Air Distribution Systems

Binnacle diffuser NIQ-R 550/1000

Application

The round binnacle diffuser type NIQ-R 550/1000 is a free standing displacement diffuser for creating displacement ventilation systems in larger occupied areas like gate seating areas in airports.

Design and construction

The binnacle diffuser is of cylindrical design with a perforated steel outer face. The unit has an attractive design, its size and shape allowing it to blend in smoothly with its surrounding. The top of the diffuser is domed to help prevent things being placed on top of it.

The simple design provides no view into the diffuser interior and the penetration of dust and other particles is prevented.

The air outlet face consists of three layers, an outer layer of 1,5 mm perforated stainless steel, a flame retardant black foam middle layer and an inner layer of perforated galvanized steel. It has a 100 mm high stainless steel base containing a segmented damper for volume control and a tapping for measuring the static pressure.

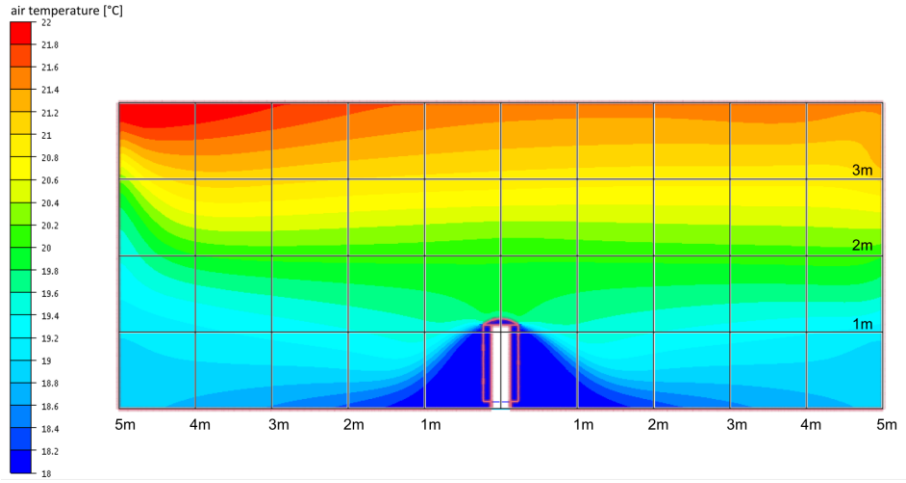


Fig. 1: Temperature distribution with front face velocity of 0,25 m/s and temperature difference room air to supply air of 3 K

