



Climate ceiling

**RAUM-K GRID**

powered by

**singular**  
klima to go

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## Why Raum-K?

Raum-K is the heating and energy system of the future. "Old" energy sources that generate heat from fossil fuels, belong in the past. We, as energy provider of the future, for more than 20 years, have been dealing with healthy, resource-saving and renewable energy, which is used to benefit people, the environment and the preservation of our habitats. We see ourselves as transmitters and receiver, an energy carrier and multiplier for the energy and heating revolution of the present and the future.

The sun is our role model: Raum-K - New World of Energy

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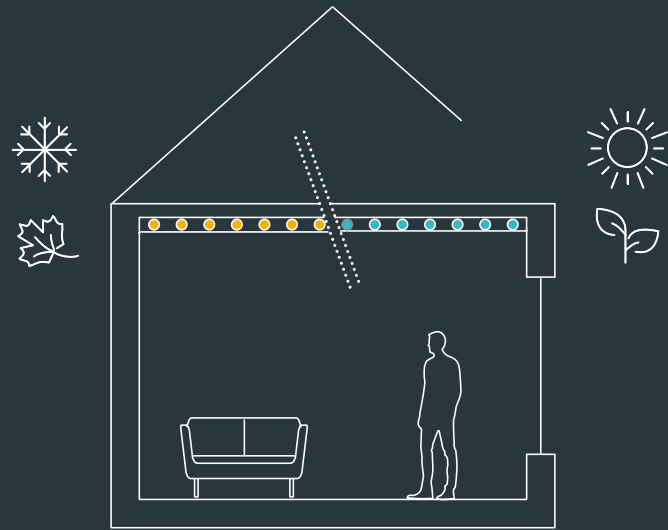
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# POTENTIAL OF A CLIMATE CEILING



## Combined heating and cooling

Heat pumps are increasingly being employed: already more than 40 % of new buildings use them for the efficient operation of their surface heating. In residential buildings, the pumps mainly generate heat for underfloor heating - leaving their cooling potential unused.

### A CLIMATE-CONTROLLED CEILING CAN DO BOTH: HEATING AND COOLING.

Up to now, cooling has been exploited far too rarely, or compensated for with an additional air conditioning unit. A reversible heat pump offers ideal conditions, creating a comfortable indoor climate all year round and maximum energy efficiency. Climatic ceilings use this potential and equip buildings for the increased cooling demand that will await us in the course of climate change.

## Cooling without the risk of catching a cold

Many rooms have drafts and cold air constantly flows through them. Rooms with such deficiencies are very common. In comparison, air conditioning systems can cool more strongly, but often cause uncomfortably cold draughts with high energy expenditure. Fortunately, air-conditioning ceilings have now become established as a means of air-conditioning. These offer practical advantages for a wide range of applications, such as absolutely silent cooling without unpleasant draughts.

## Comfortable warmth without heating air

Do you know the pleasant feeling of being warmed by the sun on a clear winter day? The air is cool, but the radiant heat makes up for it.

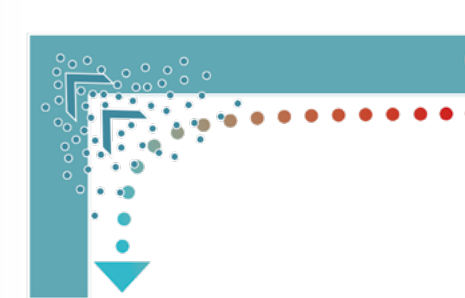
Heating with the mineral climate ceiling also works according to this principle. All surfaces in the room are heated, radiating this heat to us. The heating power can be reduced. Therefore, we are surrounded by gently heated surfaces. This means that the air does not have to be overheated and thus dried out - we feel good all round.

## Healthy breathing air

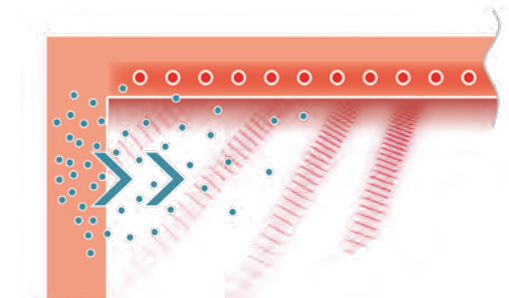
A person breathes 24,000 times every day. That is up to 12,000 litres of air\* that flows into our lungs - including all the substances suspended in it. Among them is mainly house dust, which consists of mite excrement and other organic components. Allergy sufferers in particular know the value of a low-dust room climate. With a climate ceiling based on radiant heat, people can breathe cleaner air, because it circulates less dust during heating than systems based on convection.

## Against mould and moisture

Mould is more than unpleasant and dangerous for people and buildings. Low ventilation increases the risk of harmful mould growth. Climatic ceilings actively prevent mould growth, because they primarily warm the room envelope - not the air. If the walls are warmer than the air, they remain dry and do not provide a breeding ground for mould.



