

HEATING / COOLING CEILING SYSTEM FOR ROOM AIR CONDITIONING AND LIGHTING



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POTENTIAL OF A CLIMATE CEILING

COMBINED HEATING AND COOLING

Heat pumps are on the rise: More than 40% of new buildings already use them to efficiently operate their surface heating systems. In residential buildings, the pumps mainly generate heat for underfloor heating - leaving their cooling potential unused.

A CLIMATE-CONTROLLED CEILING CAN DO BOTH: HEAT AND COOL

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 for a comfortable indoor climate all year round and maximum energy efficiency. Climatic ceilings activate this potential and equip the building already today for the increased cooling demand that will await us in the course of climate change..

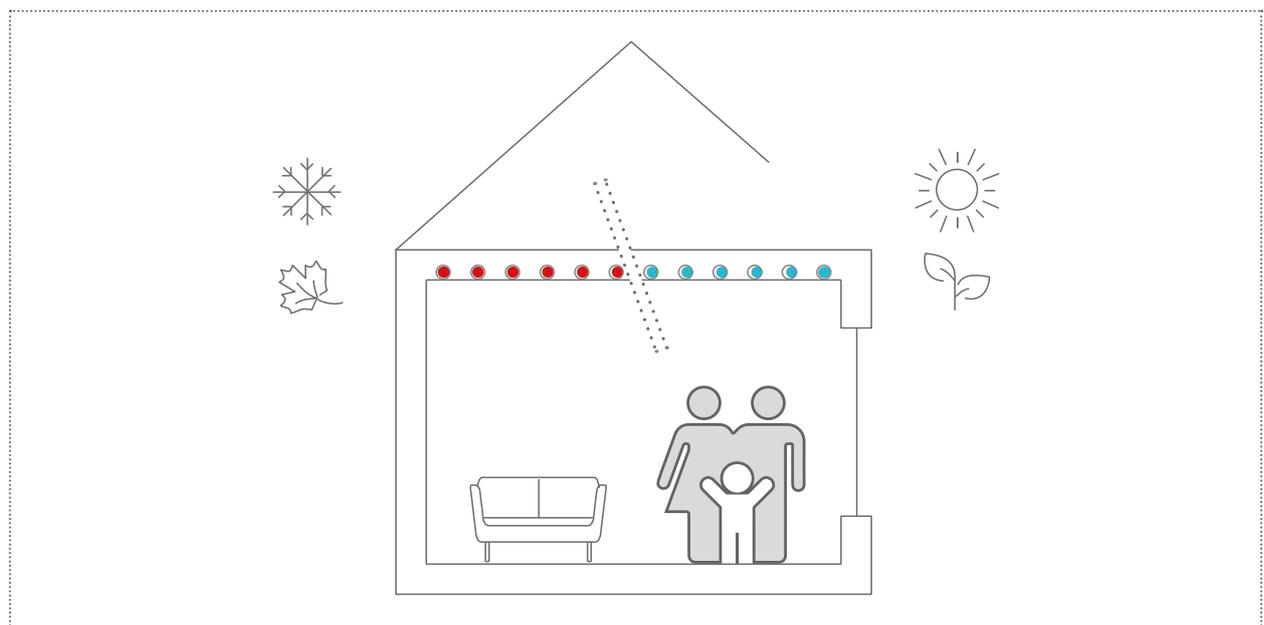
COOLING WITHOUT THE RISK OF CATCHING A COLD

The fan is roaring and cold air is constantly flowing through the room. Rooms with such deficiencies are very common. In comparison, air conditioners can cool more but often cause uncomfortably cold drafts with high energy consumption. Fortunately, climate ceilings have now become established for building air conditioning. They offer practical advantages for a wide range of applications, such as absolutely silent cooling without unpleasant drafts.

COMFORTABLE WARMTH WITHOUT HEATING AIR

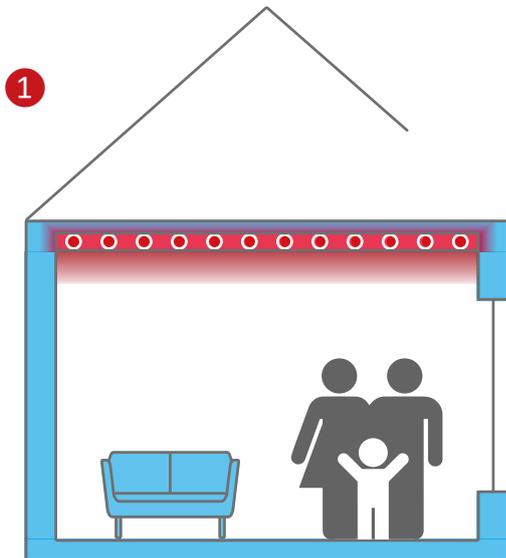
Do you know the pleasant feeling of being warmed by the sun on a clear winter day? The air is cool, but the heat radiation compensates for that.

Heating with the climate ceiling also works according to this principle. All surfaces in the room are heated and radiate this heat to us. This reduces the need for heating. In such a room, we humans are surrounded by gently tempered heating surfaces all around. Thus, the air does not have to be overheated and thus dried out - we feel comfortable all around.