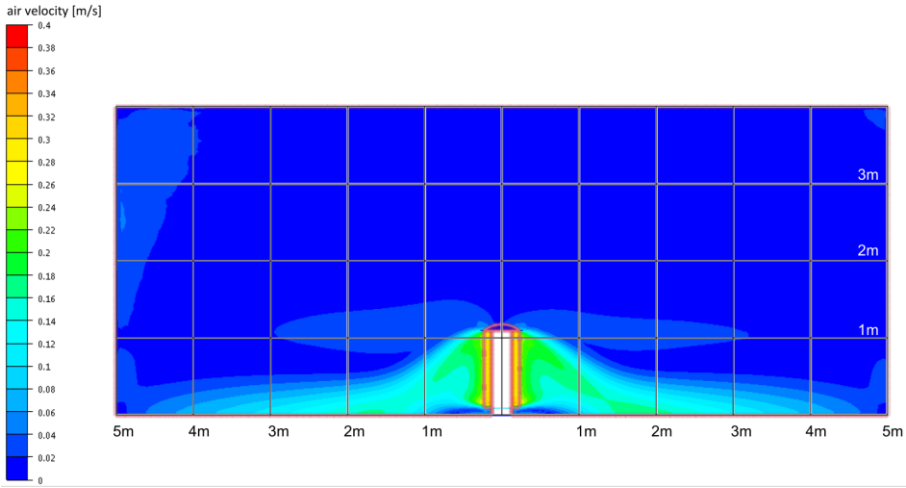
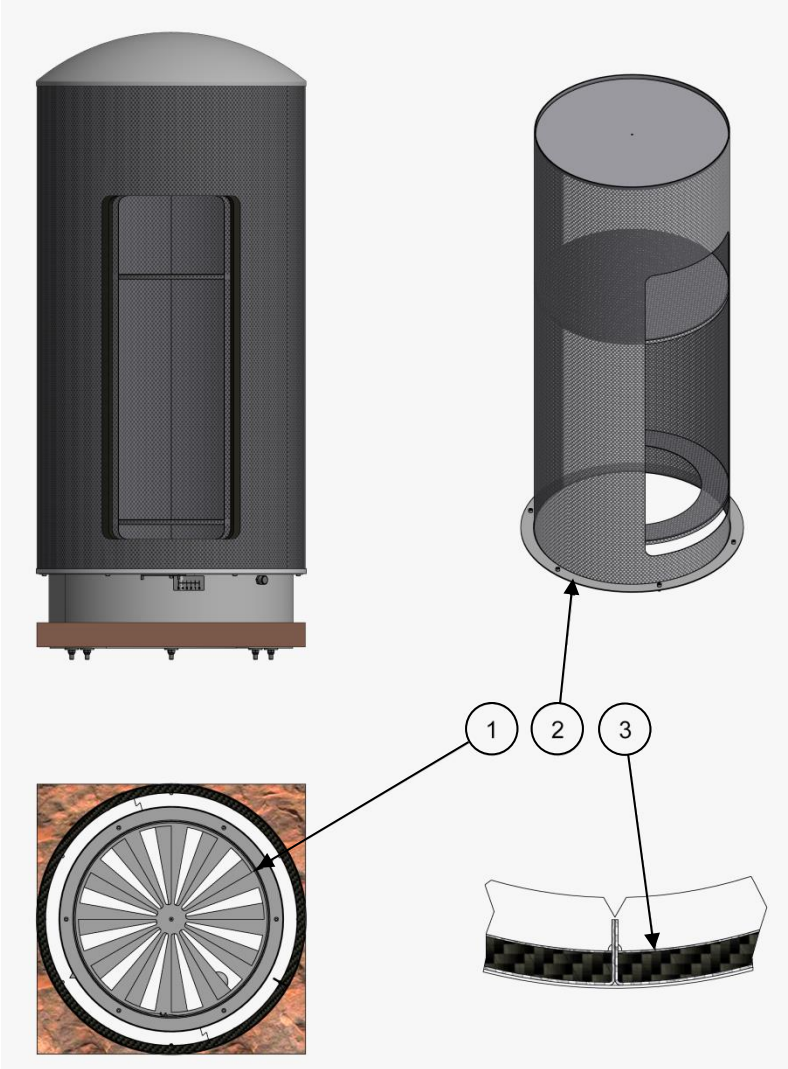


Fig. 2: Air velocity distribution with front velocity of 0,25 m/s and temperature difference room air to supply air of 3 K

Strulik GmbH D-65597 Hünfelden Neesbacher Str. 15 Tel.: (+49) 64 38 8 39-0 Fax: (+49) 64 38 8 39-30 E-Mail: contact@strulik.com
Strulik GmbH D-47138 Duisburg Am alten Viehhof 7 Tel.: (+49) 2 03 429 46-0 Fax: (+49) 2 03 429 46-66 E-Mail: duisburg@strulik.com **www.strulik.com**

Binnacle diffuser
NIQ-R 550/1000

Specific Design Features



Specific Design features

Inside the stainless steel plinth there is a segmented damper **(1)** with an adjustment scale for precise volume flow regulation. The air volume flow can be simply checked and set by using the integrated tapping to measure the static pressure.

The inner perforated cylinder **(2)** converts the air velocity and flow from the inlet nozzle to a circum-ferential flow out of the diffuser. It starts to balance the air flow of the diffuser over the whole active height.

