

Krantz

NTK floor twist outlet DB-N-DN 215

Air distribution systems

Krantz

NTK floor twist outlet

Construction design and function

Preliminary remarks

NTK stands for “Neues Technisches Konzept” (new technical concept) and is the name for a system for adaptable office design that has been successfully used for several years in office air conditioning. The NTK system includes a floor plenum for air supply and underfloor installation of electrical and telecommunications cabling systems. For air distribution from the floor plenum into the room Krantz provides a floor outlet which in the following is called NTK floor twist outlet.

Construction design and function

The main components of the NTK floor twist outlet are the floor insert **1** with carpet protection ring **2**, the twist outlet **3** and the perforated throttle disc **5**.

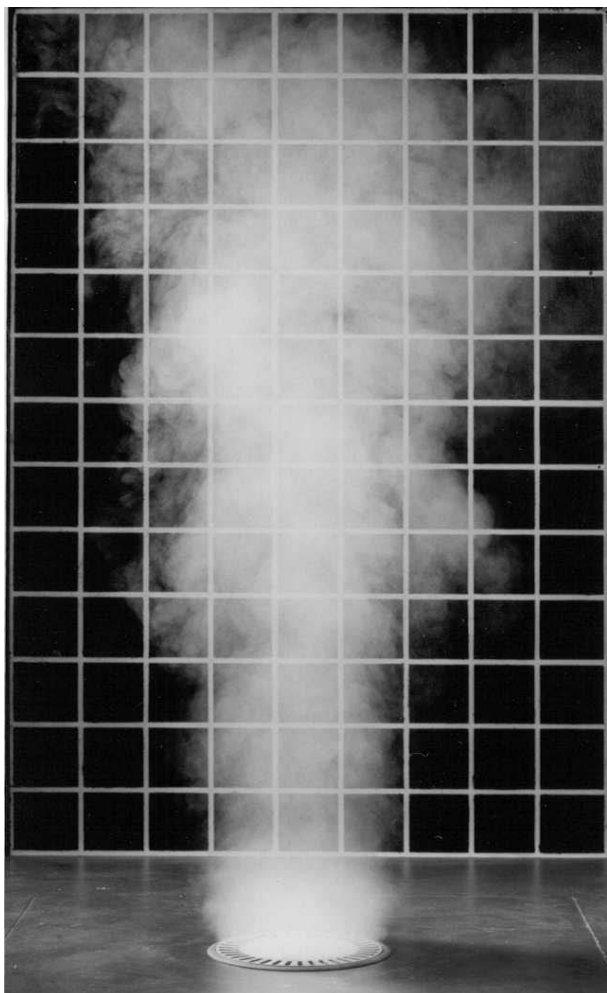


Figure 1: Example of jet pattern
Volume flow rate: 11 l/s [40 m³/h]
Temperature difference supply air to indoor air: -4 K
Grid: 10 cm x 10 cm

The air outlet **3** has a number of radially arranged slots at its periphery. These generate a slim, stable air jet which twists upwards with intensive induction of the room air and optimum length of air jet penetration into the room. Fig. 1 shows an example of the air jet pattern.

The NTK floor twist outlet is available in size DN 215, volume flow rate range 8.5 – 16.5 l/s [30 – 60 m³/h].

The volume flow rate is adjusted using the perforated throttle disc **5** which can be rotated manually.

The whole outlet unit is installed in the floor opening **9** and screwed down with four claw fasteners **12**. The floor opening will be of the same type and size as that used for usual electrical and telecommunications cabling systems.

The carpet protection ring holds the air outlet. There is no need for stepped bores in the floor. Where necessary, additional bores can be made with standard drills.

The NTK floor twist outlet is made of polycarbonate. It has a recess **4** in the middle which will be either covered with a polycarbonate lid **10** or filled with a piece of carpet **11** for a more attractive appearance.