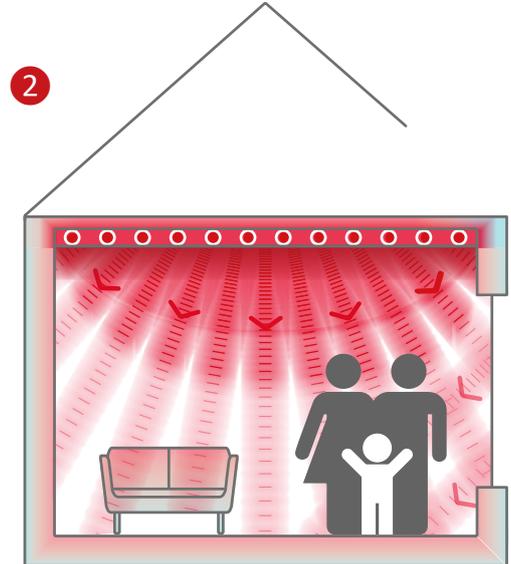


FUNCTIONALITY OF A CLIMATE DECADE

WHEN HEATING

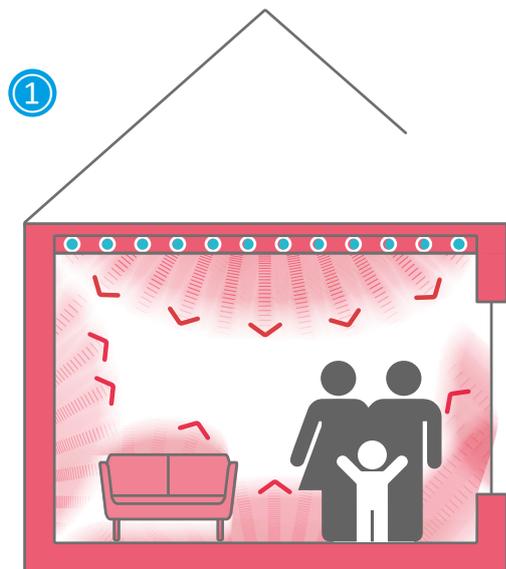


Warm water flows through pipes in the ceiling and heats its surface. At the warm surface of the ceiling heats the air.

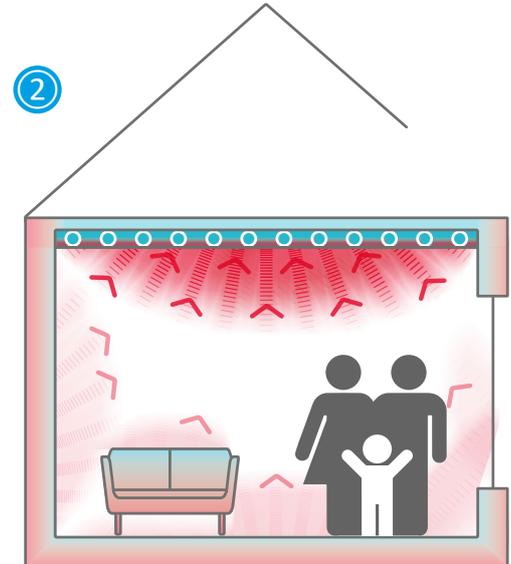


The warm air can neither rise nor cool on the ceiling: Convection is slowed down. Heat is now only transferred to the floor, walls and furniture by thermal radiation.

WHEN COOLING

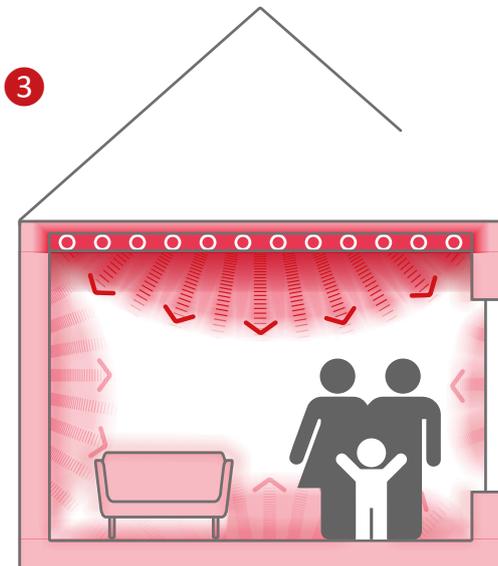


If the surfaces are heated in summer, they radiate a lot of heat into the room. Cold water is now fed through the pipes of the climate control ceiling to cool the ceiling surface.



The cooled ceiling surface absorbs thermal 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.

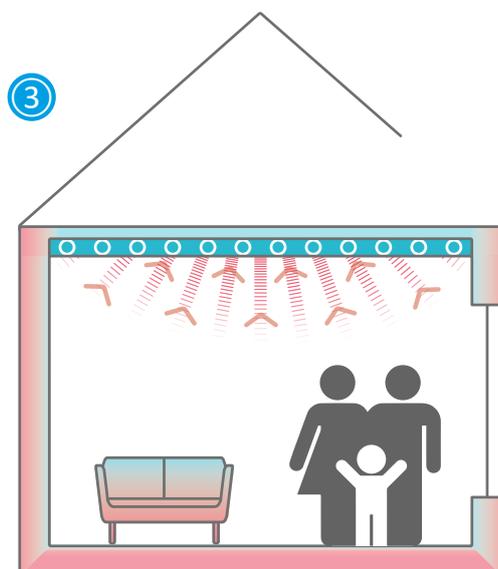
HEATING WITH THERMAL RADIATION



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

A climate ceiling brings heat into the room almost exclusively by emitting thermal radiation. As a result, it primarily heats the surfaces: Ceiling, wall, floor and furniture become warmer than the air. And the warmer the surfaces are, the more heat they themselves radiate to their surroundings. The pure heat radiation of the climate-controlled ceiling transforms virtually every surface of the room into a gently tempered surface heating. On the other hand, the air remains pleasantly fresh and is not overheated. For people this room climate is extremely comfortable.

COOLING WITH THERMAL RADIATION



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

Direct sunlight and waste heat can cause walls and floors to heat up considerably in the summer. These overheated surfaces radiate a lot of heat and disturb the natural heat regulation of humans.

That's why you cool 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. Now people can radiate their excess heat back to the cooler environment and feel comfortable.