The external perforated cylinder **(3)** comprises the three layers and provides additional control and equalization of the velocities leaving the outer face of the diffuser

Standard performance

The diffuser has an air outlet area of 1,7 m², air volume flows of 390 l/s to 500 l/s (1400 m³/h to 1800 m³/h) and provides face air velocities from 0,22 m/s to 0,32 m/s

Binnacle diffuser
NIQ-R 550/1000

Variations of volume flows
Variations of flow patterns

Variations of required volume flows above and below the standard performance

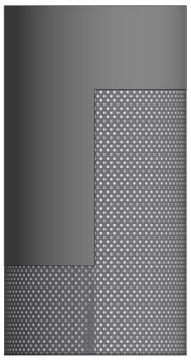
Volume flow range from 167 l/s to 390 l/s (600 m³/h to 1400 m³/h). Here the perforations of the inner cylinder are removed in some areas and this has the effect of deactivating part of the binnacle diffuser.

When using low volume flows perforated sheet is only used in the lower part of the cylinder. This has the effect of reducing the air outlet area from the binnacle whilst maintaining the correct velocities and making all the units still look the same.

Volume range from 500 l/s to 555 l/s (1850 m³/h to 2000 m³/h): To avoid the generation of high sound levels the segmented damper is replaced by a bespoke orifice plate, which generates the exact desired static pressure loss and thus provides the correct air volume.

Variations of the air flow pattern

Ba adjustment of the design of the inner perforated plate in relation to the outer surface different flow rates may be directed in different directions. There is often a need for this when the binnacle diffusers are on the edge of seating areas. Here commonly 25 % of the supply air flow is directed into the seating area, while the remaining 75 % of the air flow is directed into the walkways to prevent drafts for seated passengers.



Using different sized perforated plates to form the inner cylinder provides different volume flows in each direction, again whilst all the units look the same.

Binnacle diffuser
NIQ-R 550/1000

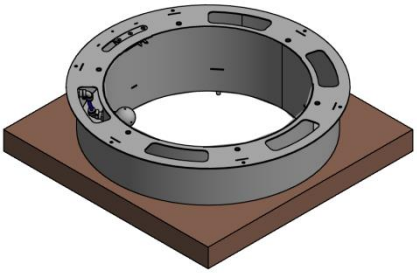
Installation options

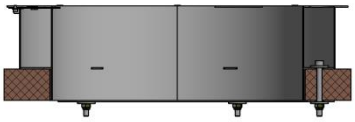
Installation options

For the installation we have two options. The diffusers can be installed in a raised floor with air supply by a pressure floor, or they are mounted on a slab for a ducted connection.

Installation in a raised floor

Here the diffuser plinth is fixed to the floor tile. A hole is cut into the floor tile and the diffuser plinth is fixed by a counter flange at the bottom side of the floor tile.



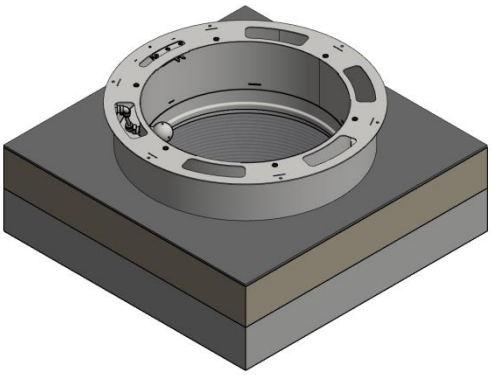


Ducted connection

For this installation method a height adjustable base frame is first installed on the concrete floor. It must be set so that the air supply is concentric to the air supply nozzle. The upper part of the floor pedestal can then later be adjusted to the height of the finished floor before the plinth of the binnacle diffuser is finally screwed to the base frame.

A suitable bracket for the installation of the base frame is supplied with the base frames.

A comprehensive assembly instruction is also part of any delivery.



Binnacle diffuser
NIQ-R 550/1000

Standard accessory
Noise level and pressure loss

Standard accessory

An anti-ram-guard may be requested as an extra accessory if the binnacle diffusers are to be installed in areas with trolley traffic.

