Opticlean ceiling air outlet made by Krantz Components

Reference project

DTKS (Deutsche Telekom Kundenservice GmbH)

- New office building in Böhlerstraße 69, Düsseldorf-Heerdt
- Building owner: BÖ69 Projektentwicklung GmbH
- Architect: Goldbeck West GmbH
- Consulting engineers: TIGEV Ingenieurgesellschaft mbH
- Mechanical contractor: Caverion Deutschland GmbH, NL Köln

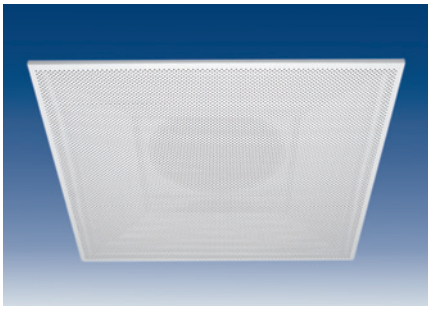
Krantz Components is a leading manufacturer of components and systems for building technology. Our product portfolio encompasses customized air distribution and cooling/heating systems for commercial and industrial applications. High-quality cleanroom systems complement our range of products.

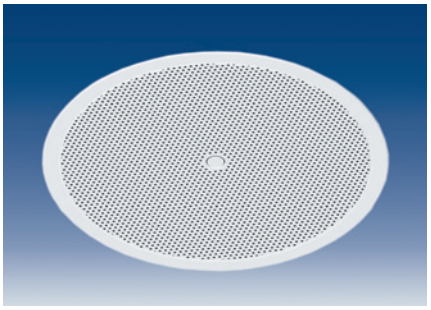
A special reference for ventilation in commercial buildings is the new office building of the DTKS in Düsseldorf-Heerdt (Germany), completed in 2013 with a total rental space of about 18 000 m^2.

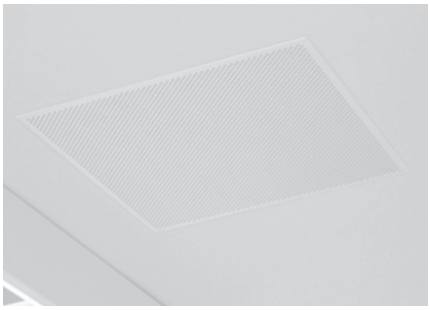
The office spaces are mainly used as call centres. Due to a high occupancy there are large internal heat loads that must be removed by HVAC systems. A pleasant interior design and a sustainable construction were of great importance while designing the building. Priority was given to high quality and comfortable thermal environment for the structural and technical equipment. Therefore the building was certified 'silver' by the German Sustainable Building Council (DGNB – Deutsche Gesellschaft für nachhaltiges Bauen).

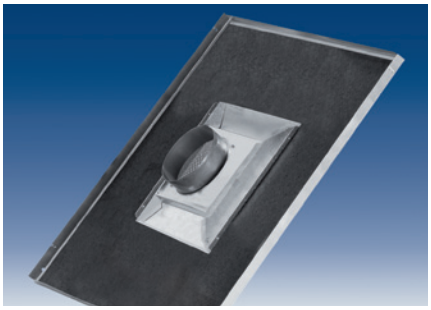
Opticlean ceiling air outlets combined with a chilled ceiling have been integrated into a metal ceiling on site in order to fulfil these demands. In other parts of the building, e.g. in the canteen, Opticlean ceiling air outlets have been installed in mineral fibre ceilings.

Photos: AVP Group Düsseldorf

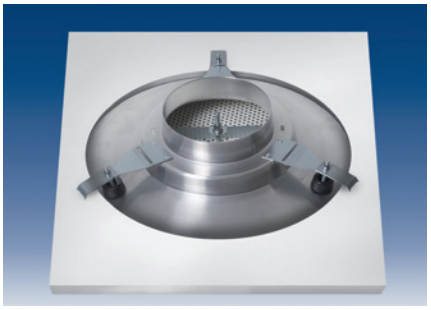




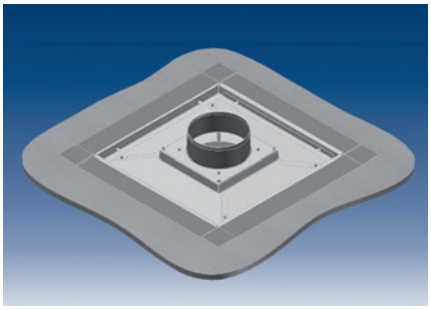




Opticlean OC-Q with square faceplate



Opticlean OC-R with circular faceplate



Opticlean OC-Q – installation with mounting frame for gypsum board ceiling

Opticlean – the solution for comfortable thermal environment

The Opticlean made by Krantz Components has been developed in order to combine in one single product the main features of a ceiling-mounted supply air outlet for diffuse indoor air flow, i.e.:

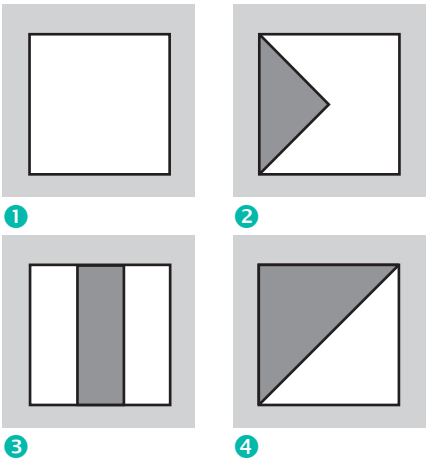
- high level of thermal comfort in the occupied zone
- unobtrusive integration into the suspended ceiling
- very low amount of dirt accumulated on the ceiling
- low sound power level and low pressure drop

The Opticlean is designed for use in suspended ceiling systems.