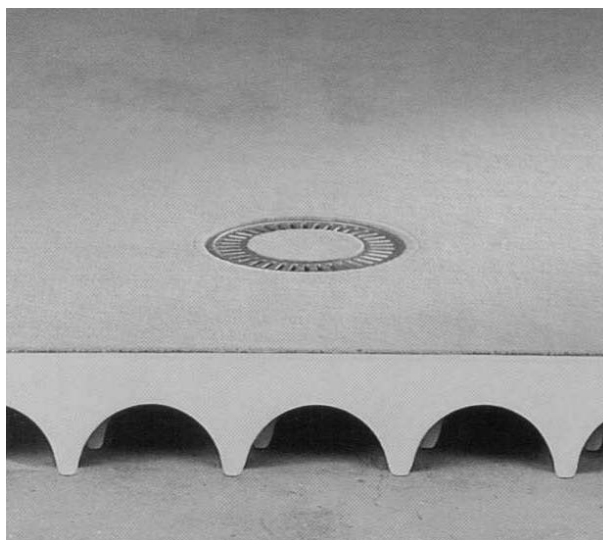
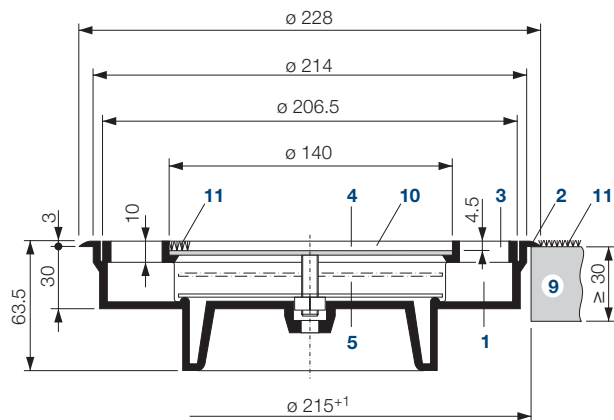


Figure 2: NTK floor twist outlet installed in a floor plenum

NTK floor twist outlet

Dimensions and design specifications



with perforated throttle disc 5
DB - N - DN 215 - D

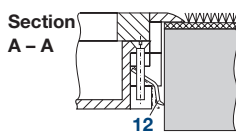
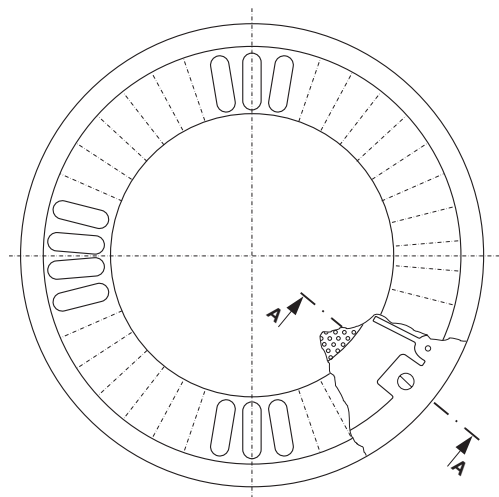


Figure 3: Dimensions of NTK floor twist outlet



Figure 4: NTK floor twist outlet with a piece of carpet in the central recess

Key

- 1 Floor insert
- 2 Carpet protection ring
- 3 Air outlet
- 4 Central recess
- 5 Perforated throttle disc
- 9 Floor
- 10 Polycarbonate lid (option)
- 11 Piece of carpet (option)
- 12 Claw fastener



Figure 5: NTK floor twist outlet in an office building

Table 1: Design specifications

NTK floor twist outlet		Size
Nominal diameter:	mm	DN 215
Air outlet volume flow rate:	l/s	8.5 – 16.5
	m ³ /h	30 – 60
Max. temperature difference supply air–return air:	K	± 10
Supply air temperature:	°C	18 – 30
Minimum air outlet centre spacing:	m	approx. 0.6
Minimum spacing to seats:	m	approx. 0.8
Installation diameter:	mm	214
Requisite diameter of floor opening:	mm	215
Max. load-bearing capacity ¹⁾ :	kN	2

¹⁾ Load category to EN 13264 'light'; point load applied centrally with a steel cube with 25 mm edge length and 2 mm corner radius