If the air is warmer than the enveloping surfaces it cools down on them. Moisture in the air condenses on and penetrates the walls.

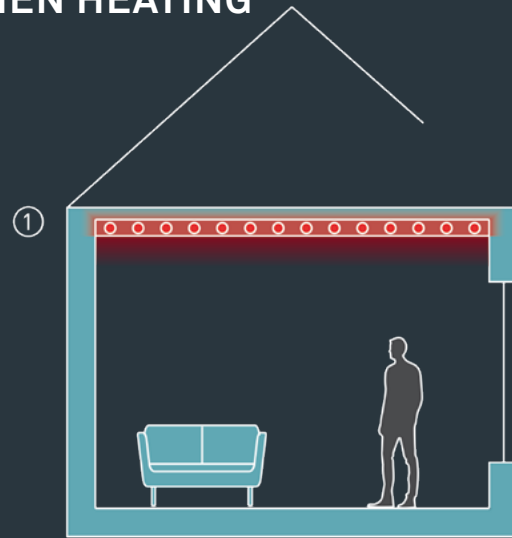


If the air is colder than the enveloping surfaces, it warms up on them. In the process, it evaporates water: the masonry dries.

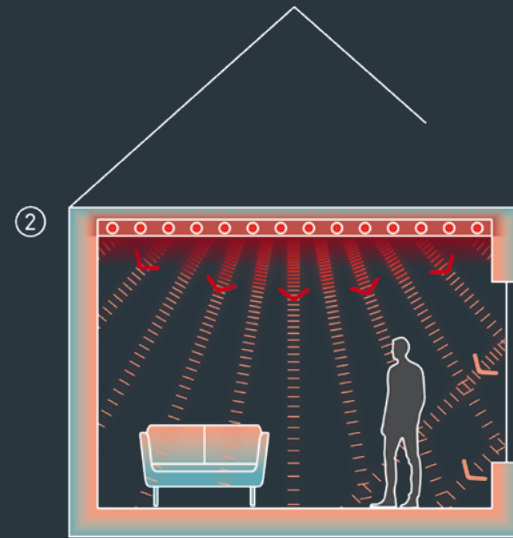
1. R. F. Schmidt, G. Thews, Physiologie des Menschen, Springer, Berlin, 1995

# HOW IT WORKS AN AIR-CONDITIONED CEILING

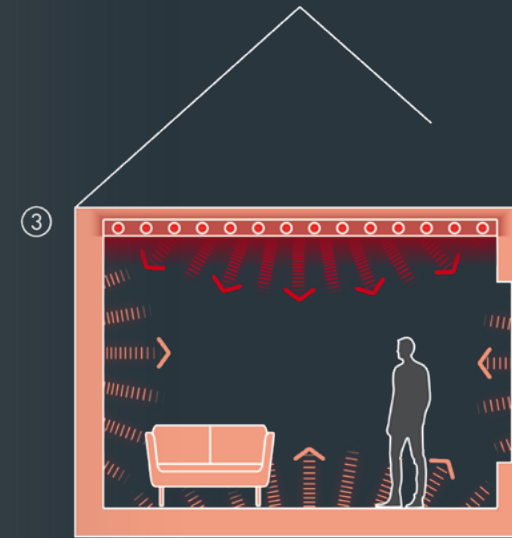
## WHEN HEATING



Warm water flows through pipes in the ceiling and heats its surface. On the warm surface of the ceiling, the air temperature rises.



The warm air can neither rise nor cool on the ceiling: Convection is slowed down. Heat is only transferred to the floor, walls and furniture by radiation.

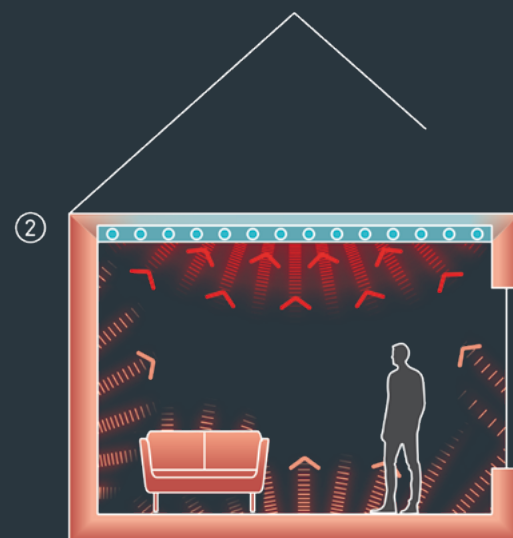


All surfaces are now warmer than the air in the room. Like the ceiling, they radiate their heat gently and evenly into the room.