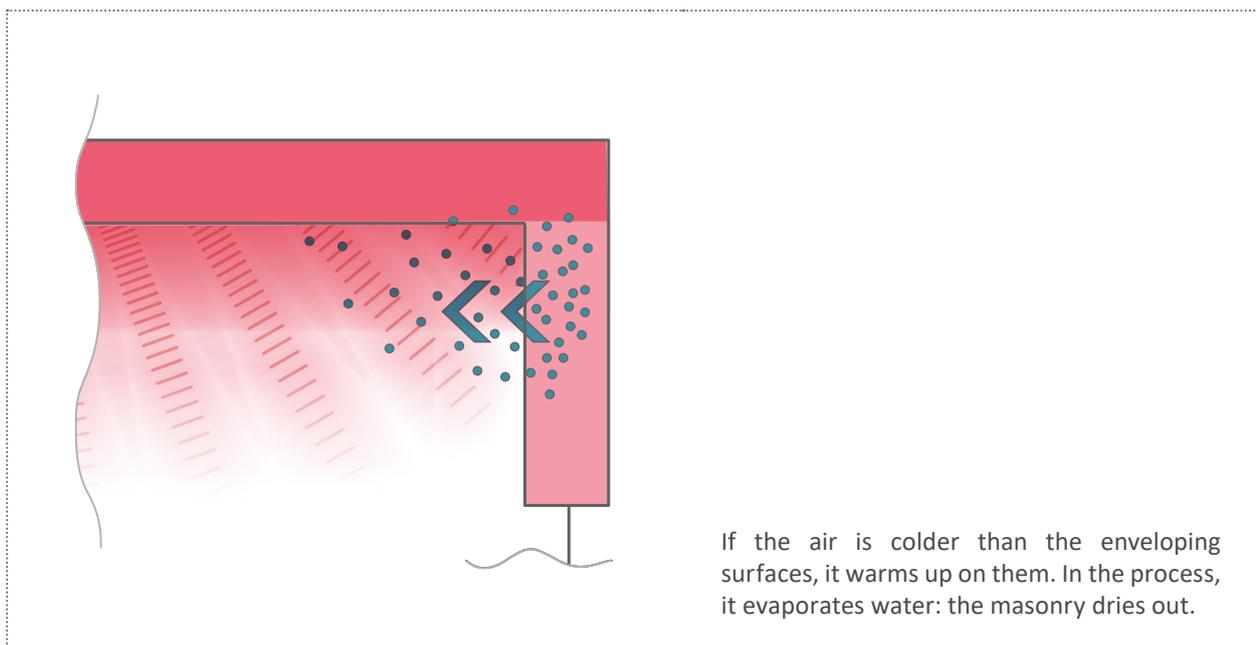
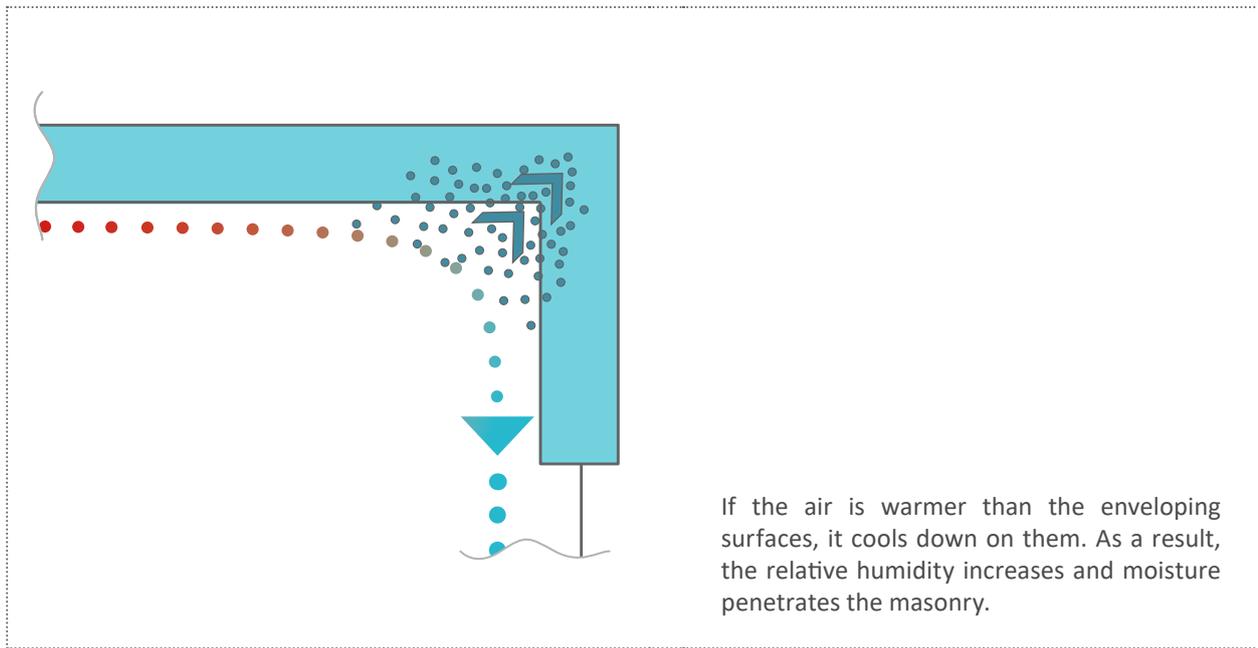
Ideally, the climate ceiling is supplemented by controlled ventilation of the living space: this dehumidifies the air during hygienic air exchange and thus enables air-conditioning of any desired intensity.

HEALTHY BREATHING AIR

A person breathes 24,000 times a day. That's up to 12,000 liters of air that flow into our lungs - including all the substances that are suspended in it. Among them is mainly house dust, which consists mainly 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 swirls up significantly less dust during heating than systems based on convection.

AGAINST MOLD AND MOISTURE

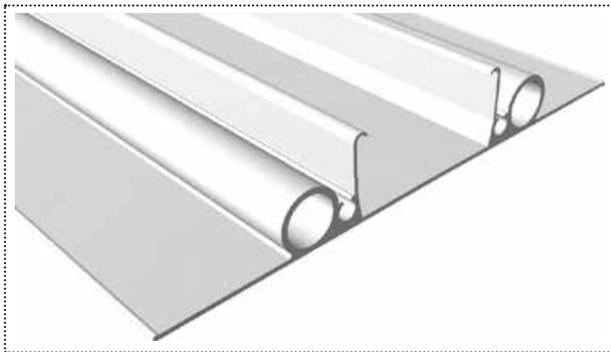
Mold is more than unpleasant and dangerous for people and buildings. Low ventilation increases the risk of harmful mold growth. Climatic ceilings actively prevent mold growth because they primarily warm the room envelope - not the air. If the walls are warmer than the air, they remain dry and do not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