NTK floor twist outlet

Air velocities above the air outlet

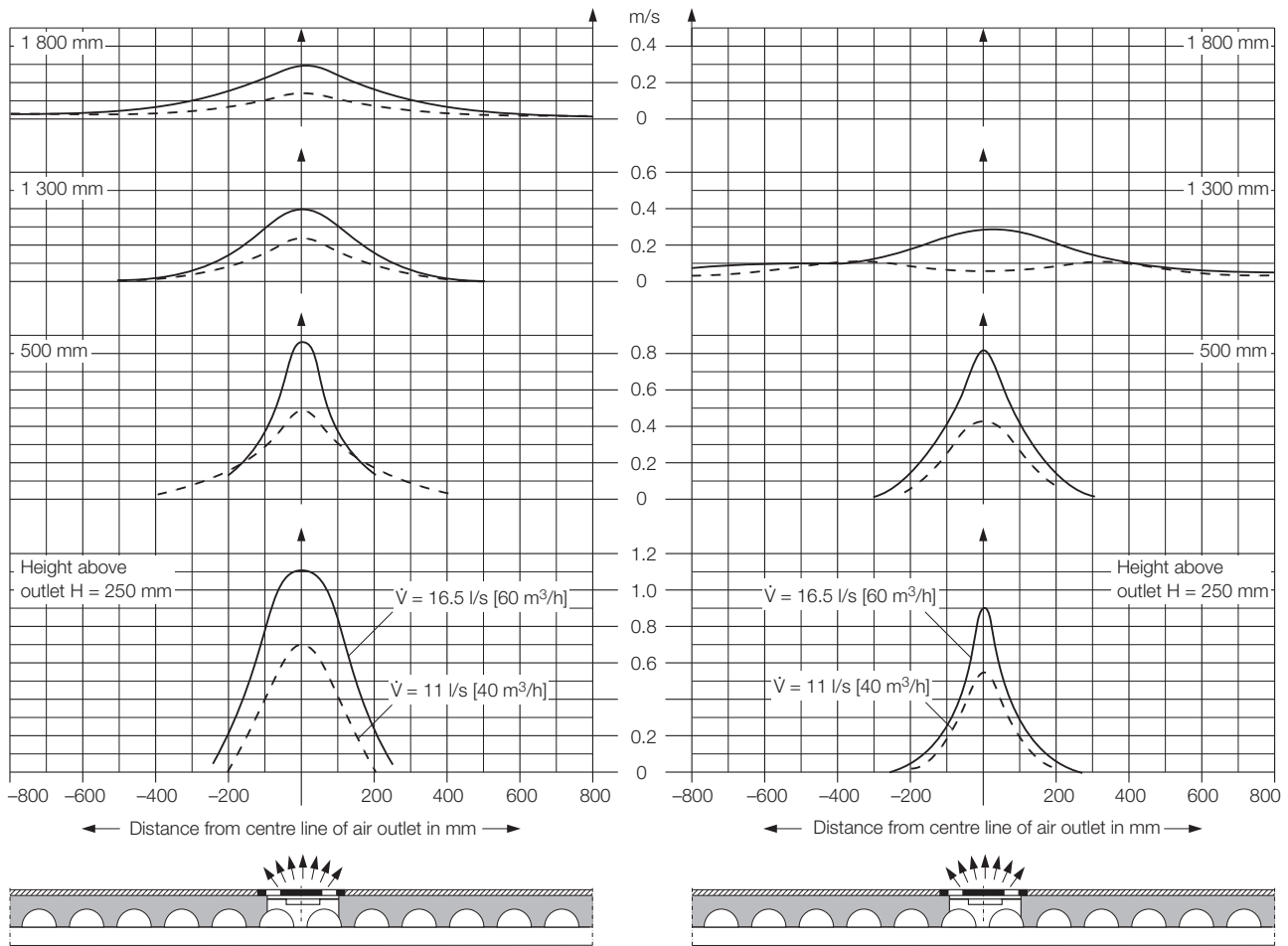


Figure 6: Jet velocities at various heights above the NTK floor twist outlet with the following difference in temperature between the supply and indoor air at 1.2 m height: **left:** $\Delta\vartheta^* = 0\text{ K}$, **right:** $\Delta\vartheta^* = -4\text{ K}$

Remarks on Figure 6:

The chart for $\dot{V}_A = 16.5\text{ l/s}$ [$60\text{ m}^3/\text{h}$] and $\Delta\vartheta^* = 0\text{ K}$ shows that at a height of 500 mm above the air outlet the jet velocity drops to about 0.9 m/s. The jet velocity continues to decrease rapidly as the height increases. At $H = 1\,300\text{ mm}$ the influence of the temperature difference is more noticeable. The colder air jet decelerates more quickly than the warmer jet. The following comparison shows for $H = 1\,300\text{ mm}$:

$$\Delta\vartheta^* = 0\text{ K} \rightarrow u_{\text{max}} = 0.40\text{ m/s}$$

$$\Delta\vartheta^* = -4\text{ K} \rightarrow u_{\text{max}} = 0.28\text{ m/s}$$

At a distance of about 500 mm from the jet axis, the supply air jet has no effect on thermal comfort. The air velocities measured are below 0.1 m/s.