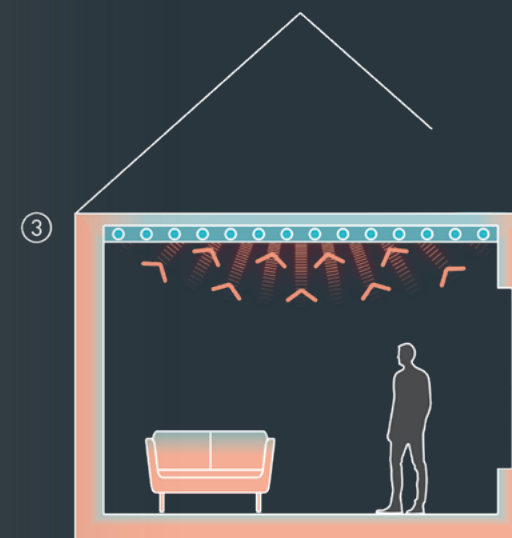
## WHEN COOLING



If the surfaces are heated up in summer they radiate a lot of heat into the room. Cold water will flow through the pipes of the climate control ceiling to cool the ceiling surface.



The cooled ceiling surface absorbs heat radiation from the room. It permanently dissipates this heat with its cooling water. The radiation exchange between the cool ceiling and the warm surfaces now also cools the walls, floor and furniture.



The cooled surfaces radiate less heat into the room and allow the body a comfortable heat regulation again without sweating. This is because the body also releases its excess heat to cooler surfaces through the exchange of radiation.

## Radiant heating

A climate-controlled ceiling brings heat into the room mostly by emitting thermal radiation. As a result it primarily heats the surfaces: Ceiling, wall, floor and furniture become warmer than the air. The warmer the surfaces are, the more heat they themselves radiate to their surroundings.

The pure heat radiation of the climate ceiling transforms virtually every surface of the room into a warm surface. The air on the other hand, remains pleasantly fresh and is not overheated. This ambient climate is extremely comfortable for people.

## Radiant cooling

Due to direct sunlight and industrial heat, the walls and floor can heat up considerably in summer. These overheated surfaces radiate heat which disturbs the natural heat regulation of humans.

This is why cooling is achieved with the help of the ceiling: All overheated surfaces now transfer their heat via radiation exchange to the cooler climate ceiling, where it is continuously dissipated with the cooling water. In the process, the surfaces cool down and radiate correspondingly less heat into the room. In exchange we can radiate our own excess heat back to the cooler environment and feel more comfortable.

The air-conditioned ceiling is supplemented by controlled ventilation of the living space: this dehumidifies the air during hygienic air exchange and therefore enables air-conditioning to a high intensity.

# PROPERTIES OF CLIMATE CEILINGS POWERED BY SINGULAR



With the symbiosis of Raum-K Grid energy rails and the mineral panel from OWA, the climate-controlled ceiling creates added value that goes far beyond the possibility of heating and cooling.

In addition to great performance, the „Mineraklimadecke“ scores above all with excellent acoustic, sound insulation properties, quick and safe installation and it is easily reversible.

The lighting integrated in the energy rails rounds of the overall system and sets new standards regarding heat and cooling ceilings.

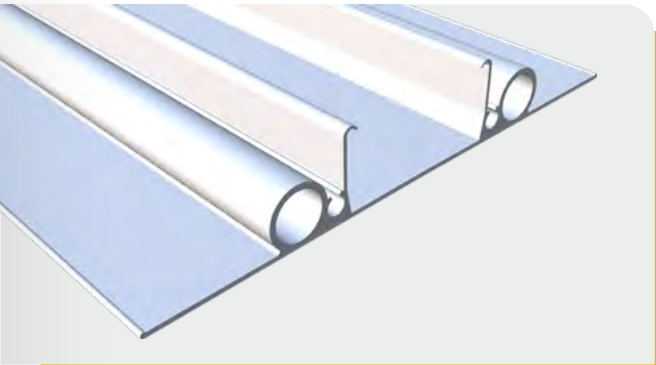


## What distinguishes Raum-K Grid from other systems?

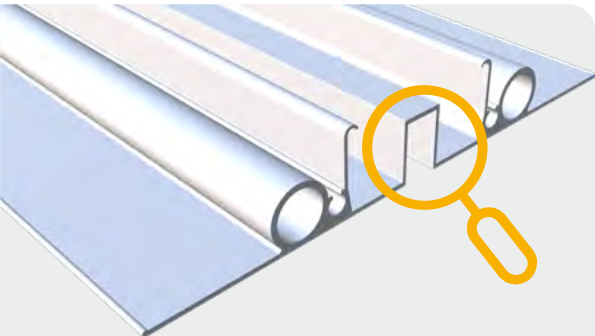
Raum-K Grid integrates the heating, cooling and lighting directly into the energy rail of a parallel or cross-band grid and not, as is usually the case, in the ceiling tiles. The mineral panels in turn take on all the other functions such as acoustics, design and the inclusion of other elements of the technical building equipment (TGA). Particularly noteworthy is the reversibility due to easy access of the ceiling cavity.

