor due to gravity.

The adjustable version (type VA-RV) has an integrated air guide device that allows the supply air to be blown out towards the floor when heating is required, in order to prevent premature upward flow of the warmer supply air.

Range of applications

Printing shops, foundries, plastics processing, paper industry, dye works, etc.

Features VA-RV/-RN

- low-turbulence displacement flow
- installation on or directly above the floor
- adjustable version (type VA-RV) or non-adjustable version (type VA-RN)
- horizontal discharge direction, with adjustable version (type VA-RV) directed towards the floor in case of heating
- flat design
- rectangular connection spigot arranged at the top

VA-RV/-RN	
Volume flow rate range	≤ 2 500 m³/h·m | 690 l/s·m
Construction lengths	1.0 to 2.5 m
Max. throw	20 m
Max. temp. difference supply air-room air	–8 K in cooling mode +6 K in heating mode

Trapezoidal and Semi-trapezoidal Displacement Diffuser

VA-T/-TH

VA-T

VA-TH

The VA-T/-TH is designed for facilities with air containing dust, aerosols or fibers and a permanent cooling mode for air discharge from top to bottom. The air diffuser is available in a trapezoidal (type VA-T, top image) and a semi-trapezoidal (type VA-TH, bottom image) design and can be arranged freely suspended or flush with the ceiling. Usually, several air diffusers are installed in series and integrated into the floor or the side of a supply air duct.

The supply air emerges the perforated casing surface in an umbrella shape, from horizontal to inclined to vertical downwards. With wider sizes, integrated swirl diffusers stabilize the jet bundle and create a stable flow that displaces heavy particles towards the floor. This results in a short dwell time of the solid particles in the room air.

Range of application

Textile industry, paint shops, laboratories, print shops, etc.

VA-	T	TH
Volume flow rate range	300 to 2 500 m³/h 83 to 690 l/s	250 to 1 500 m³/h 69 to 416 l/s
Diffuser width	140 mm, 290 mm, 500 mm	250 mm, 500 mm
Diffuser length	800 mm, 1 250 mm, 1 600 mm, 1 800 mm	1 200 mm, 1 500 mm, 1 800 mm
Throw	4 to 8 m	2 to 3 m
Max. Temp. difference supply air-room air	-3 to -8 K	–3 to –6K

Features VA-T/-TH

- low-turbulence displacement flow
- for use with permanent cooling mode
- discharge height 3 to 4 m

Type VA-T

- installation directly below the supply air ducts, usually several in a row one behind the other
- umbrella-shaped discharge direction from horizontal to inclined to vertical downwards
- covered on one side for installation directly in front of a wall
- hinged diffuser surface for easy cleaning
- with volume flow damper

Type VA-TH

- installation along a wall or row of columns, supply air feed through connection spigot at the top or rear, square or round
- semi-umbrella-shaped discharge direction from horizontal to vertical downwards

Swivel displacement diffuser

VA-S

The VA-S was designed for applications in which the supply air ducts with built-in air diffusers must be arranged on the walls and supply air with a large penetration depth into the occupied zone is required.

The supply air is discharged vertically to the perforated rectangular discharge surface and built-in swirl diffusers stabilize the supply air flow. The discharge surface can be swiveled by 45° and is therefore ideally adjustable to the cooling or heating mode. In cooling mode, the discharge direction is tilted upwards by 10° to the horizontal as standard; in heating mode, it is tilted downwards at an angle of up to 35° to the horizontal. The adjustment can be carried out manually or using a servomotor.

Range of application

Automotive industry, pressing plants, paper print shops, electroplating baths, vulcanization plants, etc.