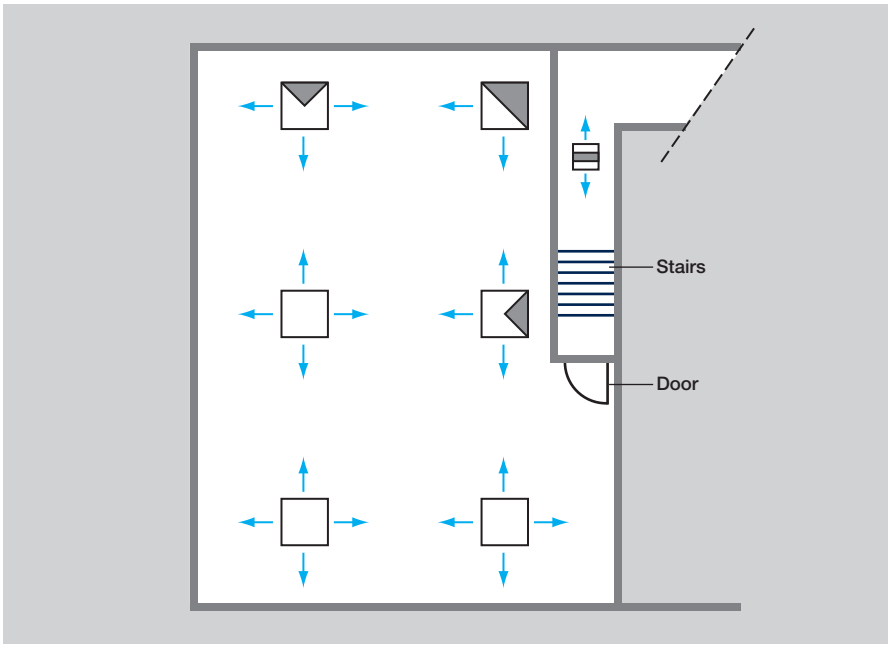
In grid ceilings with ceiling tiles of 625 x 625 mm or 600 x 600 mm, the basic Opticlean outlet can be laid from above onto the T-bars of the ceiling system, instead of square ceiling tiles, and connected to the supply air ductwork.

Furthermore a square and a circular design were developed for integration into gypsum board ceilings.

Krantz Components delivers special solutions for a number of conventional ceiling systems with metal ceiling tiles in square or rectangular design, tailored to the respective ceiling system.



Key
1. No segment cover
2. 3-way discharge
3. 2-way symmetric discharge
4. 2-way asymmetric discharge



Principle sketch of Opticlean air outlets with segment covers to adapt the discharge pattern

Construction design

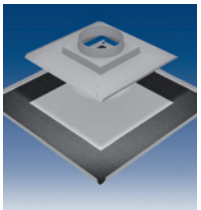
The Opticlean ceiling air outlet with square faceplate is available in seven sizes. The main component is the square air distribution element which is fixed to the perforated faceplate. The Opticlean ceiling air outlet with circular faceplate is available in two sizes. The outlet is connected to the supply air ductwork either directly by a flexible duct or via a connection box which can be optionally fitted with a volume flow damper adjustable at the connection spigot.

If the Opticlean is installed near a wall or in a room corner, it is possible to alter the discharge pattern by using segment covers made of acoustic fleece in order to avoid air draughts in the occupied zone. These covers will be fitted to the upper side of the perforated faceplate.

The faceplate of the Opticlean consists of a finely perforated metal ceiling tile. Hole diameters and free area of the perforation have to be in a certain range to ensure the correct performance of the outlet. The integration of the air outlet into the ceiling is unobtrusive. If the air distribution element is painted black, it is hardly possible to distinguish the Opticlean from the adjacent ceiling tiles.

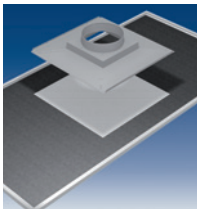
For integration into a gypsum board ceiling, a mounting frame is delivered additionally. It is inserted into the ceiling cut-out from above and fixed with four drywall screws. For final appearance the joint between the frame and the gypsum board panel has to be filled and later painted to the desired colour along with the ceiling. The faceplate is centred by means of spacers; this enables to achieve a regular gap between the mounting frame and the faceplate. This design is basically used for 12.5 mm thick gypsum board panels.