Anti-ram-guard made of 50 mm diameter stainless steel tube. Outer diameter 816 mm, height 235 mm.

Noise level and pressure loss

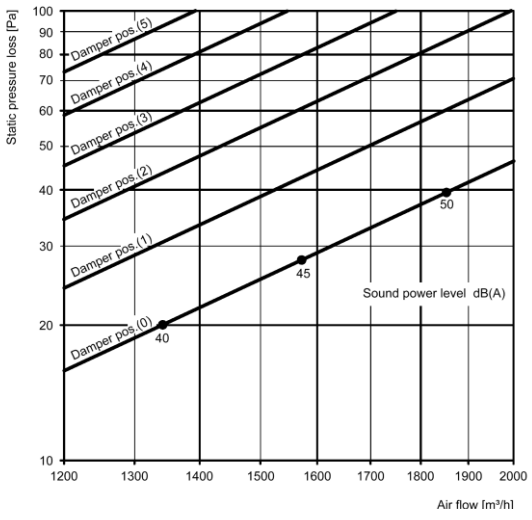


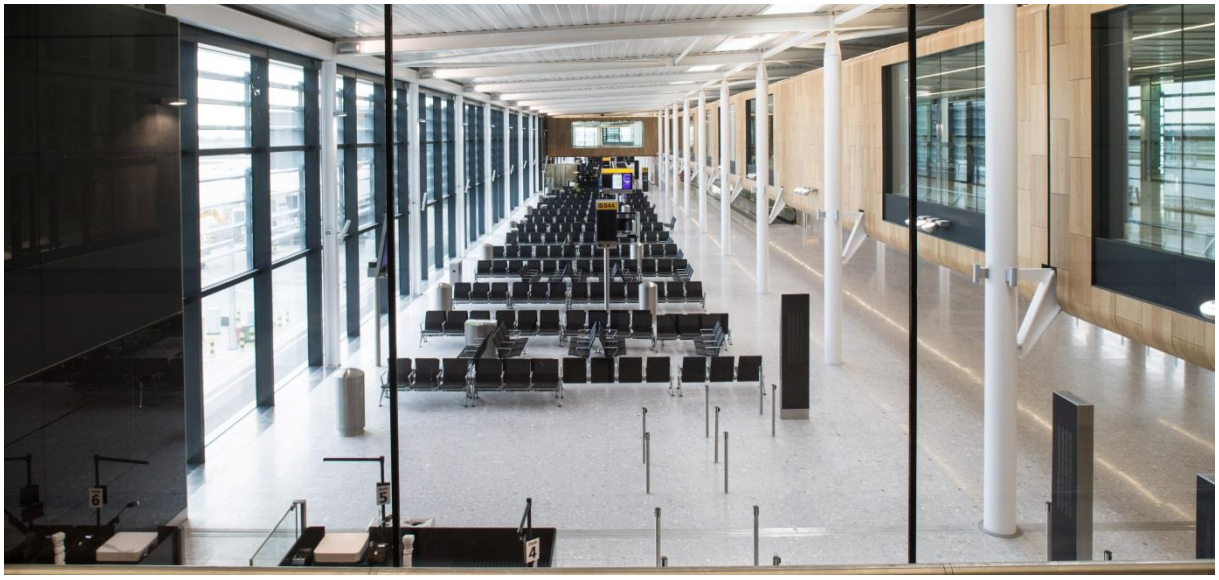
Fig. 3: Sound power level and pressure loss for binnacle diffuser NIQ-R 550/1000

Care and Maintenance

Maintenance is limited to the care of the outer stainless steel surface of the binnacle diffuser. Generally no further maintenance is required because of the design and construction preventing the passage of dust and dirt particles into the interior of the diffuser.