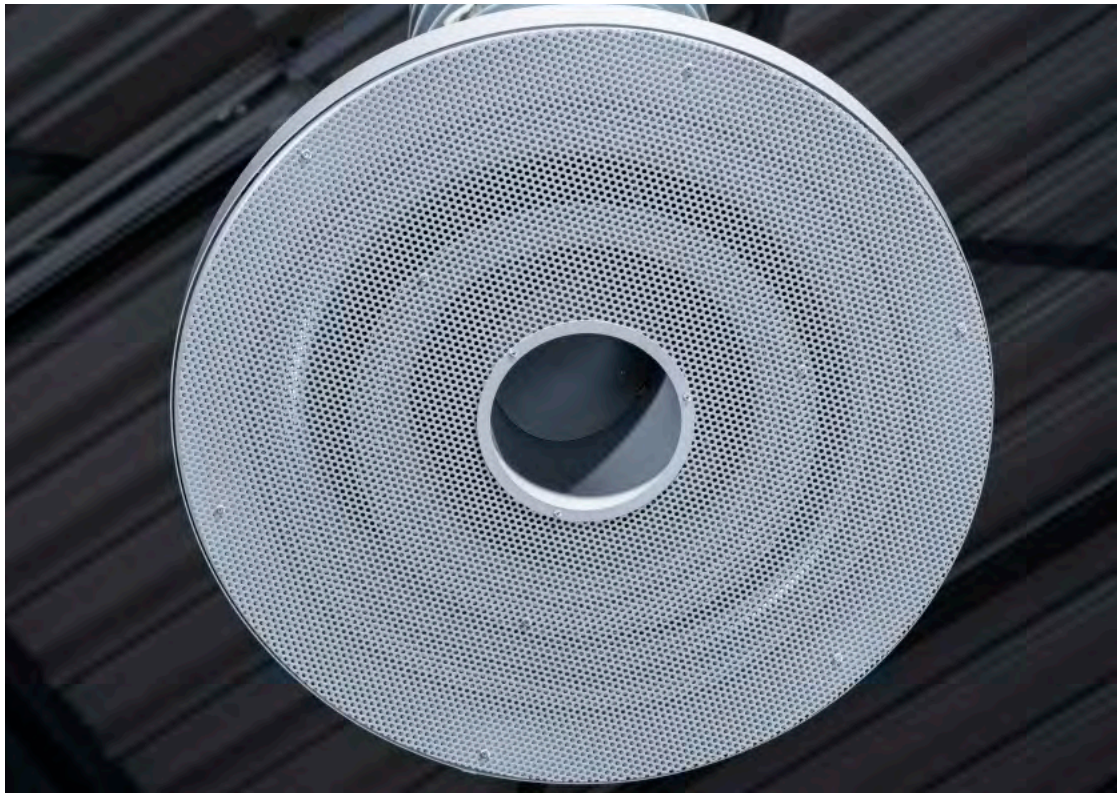
Features VA-S

- low-turbulence displacement flow
- arrangement above the occupied zone, in front of walls or galleries
- discharge height 3 to 5 m
- adjustment of the discharge direction possible, from +10° to -35° to the horizontal, manually or by servomotor
- arrangement at the side of the supply air duct, individually or several in a row next to each other

VA-S	
Volume flow rate range	800 to 1 800 m³/h·m 220 to 500 l/s·m
Sizes	1.2 m; 1.6 m; 2.0 m; 2.4 m
Penetration depth	ca. 20 m
Max. temp. difference supply air-room air	±8 K





Radial Displacement Diffuser

VA-PV

The VA-PV is particularly suitable for applications in which the supply air needs to be blown downwards from a height of 4 to 10 m with low turbulence.

The round perforated faceplate generates a low-turbulence, slightly fanned out, downward air jet. A core tube is located in the middle of the air diffuser, which is opened during heating mode to increase the penetration depth of the warm supply air jet. The lower the installation height, the more effective the flushing of the occupied zone with fresh supply air. The VA-PV is therefore suitable for both cooling and heating applications. The core tube is preferably opened by a thermal control unit or built-in servomotor or, optionally, manually.

Range of application

Automotive industry, welding halls, machining production, press shops, aircraft paint shops, etc.