|                        | CONVENTIONAL SYSTEMS                               | RAUM-K GRID - THE ACTIVE ENERGY GRID                    |
|------------------------|--|---|
| Heating and cooling:   | Heat transfer using cassettes                      | Heat transfer directly via the energy rail              |
| Heating-cooling output | Fixtures reduce the overall performance            | High performance with mounting and installation options |
| Lighting:              | Separately in the area of the ceiling tiles latten | Can be integrated directly into the bandraster          |
| Inserts:               | Non-mineralised slabs                              | High quality mineral slabs <sup>1</sup>                 |

1) If the acoustics are not taken into account for the climate-controlled ceiling, insert panels do not have to be used.



The Raum-K Grid energy rail



The Raum-K Grid light track directly in the energy grid or in the mineral battens can be integrated into the lighting



# MINERAL PANELS



## Sinfonia / OWAcoustic premium

### DDISCREET & ADAPTIVE

The OWAcoustic product line with Sinfonia C, Sinfonia and Silencia creates freedom in the room. With a total of six acoustically different effective varieties, you become the conductor of targeted room acoustics with a uniform surface. From the intelligent combination of high absorption and longitudinal sound insulation up to 100 %, almost any acoustic wish can be fulfilled.

Sinfonia was developed to prove itself in a wide range of applications. The fleece-laminated mineral ceilings are suitable for the most acoustically demanding of rooms and impress with their high sound absorption.

### FEATURES

- Very high absorption:  $\alpha_w = 0,70 - 1,00$
- Effective sound insulation
- High stability and material density



Sinfonia mineral tile, fleece-laminated

## Properties

|                                 | SINFONIA SILENCIA  | SINFONIA  | SINFONIA C                                  |
|---------------------------------|--|---|---|
| Material:                       | Mineral board, fleece-laminated                                    |   |   |
| Reaction to fire:               | A2-s1,d0 according to DIN EN 13501-1                               |   |   |
| Thickness:                      | 20 mm nom.   | 15 mm nom.  | 15 mm or 20 mm nom.                         |
| Dimensions:                     | 1.200 x 1.200 mm   | 600 x 600 mm<br>1.200 x 600 mm<br>1.200 x 1.200 mm      | 1.200 x 300 mm                              |
| Colours.                        | white  |   |   |
| Reflection of light:            | ca. 87 (ISO 7724-2, ISO 7724-3) (white)                            |   |   |
| Sound insulation <sup>1</sup> : | up to D <sub>n,f,w</sub> =24 dB / CAC=24 dB                        | up to D <sub>n,f,w</sub> =28 dB / CAC=30 dB             | up to D <sub>n,f,w</sub> =36 dB / CAC=36 dB |
| Sound absorption:               | α <sub>w</sub> =1,00 / NRC=1,00                                    | α <sub>w</sub> =0,85 / NRC=0,85                         | α <sub>w</sub> =0,70 / NRC=0,70             |
| Moisture resistance:            | up to 95 % RH  |   |   |
| Edges:                          | 3  | 3 (1.200 x 1.200 mm)<br><br>0b/3(600x600 & 1.200x600mm) | 1 / 3                                       |
| Seal of approval:               | Blauer Engel, VOC-Label Class A+ (Frankreich) LEED Credit-eligible |   |   |

1. Abhängig von Abmessung, System, Rohdecke und sonstigen Zusatzmaßnahmen

# LED LIGHTING



## Illuminate indirectly and effectively

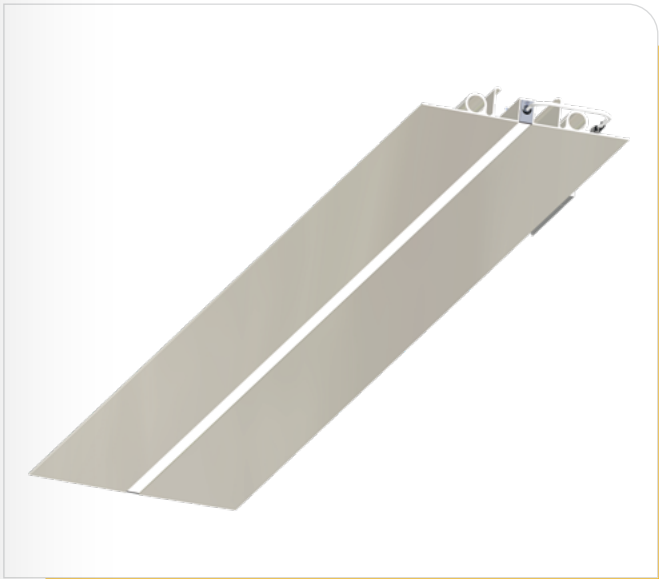
The integrated lighting is also part of the active energy track. The climate-controlled ceiling powered by singular therefore offers high performance, benefits temperatures in the water flow and increases the energy efficiency of the heat pump. This significantly reduces the operating costs.