Opticlean

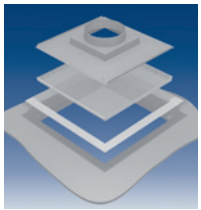


– for square ceiling tile

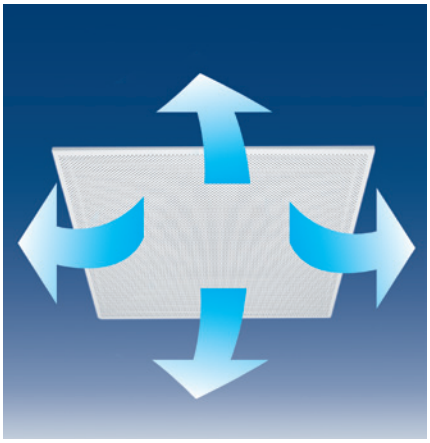
– with segment cover for 3-way discharge

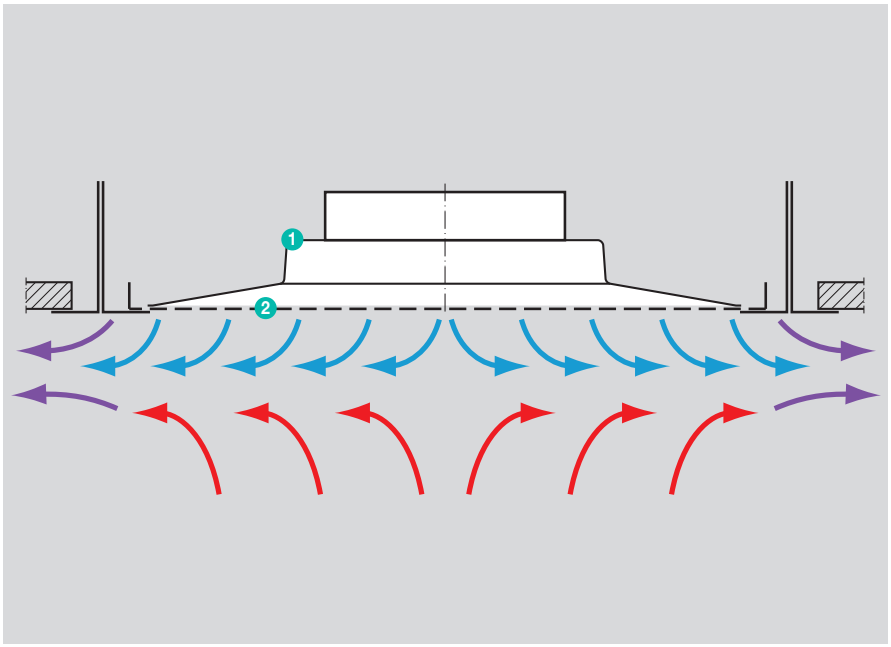


– for rectangular ceiling tile



– for integration into gypsum board ceilings





Key
1. Square air distribution element
2. Perforated faceplate

Functional principle of air distribution

Mode of operation

Air flow pattern made visible by smoke tracer

The supply air is discharged very uniformly through the finely perforated metal ceiling tile and spreads radially in the horizontal plane. As it induces indoor air, the air velocity and the difference in temperature between supply and indoor air decrease rapidly; this results in a comfortable thermal environment with draught-free indoor air velocities and uniform indoor air temperatures in the occupied zone.

The induced indoor air does not touch the underside of the ceiling tile, thanks to a layer acting as an air cushion that forms under the air outlet and thus prevents from impaction and adhesion of airborne particles. This reduces the dirt accumulation on the ceiling which usually occurs with turbulent-flow air outlets (e.g. swirl diffuser, anemostat) to a minimum.

Air flow pattern made visible by smoke tracer

Opticlean integrated into a metal ceiling tile

Unobtrusive integration into a suspended ceiling

Application

The Opticlean ceiling air outlet is suitable for the installation in pure air systems, recirculated air systems (e.g. combined with fan coils) and air-water systems having the following functions: cooling, heating, ventilation and dehumidifying. The recommended installation height ranges from 2.5 to 4.5 m. The maximum temperature difference between supply and indoor air rises up to ± 10 K. Depending on size, supply air volume flow rates of 11 to 239 l/s [40 to 860 m^3/h] can be achieved.

Opticlean ceiling air outlets are primarily designed for the use as supply air outlets. In principle it is possible to use the Opticlean as return air inlet as well, although with this kind of operation dirt accumulation (clean function) of the faceplate cannot be excluded. This applies especially for the installation in rooms with increased concentration of airborne particles.

For further information about the Opticlean OC-Q click here!

For further information about the Opticlean OC-R click here!

Apart from this, the air outlet can also be combined with HEPA filter housings for the use in cleanrooms (e.g. Puriclean).

For further information about the Puriclean click here!

Worldwide the Opticlean ceiling air outlet is more and more frequently used by consultants and architects, because compared to conventional ceiling air outlets it offers both aesthetic and functional advantages that are convincing.

D. Rossbruch, 7.3.2014

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