Features VA-PV

- low-turbulence displacement flow
- installation above the occupied zone at a height of 4 to 10 m, freely suspended
- discharge direction fanned out, vertically downwards
- when heating, the jet impulse is increased downwards by opening the core tube
- well suited for cooling and heating operation
- manual adjustment, with electric servomotor or thermal control unit
- connection from above to round pipes

VA-PV	
Volume flow rate range	1 000 to 8 000 m³/h 270 to 2220 l/s
Sizes	DN 315, DN 400, DN 500, DN 630, DN 710
Supply air coverage radius	5 m
Max. temp. difference supply air-room air	–6 K in cooling mode +10 K in heating mode

Conical Displacement Diffuser

VA-K

The VA-K is used in aircraft painting hangars, where several outlets are installed above the work area and displace the paint dust to the exhaust air system in the floor. Thanks to the highly efficient operation of the VA-K, the required air volume can be reduced by 70 % and operating costs cut accordingly. Also, indoor ice rinks can benefit from the VA-K's this: The low-turbulence displacement flow creates a lake of cold air on the ice surface, which improves the ice quality compared to conventional methods.

The supply air is discharged radially from the truncated cone-shaped, perforated front panel with low turbulence. The supply air jet spreads downwards in an umbrella shape from horizontal to inclined to vertical.

In cooling mode, a stable downward air flow is formed. In heating mode, the centrally arranged core tube and the peripheral ring gap open, increasing the penetration depth of the warm supply air jet. Adjustment is carried out by the built-in servomotor.

Range of applications

Aircraft painting hangars, ice rinks, very high halls, etc.

VA-K	
Volume flow rate range	2 500 to 10 000 m³/h 690 to 2770 l/s
Sizes	DN 630, DN 800
Supply air coverage radius	up to 5 m
Max. Temp. difference supply air-room air	–5 K in cooling mode +10 K in heating mode

Features VA-K

- low-turbulence displacement flow
- installation at a height of 10 to 30 m
- umbrella-shaped, radial, downward supply air flow
- increased penetration depth of the warm supply air in heating mode by opening the centrally arranged core tube and the circumferential ring gap
- well suited for cooling and heating
- adjustment via built-in servomotor
- connection from above

Linear Hybrid Displacement Diffuser

VA-LH

The VA-LH was designed for industrial areas with low levels of pollutants, in which the cooling capacity is largely provided by free cooling or adiabatic cooling.

In normal operation, the supply air exits the perforated surface as a low-turbulence displacement flow. If required, the VA-LH can be continuously switched to boost mode via a Bowden cable. In boost mode, the supply air also flows out as a turbulent mixing flow via a series of individually adjustable nozzles, which quickly heats up the occupied zone or cools it down through forced convection. Suddenly occurring pollutants can be effectively diluted in boost mode and displaced from the occupied zone.

Typically, the VA-LH is arranged in rows on walls or columns and installed along assembly lines or production machines.