Depending on requirements, specially developed lighting is recessed into the band louvre. Their luminous intensity can be adjusted to brighten the room pleasantly and homogeneously, even when suspended at different depths. The luminaires meet all important standards for use at work. They also provide emergency lighting, provided they are connected to a central battery.

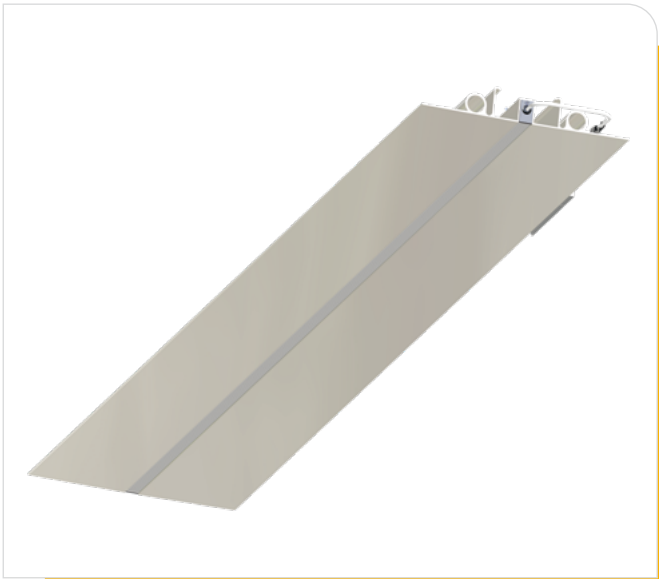


## Technical data

|                                |  |                            |   |
|--------------------------------|--|----------------------------|---|
| Type of luminaire:             | Luminaire profile heated cooling ceiling | Rated luminous flux:       | 1.682 lm  |
| Light source:                  | LED                                      | Colour rendering index Ra: | > 80  |
| Assembly type:                 | Installation                             | Housing design:            | Extruded aluminium profile                            |
| Input voltage AC:              | 198–264V~                                | Connection method:         | Terminal on the external power supply unit            |
| Input voltage DC:              | 176–280V=                                | Emergency light:           | Suitable for safety lighting systems (EN 50172))      |
| Frequency:                     | 0/50/60 Hz                               | Protection class:          | I   |
| Power input:                   | 34 W                                     | Degree of protection:      | IP42  |
| Rated lamp power:              | 29 W                                     | Ambient temperature:       | -25 °C / +50 °C                                       |
| Module / luminaire efficiency: | 145 / 50 lm / W                          | Dimensions (L x W x H):    | 1.121 x 188 x 28 mm                                   |
| Power Factor:                  | 0,98                                     | Weight:                    | 2,5 kg  |
| THD:                           | < 7 %                                    | Luminary glass:            | Opal plexiglass profile                               |
| Lifespan:                      | L80 / B10: 50.000 h                      | Design options:            | Suitable for workplaces and / or VDU workplaces (BAP) |
| Dimming:                       | DALI und SwitchDIM (Taster)              |                            |   |
| Nominal luminous flux:         | 3.600 lm                                 |                            |   |



Raum-K Grid Light Element Opal



Raum-K Grid lighting element BAP (VDU workstation)

## Tailor-made for integrated lighting

The customised LED technology is a development of Raum-K's module partner AS LED Lighting GmbH. The light intensity of each individual luminaire is separately adjustable, can be integrated flush into the energy track and achieves a pleasantly bright, flicker-free light at any ceiling height. Among other things, the luminaires meet all applicable requirements for the lighting of workplaces.

## Lifespan, warranty and planning

After 50,000 hours of operation, the lighting still has at least 80 %, or more, of the initial luminous flux, whereby a maximum of 10 % may fall below this value (L80 / B10). This means, even with 24 hours of continuous lighting for at least 6 years, there's no need for maintenance or replacement. We offer a 5-year warranty. As each luminaire is equipped with its own LED driver, defective light units can also be replaced without great effort and without disrupting operation.

The lighting design can be commissioned as an option. It determines the required number of luminaires and their suitable placement.

## Optimisable for every room

Each module is 1,121 mm long and equipped with its own LED transformer. This means that the energy grid can be freely combined with mineral panels. Seamlessly connected light strips are just as possible as the selective use of separate luminaires.

## High-quality LED lighting

High-quality LEDs and an opal luminaire glass achieve a homogeneous illumination of the room. Even with dimmed light no individual points of light are visible. The luminaires are dimmable and are available in neutral white.