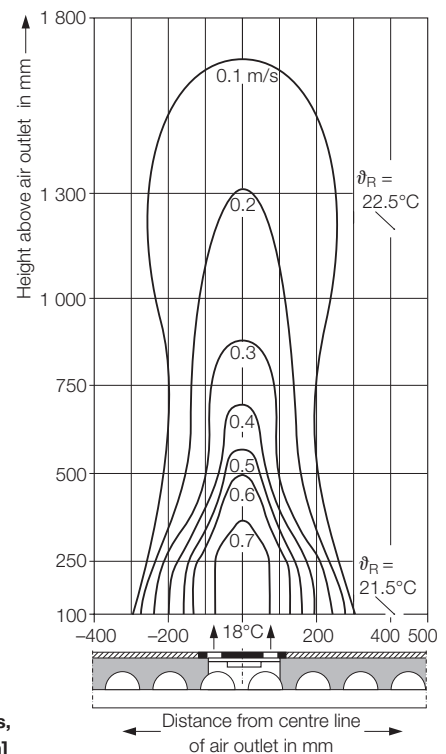


Figure 7: Maximum air velocities in jet axis, $\dot{V}_A = 14\text{ l/s}$ [$50\text{ m}^3/\text{h}$]

NTK floor twist outlet

Jet temperature, sound power level and pressure drop

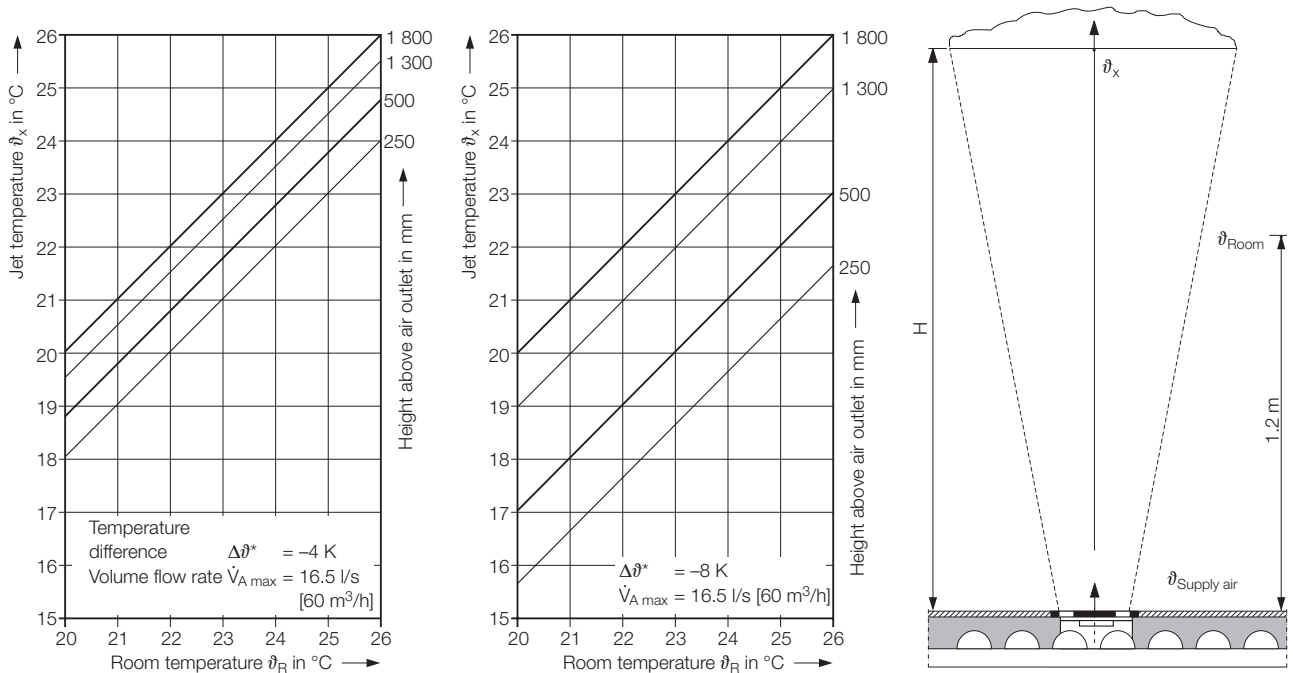


Figure 8: Jet temperature at different heights above NTK floor twist outlet

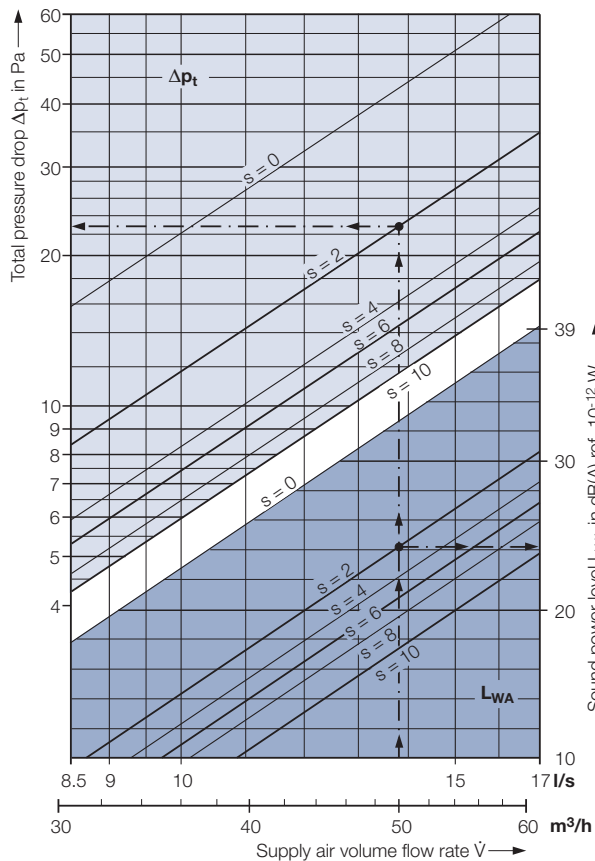


Figure 9: Sound power level and pressure drop

Nominal size	Insertion loss in dB								Mean value
	Octave band centre frequency in Hz								
DN	63	125	250	500	1000	2000	4000	8000	
215	10	10	7	7	6	7	12	17	10

Remarks:

$\Delta\vartheta^*$ = temperature difference between supply air ($\vartheta_{\text{Supply air}}$) and occupied zone ($\vartheta_{\text{Room air}}$ at a height of 1.2 m).

$\Delta\vartheta_x$ = temperature difference between jet (ϑ_x) and occupied zone (ϑ_{Room} at a height of 1.2 m).

$\Delta\vartheta_x$ reduces rapidly in response to height. The percentage decrease in temperature difference is shown in the table.

Height H above air outlet	Size DN 215
250 mm	45%
500 mm	65%
1 300 mm	85%

At a height of 1 800 mm above the floor, jet temperature and room temperature are already fully equalized. This applies to the maximum air outlet volume flow rate. At lower volume flow rates temperatures equalize even more rapidly.

Key

s = Opening of perforated throttle disc, in mm

NTK floor twist outlet

Features, type code and tender text

Features

- Slim vertical jet
- Stable air jet penetration depth
- Intensive mixing of supply air with indoor air
- Very slight lateral interference