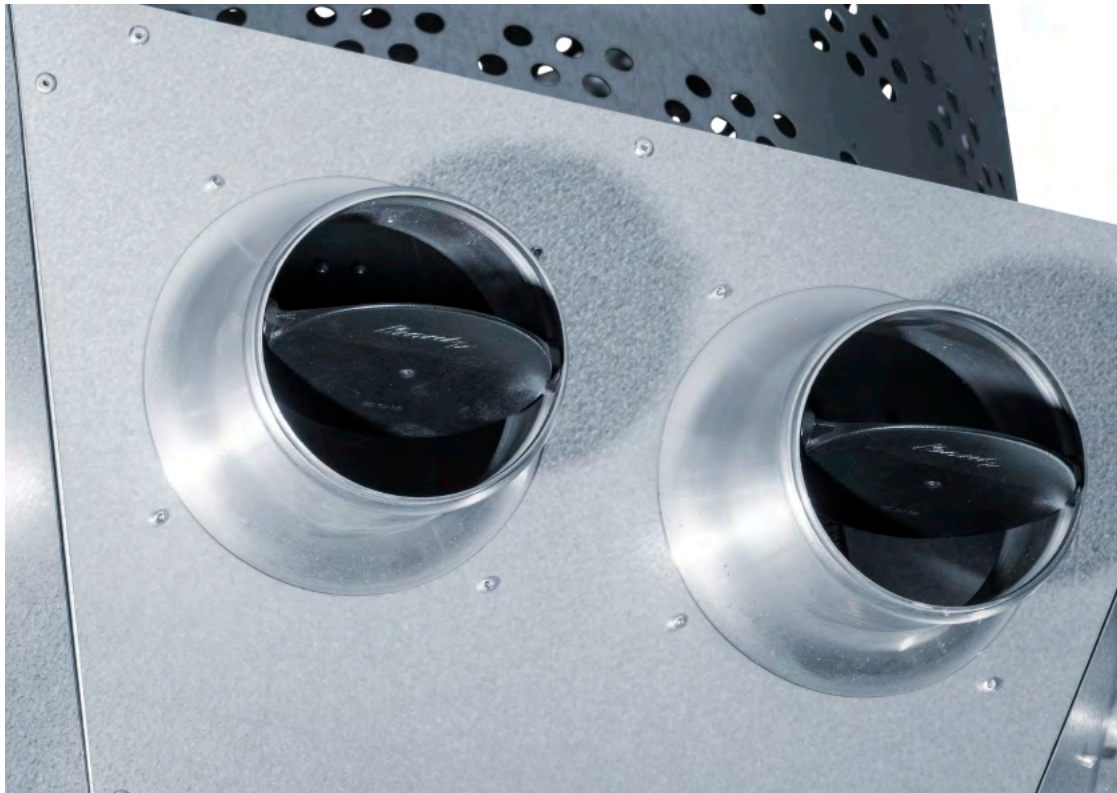
Range of applications

Print shop, metal processing, injection molding, automotive industry, etc.

Features

- normal operation: Low-turbulence displacement flow
- boost mode: Turbulent mixing flow via the nozzles as required
- supply air induction of the nozzles from the perforated surface above
  → direct introduction of fresh air into the occupied zone
  → no induction of substance- and heat-loaded air above the diffuser
- individual fine adjustment of the nozzles possible
- integrated air guiding device for controlled, stepless operation of the nozzles

VA-LH	
Volume flow rate range	750 to 3 000 m³/h 210 to 830 l/s
Lengthsizes	1 250, 1 600, 2 000 mm
Installation height	3 to 5 m
Penetration depth	10 to 20 m in heating mode 20 to 30 m in cooling mode
Max. temp. difference supply air-room air	–10 K in cooling mode +8 K in heating mode



Circular Hybrid Displacement Diffuser

VA-ZH

The VA-ZH was designed for manufacturing and production halls with low to medium levels of pollutants without a mechanical refrigeration system. Ideally, the VA-ZH is combined with adiabatic cooling.

In normal operation, the VA-ZH directs the supply air into the occupied zone with low turbulence via the perforated cylindrical outer surface. Depending on requirements, the VA-ZH can be briefly switched to boost mode using a chain or Bowden cable. As long as the boost mode is activated, the supply air is also discharged via the individually adjustable nozzles located on the underside. In boost mode, the occupied zone can be heated up quickly, cooled down by means of forced convection or used to dilute any sudden build-up of pollutants.

Installation directly above the workplace and along assembly or production lines has established itself as an advantageous arrangement for the VA-ZH.