## At work and visual display workstation (BAP)

The luminaires comply with DIN EN 12464-1 for the lighting of indoors and the technical requirements and specifications for workplaces ASR A3.4., taking glare limitation into account. Furthermore, they are suitable for central batteries according to DIN EN 50172 and can be used for emergency lighting. Photobiological safety is measured and certified according to IEC 62471.

When requested, the Raum-K Grid lighting element is also available for use at computer workstations (BAP).

# ADVANTAGES

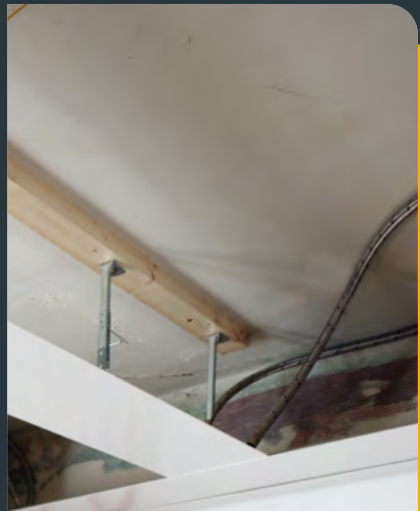


## Energy rail

The energy rail remains visible on the underside of the ceiling and is therefore a technical, as well as a design feature. You have the choice between different grids (cross or parallel grid) and centre distances.

## Mineral panels

In the Raum-K Grid system, the mineral panels are not only a design feature, but also optimise the room climate. The sound and insulating properties of the mineral panels improve the comfort in the room.



## Reversible and free area for fixtures

In the grid system, fixtures do not compete with lighting as usual, heating and cooling (space wise). The mineral panels are available without restriction for fixtures and attachments such as loudspeakers, downlights, cameras and sprinklers. They allow quick access to the building services in the ceiling void at any time without interrupting the function and effect of the water-bearing elements. Subsequent changes to the room layout and use can therefore be implemented with comparatively little effort.

## Low planning and installation effort

The system components of the climate ceiling Raum-K Grid powered by singular are in stock and can therefore be ordered quickly. The planning and installation work is significantly reduced. Adaptation at the construction site is possible without any hindrance. On-site requirements can be implemented at short notice any time.



Conference room, OWA Headquarter, Amorbach



# FIELD OF APPLICATION



## 7 NON-RESIDENTIAL BUILDING SEGMENTS

### System solutions for every building and all rooms.

Singular ceiling systems are manufactured in Germany and stand for the highest quality and performance in terms of optimum room acoustics as well as building material classification, hygiene, moisture resistance and indoor air quality.

They are available in numerous finishes and for different construction systems, making them suitable for ceiling solutions in retail, restaurants, hospitals, hotels, sports and leisure facilities, offices and schools. In the latter segments, our ceiling systems make a significant contribution to stress reduction thanks to pleasant room acoustics.

Based on specially manufactured insert panels, they open up a wide range of planning possibilities.



Climate ceiling with integrated illumination

### Design varieties for every room concept

The Raum-K Grid system offers many modular combination options: You can suspend the ceiling areas to different depths, accentuate them with or without integrated lighting and you have a choice of different insert panels. Depending on your needs, different constructions can be connected without leaving the boundaries of the system.



Air-conditioned ceiling with integrated lighting

# REFURBISHMENT



## Minimum installation height

Raum-K Grid powered by singular is suitable for almost any room. The system has a slim cross-section because all the technology is already integrated into the grid: with minimal suspension, the installation requires just 180mm in height above the ceiling construction and creates a free available installation level for building services. This makes the system suitable for the renovation of rooms that are severely limited in height.

## Minor intervention in the existing building

Raum-K Grid can also be installed during use without having to empty the room. Only the hangers need to be screwed into the ceiling – the rest is simply hooked in. The planning and installation expenditure is significantly reduced. Adjustment at the construction site is problem-free. Site requirements can be arranged for at short notice any time.

## Energy refurbishment

The high efficiency of the air-conditioned ceiling makes it highly attractive in the context of: The energy rail heats the room with water temperatures that are very close to the desired room climate. The water flow therefore needs to be heated less or cooled less. This means that a reversible heat pump can provide the required flow temperatures with particularly low electricity consumption. This ensures a further increase in efficiency in the energy budget.



Reception, urological practice, Bad Mergentheim



Treatment room, urological practice, Bad Mergentheim

**"I particularly like the very comfortable climate, which has improved significantly with the installation of the air-conditioned ceiling and more over that it benefits my patients."**

*Dr. med. David Brix, Urologe from Bad Mergentheim*

2) If desired, a lower construction height of the ceiling construction is also possible - up to at least 60mm..