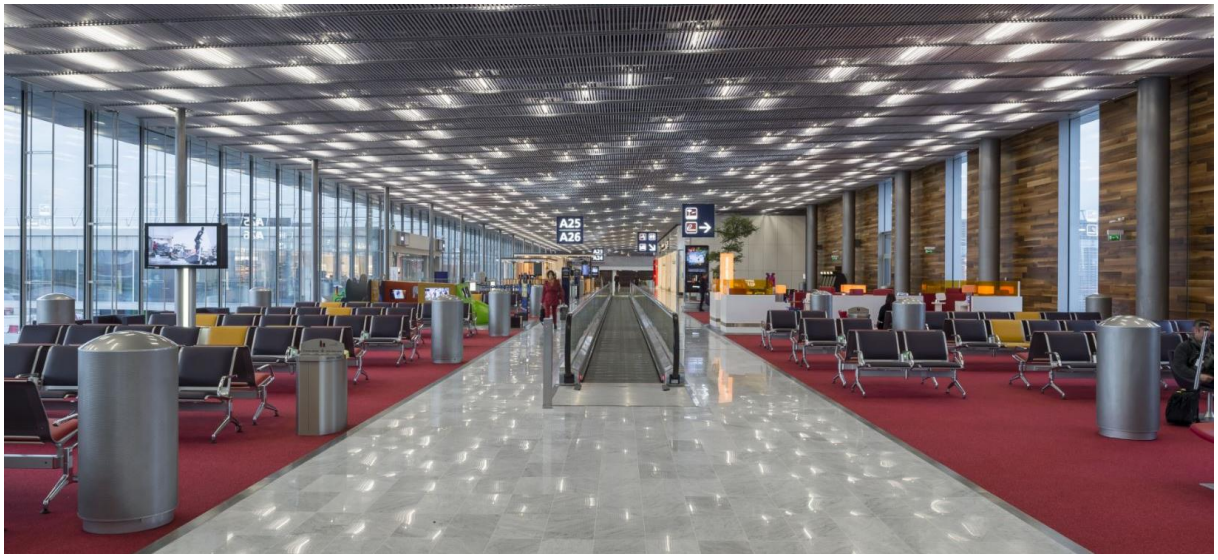
Binnacle diffuser
NIQ-R 550/1000

References



Reference Heathrow Airport Terminal T2B.

Binnacle diffuser installation in raised floor. Diffuser front face stainless steel



Reference Paris Orly Airport.

Binnacle diffuser installation with base frame on slab. Diffuser front face powder coated to RAL. Powder: Akzo Nobel Type 310, Nickel Interpone clear vanish matt, Interpone 610

Tender text

Position	Description	No. of units	Unit price	Extended price
	Round binnacle diffuser for use as supply air diffuser to create a displacement ventilation flow. The diffuser is to be mounted on the provided 100 mm high stainless steel plinth, which contains a segmented damper and a device for measuring the static pressure loss of the diffuser. The outer 1000 mm high casing of the diffuser is built as domed cylinder and consists of three different layers. The outer surface shall be made of perforated stainless sheet steel. The innermost layer shall be made from zinc coated perforated sheet steel plate and shall form an air distribution element to transform the spigot velocity into a balanced equal lower velocity around the circumference of the diffuser. In between the two steel layers there shall be incombustible black foam to prevent any sight into the diffuser. The inner perforated cylinder may have reduced perforations to reduce the active surface of the whole diffuser. **Dimension**: Diameter of diffuser: 550 mm Active diffuser height: 1000 mm Height of plinth: 100 mm **Surface diffuser:** □ Stainless steel natural □ Stainless steel grinded □ Stainless steel powder coated **Type of damper:** □ Standard segmented damper □ Special perforated plate to create a specified pressure loss **Installation**: □ Installation for raised floor □ Installation for ducted connection, with base frame □ Bracket for installation of the base frame to the slab Airflow per diffuser:…….m^3/h Sound power level:……..dB(A) Static pressure loss:……Pa Manufacturer: **Strulik GmbH** Type: **Binnacle displacement diffuser NIQ-R 550/1000**			