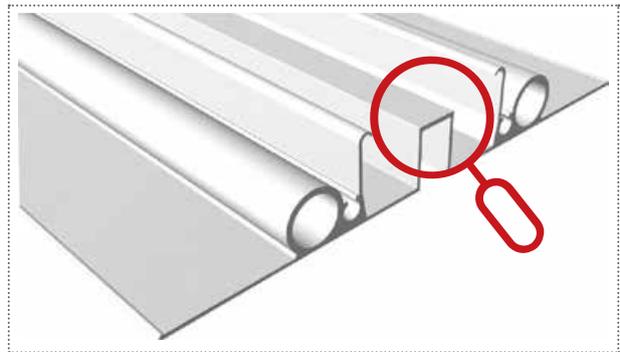
WHAT DISTINGUISHES EFFIDUR FROM OTHER SYSTEMS?

effidur integrates heating, cooling and lighting directly into the energy track of a parallel or cross-band grid and not, as is usually the case, into its ceiling panels. The filling elements, e.g. mineral tiles, take over all other functions such as acoustics, design and the accommodation of further elements of the technical building equipment (TGA). Particularly noteworthy is the ability to revise the system at any time thanks to easy access to the ceiling cavity.

	CONVENTIONAL SYSTEMS	EFFIDUR » THE ACTIVE ENERGY GRID
Heating and cooling »	Heat transfer by means of cassettes	Heat transfer directly via energy rail
Heating-cooling performance »	Fixtures reduce overall performance	High performance even with add-ons and fixtures
Lighting »	Separate in the area of the ceiling panels	Can be integrated directly into the bandrastrer
Inserts »	Non-mineralized panels	Any filling elements



effidur-Energy rail



effidur-Light rail

FILLING ELEMENT MINERAL PLATE

SINFONIA / OWACOUSTIC PREMIUM



DISCREET & ADAPTIVE

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

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

BENEFITS

ENERGY RAIL

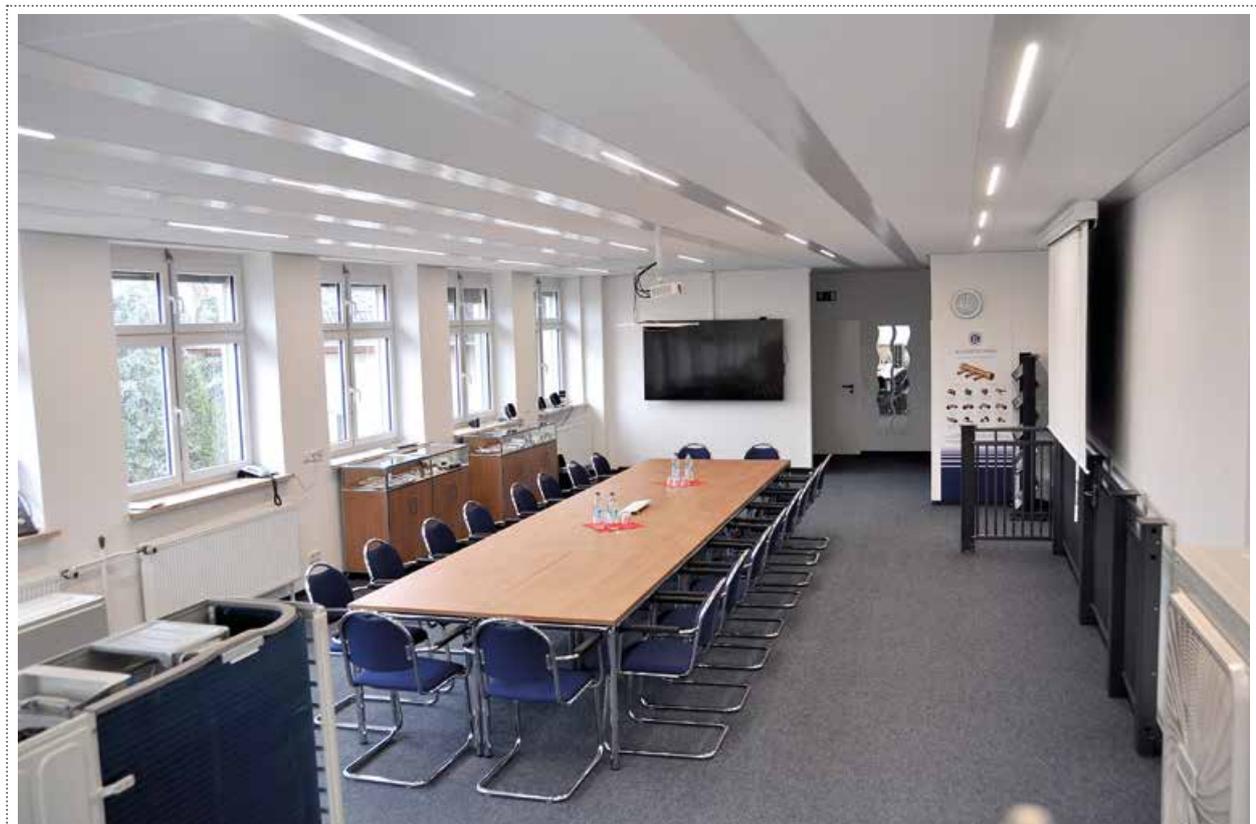
The energy rail remains visible on the underside of the ceiling and is thus as much a technical as a design feature. You have the choice between different grids (cross or parallel grid) and center distances, even a color scheme based on the RAL scale is possible after coordination.

REVERSIBLE AND FREE AREA FOR FIXTURES

With effidur energy rails, the intermediate spaces are available for built-in and add-on components such as loudspeakers, downlights, cameras and sprinklers. They allow quick access to the building technology in the ceiling cavity 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 effidur climate control ceiling are available from stock and can therefore be called up quickly. On-site adaptations can be implemented by cutting to size on site. We are also happy to support you in planning and design and cut the rails to size at the factory. This significantly shortens the installation time. To facilitate logistics on the construction site, the cut-to-size parts can be packed by component section and/or rooms on request.