Range of applications

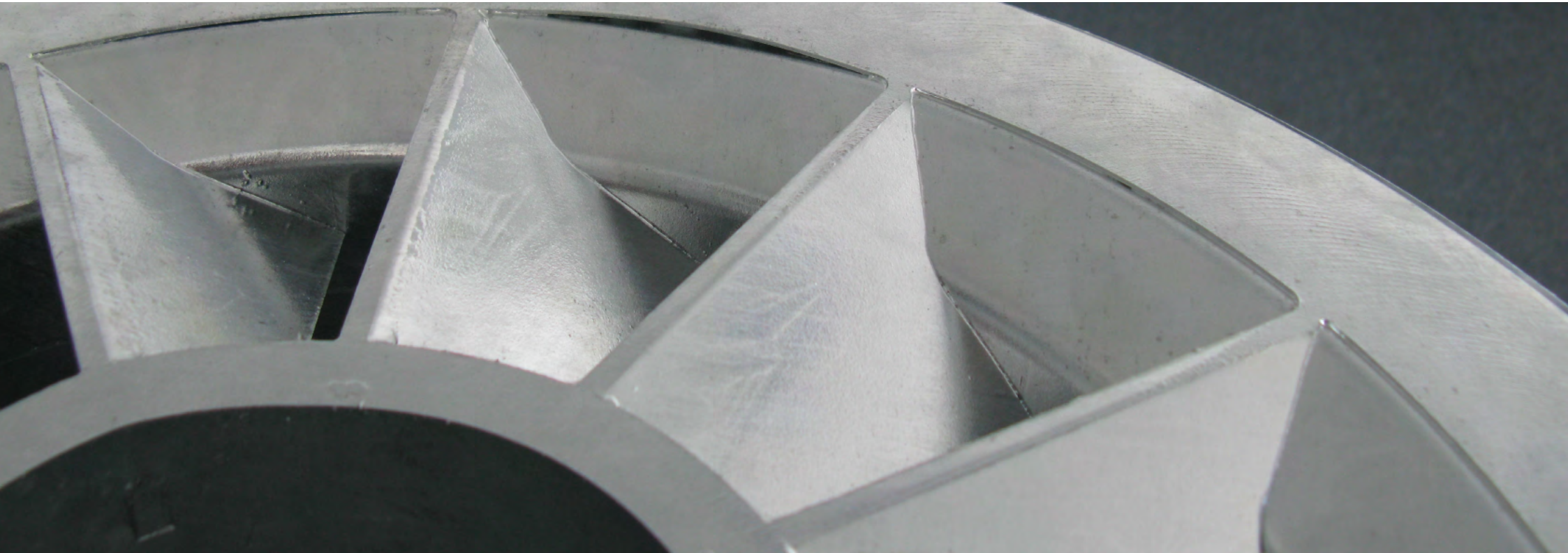
Print shop, metal processing, injection molding, automotive industry, etc.

VA-L	
Volume flow rate range	1 200 to 7 000 m³/h 340 to 1940 l/s
Sizes	DN 315, DN 450, DN 560
Installation height	3 m
Penetration depth	7 bis 17 m in heating mode 12 bis 20 m in cooling mode
Max. Temp. difference supply air-room air	–10 K in cooling mode +8 K in heating mode

Features

- normal operation: Low-turbulence displacement flow
- boost mode: Turbulent mixed flow via the nozzles as required
- supply air induction of the nozzles from the perforated surface above
  → direct introduction of fresh air into the occupied zone
  → no induction of material- and heat-laden air above the diffuser
- individual fine adjustment of the nozzles possible
- integrated air guiding device for controlled, stepless switching on of the nozzles



Adjustable Radial Diffuser

RA-V

The RA-V generates turbulent mixing ventilation without the characteristics of displacement ventilation and is therefore ideal for use in areas with low levels of pollutants. With a maximum discharge height of 13 meters, the RA-V easily supplies industrial halls with fresh air.

The large discharge height is possible thanks to an adjustable guide ring, which can be adjusted as required or depending on the heating or cooling mode. This allows the discharge direction to be changed from horizontal in cooling mode to vertical in heating mode. The guide ring is usually adjusted using an integrated electric servomotor.

The RA-V can be installed either flush with the ceiling or freely suspended. Integration into the air duct is also possible as an option.

Range of applications

Assembly halls, warehouses, logistics areas, etc.

Features

- turbulent mixing ventilation
- continuously adjustable discharge direction
- penetration depth adjustable to room height and thermal load case
- diffuser can be easily dismantled from below, e.g. for hygiene inspections
- diffuser made of painted sheet steel, plenum box made of galvanized sheet steel
- available with round or square visible faceplate

RA-V	
Volume flow rate range	220 to 5 500 m³/h 61 to 1520 l/s
Sizes	DN 200, DN 224, DN 250, DN 315, DN 355, DN 400, DN 500
Discharge height	2,5 - 13 m
Max. temp. difference supply air-room air	– 12 K in cooling mode + 15 K in heating mode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Adjustable Radial Diffuser with Core Tube

RA-V2

Like the RA-V, the RA-V2 introduces the supply air into the application area as turbulent mixing flow ventilation without the characteristics of displacement flow. The RA-V2 unfolds its full potential particularly in areas of application with large thermal room load fluctuations, low pollutant levels and if large discharge heights are required.