Corridor, urological practice, Bad Mergentheim

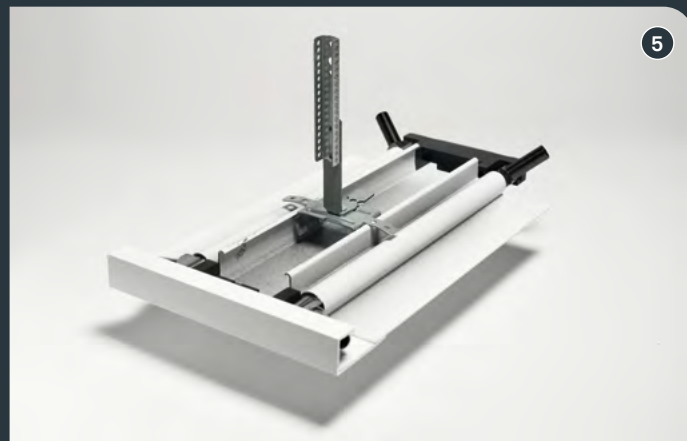
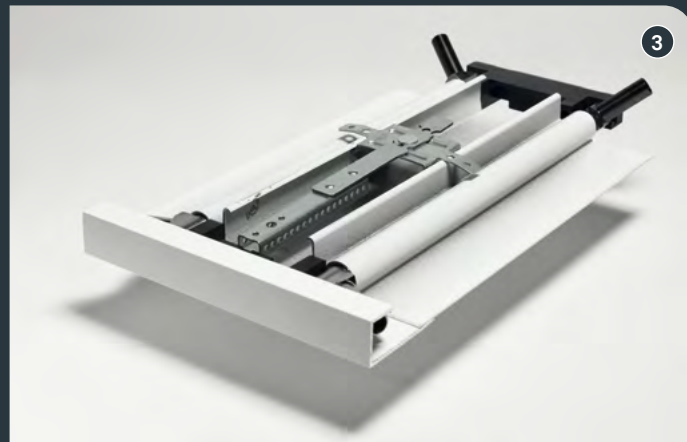


Corridor, urological practice, Bad Mergentheim



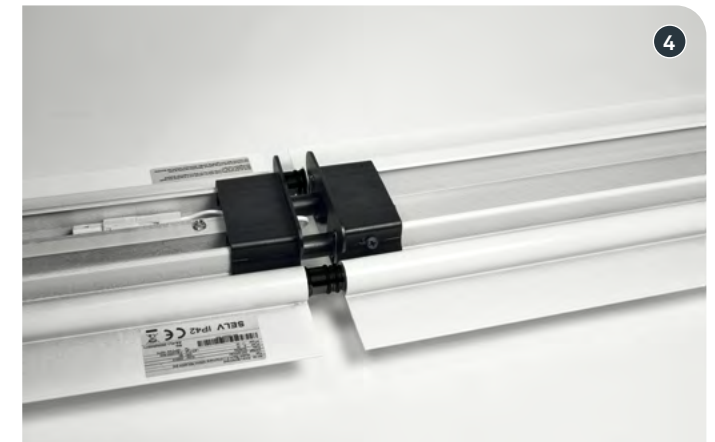
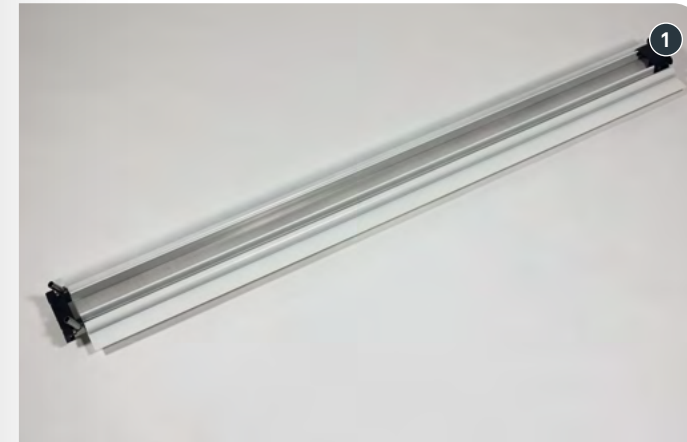
Treatment room, urologische Praxis, Bad Mergentheim

# ASSEMBLY



## Structure

- 1 Support cross band and wall with U-termination rail
- 2 Connecting walls without U-termination rail
- 3 Wall termination and support cross band with Nonius bottom part flat
- 4 Profile joint without connection coupling
- 5 Wall termination and support cross band with Nonius bottom part Raum-K Grid ES
- 6 Crossing point cross ligament grid



## Raum-K Grid System

The Raum-K Grid system is characterised by its simple design with less than 10 components.