Training room for heat pumps - realisation „ Mineral panel, parallel strip, light rail directly in the energy grid, Lindner Armaturen GmbH, Chemnitz

FIELDS OF APPLICATION

SYSTEM SOLUTIONS FOR EVERY BUILDING AND ALL ROOMS

effidur heating / cooling ceiling systems are manufactured in Germany and stand for highest quality and performance as well as hygiene, moisture resistance and indoor air quality.

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

Freely selectable filling elements provide a wide range of planning options for optimally designing the building and room acoustics, appearance or room or workplace lighting for your property.

DESIGN VARIANTS FOR EVERY ROOM CONCEPT

The effidur ceiling system offers many modular combination options: You can suspend the ceiling areas to different depths, accentuate them with or without integrated lighting, and choose from different filling materials. Depending on your needs, different constructions can be easily connected without leaving the limits of the system. Even hall fixtures for permanent or temporary use can be realized as desired, e.g. in combination with shelving systems.



Climatic ceiling with integrated lighting as false ceiling solution for industrial assembly workplaces

RENOVATION

MINIMUM INSTALLATION HEIGHT

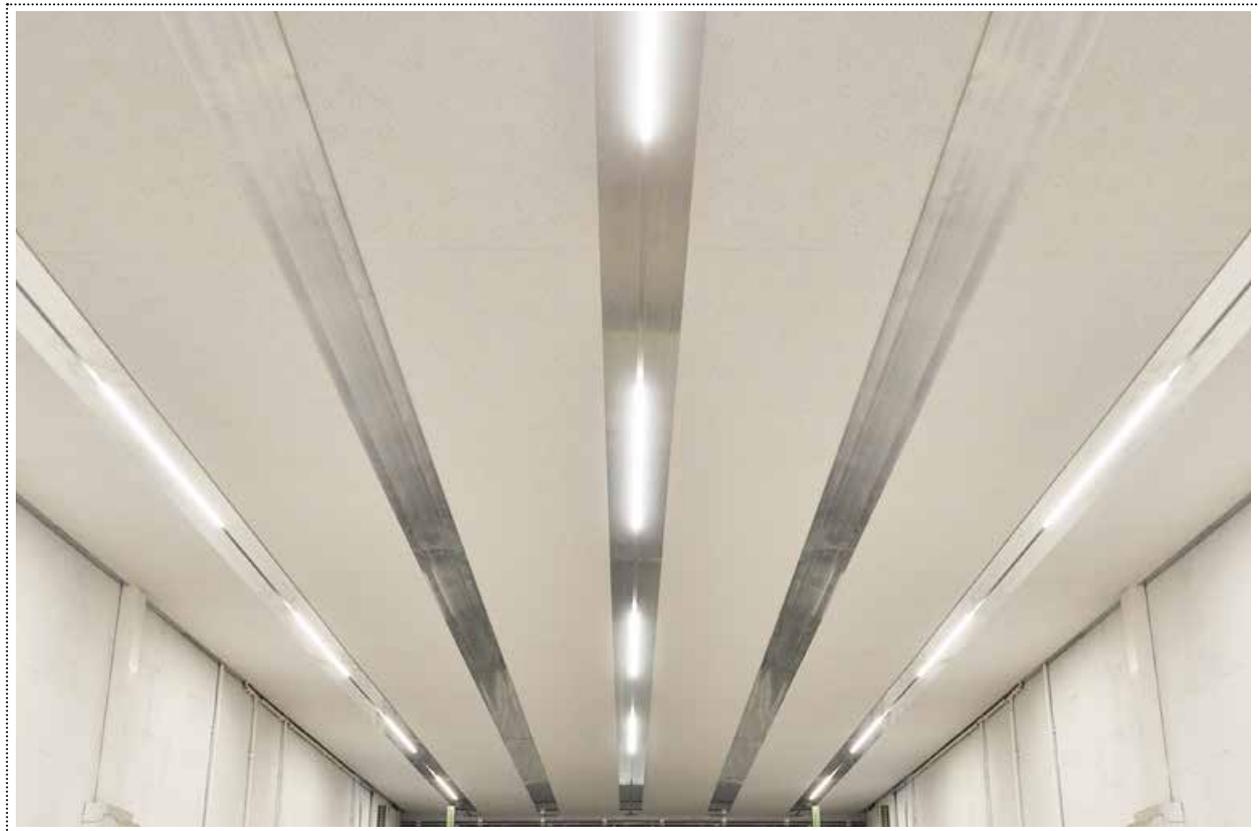
The effidur climate-controlled ceiling is suitable for almost any room. The system has a slim cross-section because the entire technology is already integrated in the grid: With minimal suspension, the structure requires just 180 mm of height below the ceiling structure and still creates a freely available installation level for the building technology. The system is thus also suitable for the renovation of rooms that are severely restricted in terms of room height.

LITTLE INTERVENTION IN THE EXISTING BUILDING

The effidur climate ceiling system can also be installed during use without having to empty the room. Only the hangers have to be screwed into the ceiling - the rest is simply hung in place. The planning and installation effort is thus significantly reduced. Adjustment at the construction site is straightforward. Site requirements can be implemented at short notice at any time.

ENERGETIC RENOVATION

The high efficiency of the climate control ceiling makes it highly attractive in the context of energy refurbishment: The energy rail tempers the room with water temperatures that are very close to the desired room temperature. The water supply thus needs to be heated less or cooled less. As a result, a reversible heat pump can provide the required flow temperatures with particularly low power consumption. This ensures a further increase in efficiency in the energy budget.



Realisation with individual placement of the luminaires, according to the requirements of the workstations
SAM Group GmbH, Chemnitz

LIGHTING

ILLUMINATE INDIRECTLY AND EFFECTIVELY

The integrated lighting is also part of the active energy rail. Depending on requirements, specially developed luminaires are recessed flush into the band louvre. Their luminous intensity can be adjusted to illuminate the room pleasantly brightly and homogeneously, even when suspended at different depths. The luminaires meet all important standards for use in workplaces. They also provide emergency lighting when connected to a central battery.