The discharge direction of the RA-V2 can be varied from horizontal in cooling mode to vertical in heating mode. To enable adjustment, the RA-V2 has a core tube with an integrated damper that is used to open or close the core tube. The damper can be adjusted either manually, by electric servomotor or with a thermal control unit. The thermal control unit is particularly advantageous in terms of investment costs, as the adjustment is independent of the supply air temperature and no auxiliary energy is required.

Range of applications

Exhibition halls, logistics areas, warehouses, assembly halls, etc.

Features

- turbulent mixing ventilation
- discharge direction adjustable from horizontal to vertical
- manual adjustment, with electric motor or thermal control unit
- perforated plate to increase the jet penetration depth on request
- available with round or square visible faceplate

RA-V2	
Volume flow rate range	400 to 16 000 m³/h 110 to 4440 l/s
Sizes	DN 250, DN 315, DN 355, DN 400, DN 500, DN 630, DN 710, DN 900
Discharge height	2.8 to 15 m
Max. temp. difference supply air-room air	–12 K in cooling mode +12 K in heating mode


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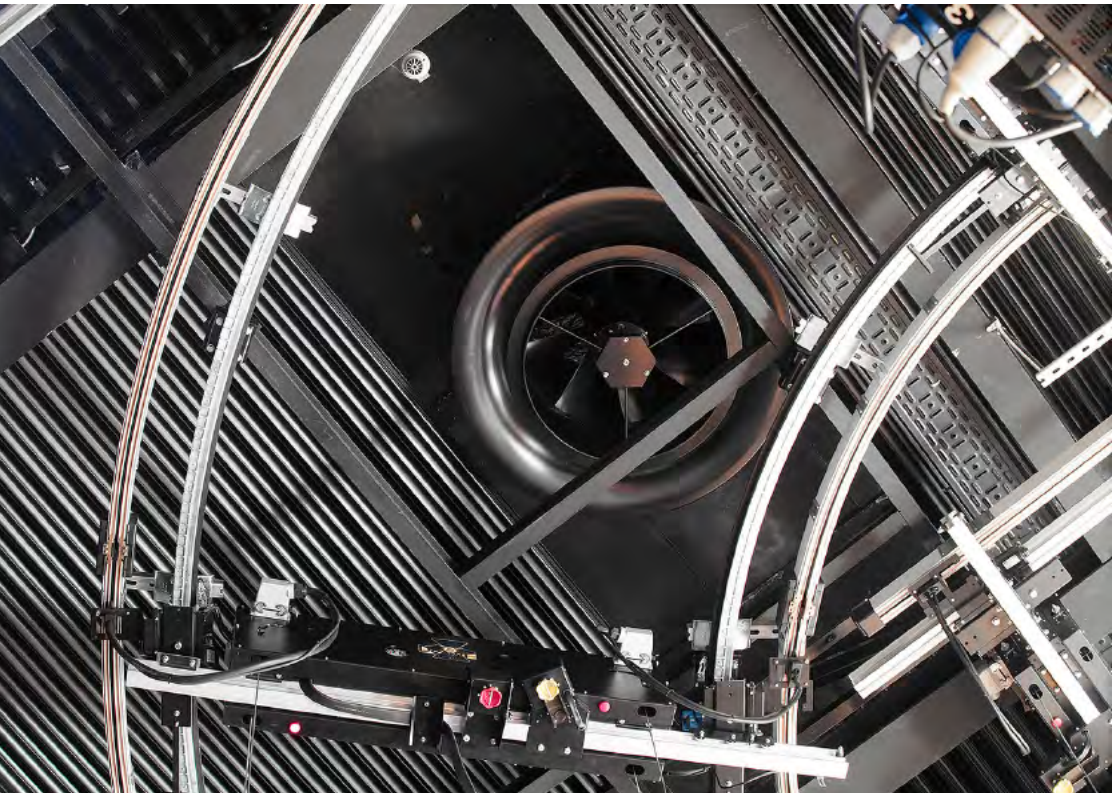

Variable Twist Diffuser with Guide Ring

DD-VL

The DD-VL generates a turbulent mixing flow and easily penetrates large room volumes, even with large thermal room load fluctuations. It is particularly suitable when high volume flows are required with a high heating performance and a low level of pollutants.