Raum-K Grid energy rail with Raum-K Grid U termination rail



# WATER PURIFICATION

## Water quality plays a key role in energy efficiency

What should be taken into account when commissioning a climate-controlled ceiling – as with any other heating system – is the quality of the water, since not all water is the same. Even though tap water is strictly controlled in Germany, it should be adapted for use in modern heating systems. With our water treatment partner perma-trade, the quality of the water is optimally prepared for the energy efficiency of your climate-controlled ceiling.

## Securing guarantee and warranty: The VDI Guideline 2035

The VDI Guideline 2035 regulates measures for a permanently trouble-free heating operation and to ensure optimum energy efficiency. It sets specifications for the water (low-salt mode of operation, electrical conductivity less than 100 µS/cm) of heating systems and also forms the basis for any warranty and guarantee claims by manufacturers. Whenever a heating system is put into operation or modernised, system operators should ensure that the sanitary, heating and air-conditioning specialist contractor checks the water used accordingly and, if necessary, treats it in accordance with the specifications of VDI Guideline 2035.



Perma-trade Wassertechnik is at your disposal as water experts and will be happy to provide you with personal advice.

## Our recommendation for water treatment: perma-trade

When commissioning the Raum-K climate ceilings powered by singular, we suggest water treatment with the mobile device permaLine. It can be used to treat the water during operation in accordance with the specifications of VDI guideline 2035 using the partial flow method. The system water is desalinated and the hardness components calcium and magnesium as well as corrosive salts are rendered harmless. If required, the pH value of the water can also be adjusted, which is particularly important for aluminium materials.



## Your advantages

### Assured durability through an increase in warranty from currently two to 10 years.

Raum-K climate-controlled ceilings powered by singular, which have received permaLine filling water treatment, are optimally set for energy-efficient operation and optimally protected against corrosion damage. We can therefore up your warranty on Raum-K climate-controlled ceilings powered by singular, with permaLine, up to 10 years.



permaLine PT-IL 20 with permasoft T-PS 21000 IL

# CHECK LIST

## Customer

|                 |                       |
|-----------------|-----------------------|
| Company:        | Construction project: |
| Contact person: | Place:                |
| Place:          | Street:               |
| Street:         | Project Name:         |

**Every indictment creates clarity and planning certainty:**

## 1 Surfaces

Total area of the BV: \_\_\_\_\_ m<sup>2</sup>

Surfaces to be cooled: \_\_\_\_\_ m<sup>2</sup>

## 2 Raum-K Grid

- ☐ Climate ceiling
- ☐ Climatic Sail (coming soon)
- ☐ Special design

### 3 Type of timber ceiling

- ☐ In-situ concrete    ☐ Wood construction
- ☐ Reinforced concrete ribbed floor
- ☐ Filigree ceiling    ☐ Prestressed concrete
- ☐ Ready-mixed concrete
- ☐ Roof construction (trapezoidal sandwich)
- ☐ Reinforced concrete slabs with intermediate components
- ☐ Other

#### 4 Floor piping

- ☐ Plastic pipe      ☐ Aluminium composite pipe
- ☐ Stainless steel

## 5 Pipeline system

- ☐ 2 Pipes      ☐ 4 Pipes

## 6 Calculation parameters

| COOLING:         | RECOMMENDED | DESIRED |
|------------------|-------------|---------|
| Room Temperature | 26 °C       | _____   |
| Forerun          | 16 °C       | _____   |
| Recirculation    | 19 °C       | _____   |

| HEATING:         | RECOMMENDED | DESIRED |
|------------------|-------------|---------|
| Room Temperature | 20 °C       | _____   |
| Forerun          | 35 °C       | _____   |
| Recirculation    | 28 °C       | _____   |

## 7 Delivery point

- ☐ Distribution line
- ☐ Collector line

## 8 Combination with other systems

- ☐ Buffer storage tank
- ☐ Air conditioning systems
- ☐ Solar heating
- ☐ Geothermal energy
- ☐ Photovoltaics

## 9 Control distribution area

- ☐ According to cooling/heating load calculation
- ☐ According to the floor plan

## 10 Control units

- ☐ As part of the building services

## 11 Coordination with external trades

Are the housings for lighting, electrical outlets, sprinklers, etc. in the air-conditioning ceiling intended?

- ☐ No, not intended
- ☐ yes, specifically \_\_\_\_\_

## 12 Remarks

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Questionnaire completed by

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_

## Imprint



## Comfort, ecology and economy combined in one ceiling

The ultimate goal of heating and cooling has always been a comfortable indoor climate. Nowadays, systems should also have an ecological energy balance and, of course, be as economical as possible in terms of investment and operation. The solution for all these requirements is the same:

An efficient climate ceiling that heats and cools comfortably.

This creates additional space for installation and allows the ceiling mass to be accessed. Raum-K with its module partner Singular is thinking in the future: with area-wide available throughout the building, which can heat and cool, and the engineering for the planning and design of the systems, together we are creating the energy turnaround.




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