PRODUCT FEATURES AND CHARACTERISTICS

Luminaire type	Light rail Heating- cooling ceiling	Nominal luminous flux	3105 lm
Illuminant	LED	Rated luminous flux	1850 lm
Mounting type	Installation	Color temperature	4000 K
Input voltage AC	198 - 264V ~	Color rendering index	> 90
Frequency	50/60 Hz	Housing design	high quality Aluminum extrusion
Connected load	25,8 W	Connection type	Terminal on ext. LED driver
Rated power Illuminant	27,0 W	Emergency light	With appropriate driver
Module/ luminaire efficiency	133/84 lm/W	Protection class	I
Power Faktor	> 0,95	Protection category	IP 42
THD	< 10 %	Ambient temperature	-25 °C / +50 °C
Lifetime	L80/B10 > 50.000 h	Dimensions (L×W×H)	1121×188×28 mm
Dimming	DALI	Weight	2,5 kg
ESD-classification	Test severity level 1	Luminaire glass	Clear PMMA prismatic profile
Lifetime LED board	bis zu 72.000 h	Risk group (IEC 62471)	RG 1

MAXIMUM LOAD OF AUTOMATIC CIRCUIT BREAKERS

Automatic circuit breaker	C10	C13	C16	C20	B10	B13	B16	B20	Starting current	
Installation Ø in mm ²	1,5	1,5	2,5	2,5	1,5	1,5	2,5	2,5	I_{max}	Pulse duration
Number of luminaires	40	56	68	80	24	34	41	48	30A	180 µs



effidur-Energy rail



effidur-Light rail - Lighting that can be integrated directly into the energy grid or into the mineral battens

TAILOR-MADE FOR INTEGRATED LIGHTING

The luminous intensity of each individual luminaire can be regulated separately, can be integrated flush into the energy rail, and achieves a pleasantly bright, flicker-free light at any ceiling height. In addition, the luminaires meet all applicable requirements for workplace lighting - dimmable and DALI-compatible.

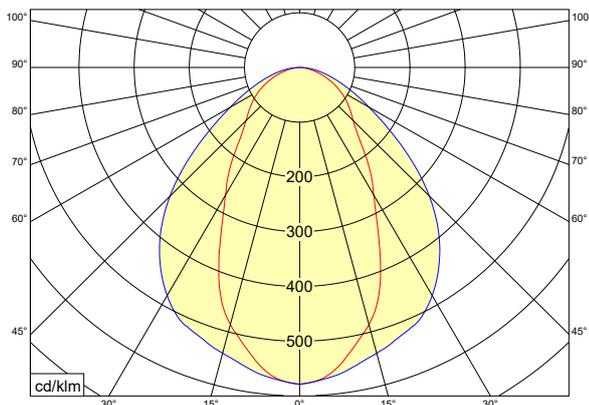
LIFETIME, WARRANTY AND PLANNING

After 50,000 hours of operation, the luminaires still have at least 80% of the initial luminous flux, with a maximum of 10% falling below this value (L80 / B10). This promises at least 6 years of optimal operation without maintenance and replacement, even with 24 hours of continuous lighting per day. We offer 5 years warranty. Since each light is connected to the LED driver in a separable way, defective light units can also be unplugged and replaced without much effort and without disturbing the operation. Lighting design can be ordered as an option. It determines the required number and suitable placement of the luminaires.