The DD-VL is equipped with a guide ring that allows the discharge direction to be adjusted so that the supply air is optimally supplied to the occupied zone in cooling and heating mode. The adjustment ranges from horizontal in cooling mode to vertical in heating mode or can be adjusted according to current requirements. The adjustment can be carried out manually or via an electric servomotor.

Range of applications

Assembly halls, warehouses, logistics areas, exhibition halls, multi-purpose halls, sports arenas, etc.

Features

- turbulent mixing ventilation
- uniform temperature and humidity distribution throughout the room
- penetration depth can be adjusted to the room height and heat level
- discharge direction can be adjusted from horizontal to vertical
- adjustment manually or with electric motor
- various connection types

DD-VL	
Volume flow rate range	600 to 11 000 m³/h 170 to 3050 l/s
Sizes	DN 315, DN 400, DN 500, DN 630, DN 700
Discharge height	3 to 12 m
Max. Temp. difference supply air-room air	–10 K in cooling mode +20 K in heating mode


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Variable Twist Diffuser with Jet Straightener

DD-VG

The DD-VG develops its full performance in very high halls with low pollutant levels and effortlessly flushes them with a turbulent mixing flow. Thanks to an adjustable guide ring with jet straightener, the DD-VG achieves a high penetration depth of up to 28 meters, even with large thermal room load fluctuations.

The guide ring with jet straightener can be adjusted either manually or with an electric servomotor. The discharge direction can be varied by adjusting the guide ring from horizontal in cooling mode to vertical in heating mode or to match the required application.

Range of applications

Assembly halls, warehouses, logistics areas, exhibition halls, multi-purpose halls, sports arenas, etc.

Features

- turbulent mixing ventilation
- uniform temperature and humidity distribution throughout the room
- penetration depth can be adjusted to the room height and heat level
- discharge direction can be adjusted from horizontal to vertical
- adjustment manually or with electric servomotor
- various connection types

DD-VG	
Volume flow rate range	600 to 11 000 m³/h 170 to 3050 l/s
Sizes	DN 315, DN 400, DN 500, DN 630, DN 710
Discharge height	3 to 28 m
Max. temp. difference supply air-room air	–10 K in cooling mode +8 K in heating mode


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Swivel Jet Nozzle
DW-V2

The DW-V2 is used in areas where ceiling diffusers cannot be used for structural or operational reasons and where high volume flow rates are required and a low level of pollutants is present. The DW-V2 is equipped with an adjustment device so that the nozzles can be optimally adapted to the respective thermal load case. Further advantages are a high throw range with a high induction effect and a low sound power level.

The DW-V2 can be tilted by ± 30 degrees to the horizontal during operation according to the thermal load. Adjustment via a thermal control unit is particularly advantageous, as this reacts automatically to the supply air temperature without auxiliary energy or additional control technology and adjusts the DW-V2 accordingly.

The DW-V2 is usually installed laterally in a supply air duct or a pressure chamber directly on a wall or gallery.

Range of applications

Assembly halls, logistics areas, airports, exhibition halls, multi-purpose halls, sports arenas, etc.

DW-V2	
Volume flow rate range	40 to 2 140 m³/h 12 to 590 l/s
Sizes	DN 60, DN 80, DN 120, DN 150, DN 200, DN 250
Installation heights	2.5 to 10 m
Max. throw	3 to 50 m
Max. Temp. difference supply air-room air	– 8 K in cooling mode + 6 K in heating mode

Features

- turbulent mixing ventilation
- for lateral installation in ducts, pipes or pressure chambers
- jet direction can be adjusted by ± 30° in the horizontal plane
- manual adjustment, with electric motor or thermal control unit
- very low sound power level
- higher temperature differences between supply air and room air are possible on a project-specific basis

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