- Low temperature stratification in room
- Low sound power level
- Minimum supply air temperature 18°C
- Maximum temperature difference between supply and return air ± 10 K
- With perforated throttle disc for volume flow rate adjustment during system balancing
- Fits same floor openings as for electrical and telecommunications cabling systems
- Fastening to floor with 4 claw fasteners
- Material: polycarbonate, body-tinted in a colour similar to RAL 7037 (dusty grey) ¹⁾
- Can be walked and driven over, also with wheelchair

Tender text

..... units

NTK floor twist outlet for installation in a floor plenum; round, for generating twisted, stable, vertical air jets,

consisting of:

- floor insert with carpet protection ring and four claw fasteners,
- air outlet element with radial air slots and central recess; recess depth 4.5 mm for optional insertion of a piece of carpet,
- perforated throttle disc for stepless adjustment of volume flow rate by hand (can be operated during system balancing).
- Accessory: lid to close the central recess.

Type code

DB-N – DN 215 – D – __

Floor twist outlet
Size
Damper
Accessory

Size

215 = DN 215

Damper

D = throttle disc

Accessory

D = lid to close the central recess

Material:

Air outlet made of polycarbonate, outer surfaces matted to be made scratch-resistant, body-tinted in a colour similar to RAL 7037 ¹⁾

Make:

Krantz

Type:

DB-N – DN 215 – D – __

Subject to technical alterations.

¹⁾ other colours on request

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The logo for Krantz GmbH, featuring the word "Krantz" in a stylized, blue, cursive script font.