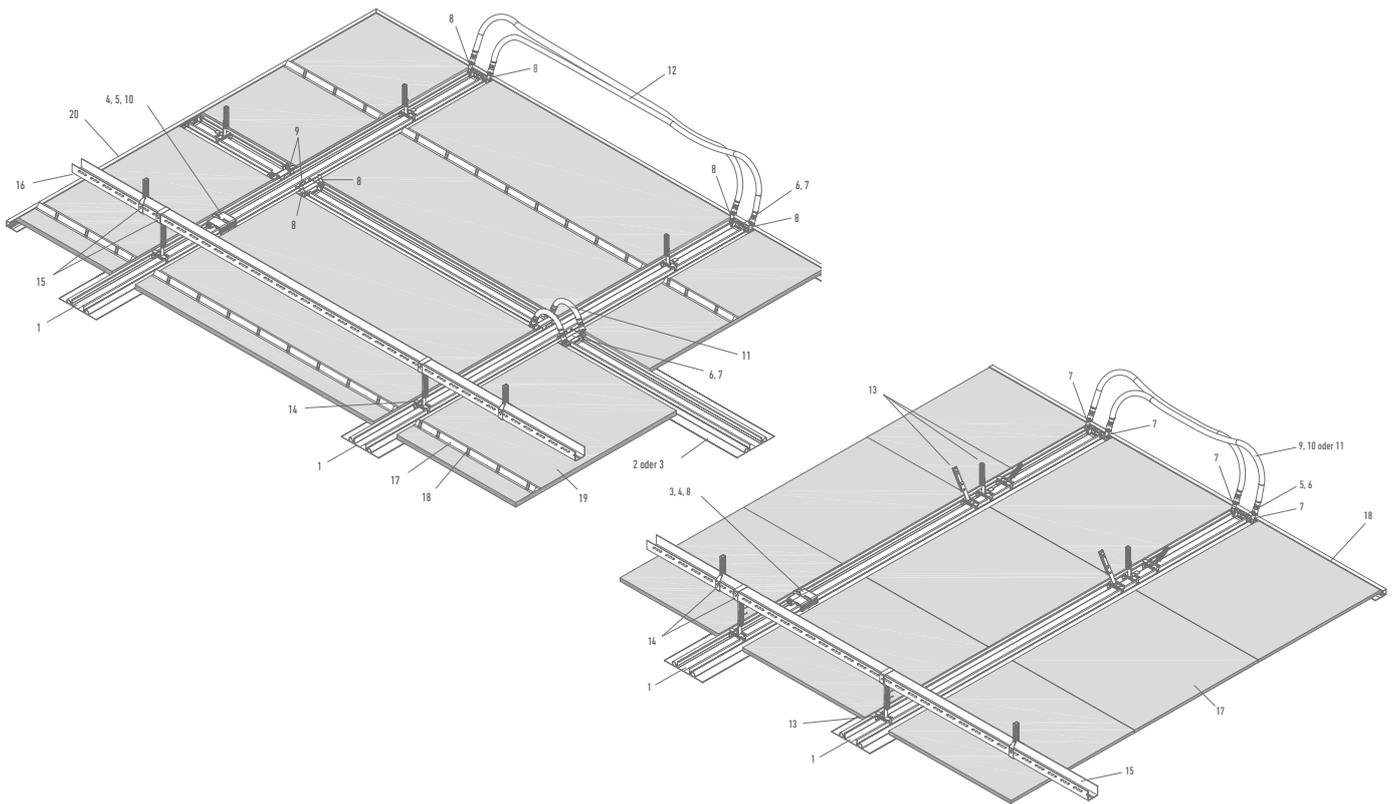
OPTIMIZABLE FOR ANY SPACE

Each light rail is standard 1121 mm long, special lengths up to 3000 mm long. This allows the grid of the energy plates to be freely combined. Depending on requirements, the LED driver configuration can be adapted room-specifically to the number of luminaires. Seamlessly connected light strips are just as possible as the selective use of separate luminaires. High-quality LEDs with prismatic and colored luminaire glass achieve homogeneous illumination of the room. The luminaires are dimmable and available in neutral white.

WORKPLACE AND COMPUTER WORKSTATION SUITABILITY (BAP)



the luminaires comply with DIN EN 12464-1 for the lighting of indoor workplaces and the technical rules for workplaces ASR A3.4., taking glare limitation into account. In addition, they are suitable for central batteries in accordance with DIN EN 50172 and can be used for emergency lighting. The photobiological safety is measured and certified according to IEC 62471. effidur light rails are suitable for monitor workstations (BAP).



DATASHEET HKD

Special notes » An increase in performance is possible by increasing the energy rail share.

It is particularly important to note that the stated values (heating or cooling capacity) of the ceiling system offered show the actual capacity to be achieved in the room. The mere indication of the active heating/cooling capacity (Pa) is therefore not sufficient for the proof of performance.

The following applies » For the selection of a suitable cooling system, the nominal cooling capacity must be related to the panel area of the test room
 $P_p = P_a * (A_a/A_p) \text{ W/m}^2$ according to VDI 6034.

The test certificates, which also serve as a basis for analytical calculations and simulations, are verified by a testing laboratory accredited according to ISO/IEC and recognized by DINCERTCO.

Decisive for this are »

Cooling load » DIN EN 14240 (values at Δt : 8K)

Heating load » based on DIN EN 14037 (values at Δt : 15K) VDI 6034 must be observed.

The ceiling is to be installed as a climate ceiling for closed rooms to achieve a comfortable indoor climate.

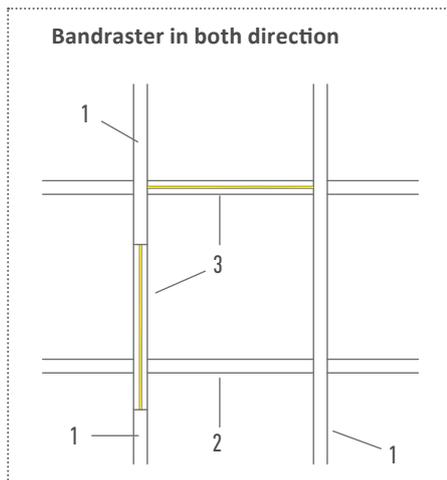
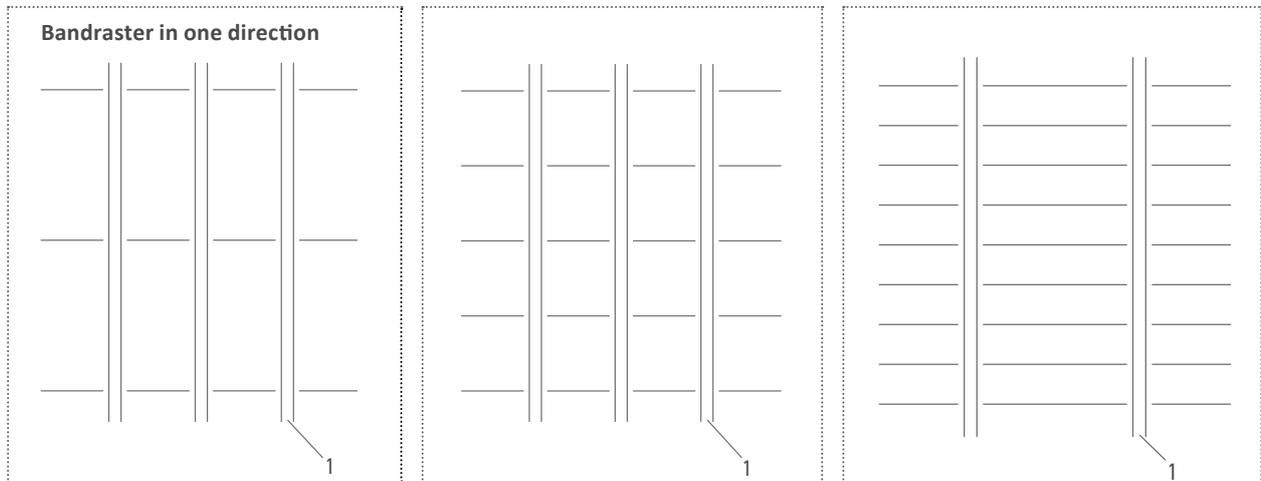
The output is to be adjusted according to the heating or cooling load by changing the pipe spacing and maintaining the active area to the plate surface or room base. Particularly in the case of heating, care must be taken to ensure optimum infrared illumination of the room.

The system is designed as an aluminum surface heat exchanger. **The heat-carrying medium must be prepared on site in accordance with the relevant guidelines, VDI 2035, and, depending on the situation on site, possibly hydraulically separated via heat exchangers, connected to the house system in a separate circuit.**

Connecting hoses plug-in/Eurocone are to be used as connecting lines. The use of metallic materials which come into contact with the heating or cooling medium is not permitted without express approval.

PARALLEL AND CROSS BAND GRID, REMOVABLE

Example of laying »



1. Energy rail Nr° 7590-3600-9003M, Length 3600 mm
2. Energy rail Nr° 7590-1121-9003M, Length 1121 mm
3. Energy light rail Nr° 9585-1121-9003M, Length 1121 mm

Energy rail center distance	Suspension distance	Total weight per unit area	Deflection l/500
710 mm	up to 1250 mm	16,9 kg/m ²	up to 2.5 mm
710 mm	1251 - 1310 mm	15,1 kg/m ²	up to 2.6 mm
710 mm	1311 - 1500 mm	7,7 kg/m ²	up to 3.0 mm
710 mm	1501 - 1800 mm	4,1 kg/m ²	up to 3.6 mm
1310 mm	up to 1250 mm	9,2 kg/m ²	up to 2.5 mm
1310 mm	1251 - 1310 mm	8,2 kg/m ²	up to 2.6 mm
1310 mm	1311 - 1500 mm	4,16 kg/m ²	up to 3.0 mm

This table only applies to area loads! Point loads, line loads, fixtures, etc. must be considered separately. A hanger must be placed next to longitudinal connections (coupling) on the supporting energy rail. Further details can be found in the installation instructions.

PERFORMANCE DATA

Technical data of the tested parallel belt system »

profile axis distance (mm): 710
Dimension energy rail: 188/28/1,5 mm

Values according to test reports:	Cooling case	Heating case
Performance per m ²		
	Pa= 44 W/m ² Δt 8 K (active surface - DIN EN 14240)	
Pp=Pa*Aa/AP	Pp= 44 W/m ² Δt 8 K (plate area VDI 6034)	
		64 Watt/m ² Δt 15 K (DIN EN 14037)
Cooling capacity per m energy rail 21 W (Δt 8 K)		
Heating capacity per m energy rail 30 W (Δt 15 K)		

Technical data of the tested parallel belt system »

Profile axis distance (mm): 1316
Dimension energy rail: 188/28/1,5 mm

Values according to test reports:	Cooling case	Heating case
Performance per m ²		
	Pa= 32 W/m ² Δt 8 K (active surface - DIN EN 14240)	
Pp=Pa*Aa/AP	Pp= 32 W/m ² Δt 8 K (panel area VDI 6034)	
		50 Watt/m ² Δt 15 K (DIN EN 14037)
Cooling capacity per m energy rail 21 W (Δt 8 K)		
Heating capacity per m energy rail 34 W (Δt 15 K)		

Technical data of the tested cross belt system »

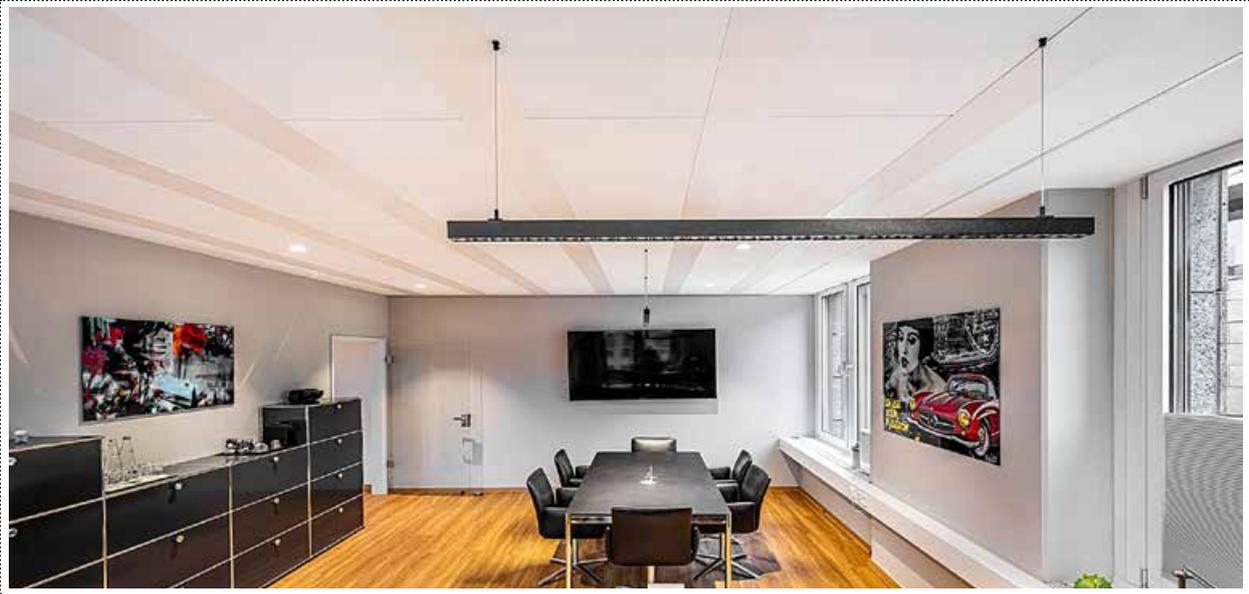
Profile axis distance (mm): 1310 mm
Dimension energy rail: 188/28/1,5 mm

Values according to test reports:	Cooling case	Heating case
Performance per m ²		
	Pa= 40 W/m ² Δt 8 K (active surface - DIN EN 14240)	
Pp=Pa*Aa/AP	Pp= 40 W/m ² Δt 8 K (panel area VDI 6034)	
		59 Watt/m ² Δt 15 K (DIN EN 14037)
Cooling capacity per m energy rail 21 W (Δt 8 K)		
Heating capacity per m energy rail 31 W (Δt 15 K)		

We will be pleased to provide test certificates. Due to the usual deviations in the presentation of the relevant performance parameters, we recommend evaluating them under the same conditions according to VDI 6034.

REFERENCES / INSTALLATION ADVICE

PARALLEL BAND INCL. LIGHT



Office building, euprax München



Reception area, Treatment room, urological practice, Bad Mergentheim



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