



CEILING SYSTEMS

radiant heating
& cooling
components

OEM

Comfort changes perspective



MAXIMUM COMFORT



NO AIR MOVEMENT



LOW TEMPERATURE



ARCHITECTURAL INTEGRATION



ENERGY SAVING



EASY INSTALLATION



HEATING & COOLING



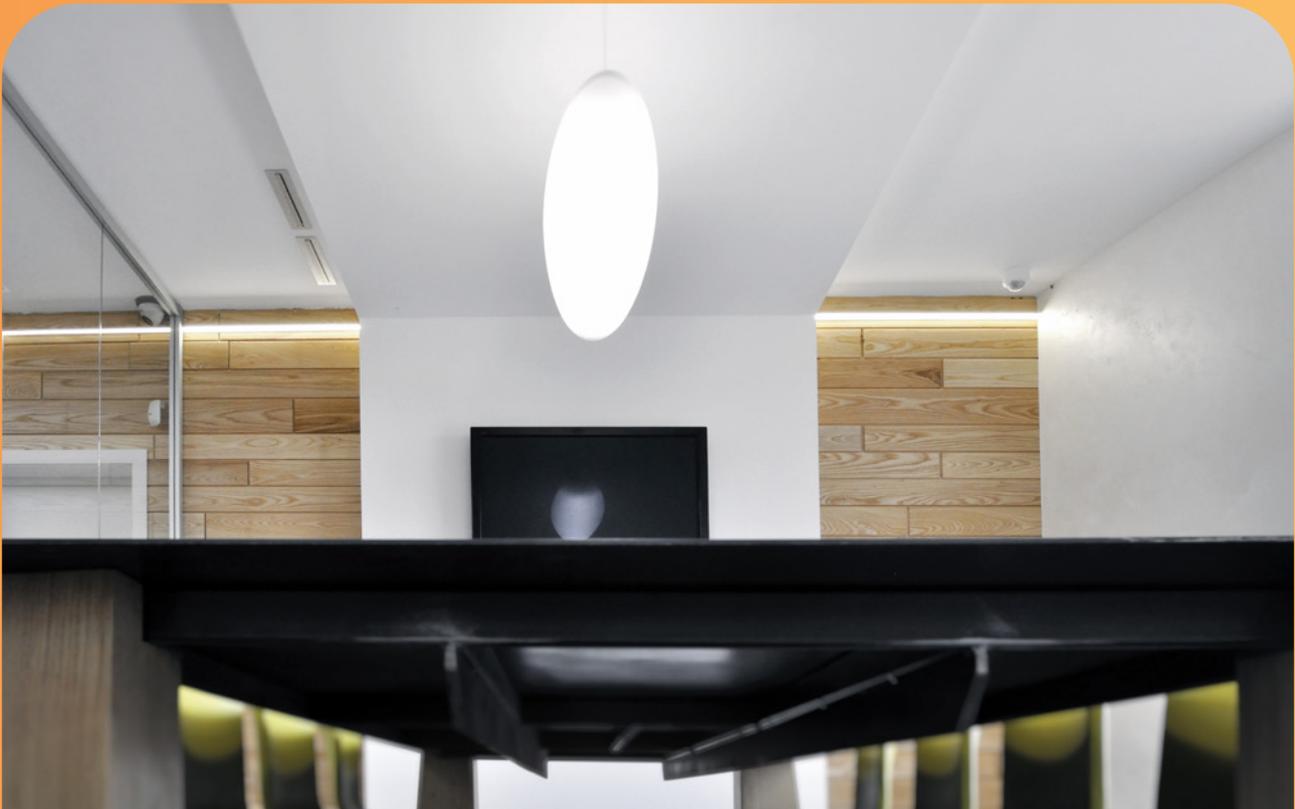
SILENT



UNIFORM TEMPERATURE



ENVIRONMENTALLY FRIENDLY

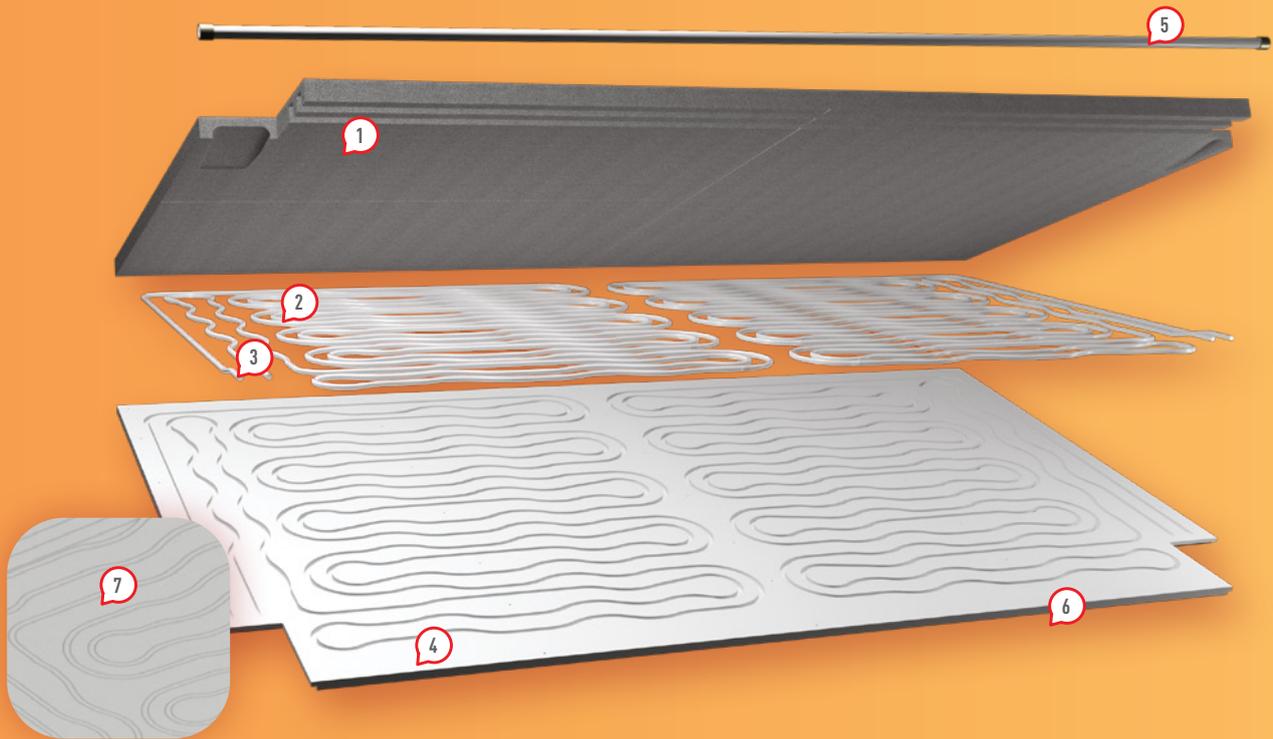


The advantages of cooling/heating ceiling systems

- perfect application for cooling
- well suitable for heating
- fast response time for cooling up/down
- perfect for residential building
- perfect for office building

Simplified method of installation

- patent "Expansion-Plug" for locking and pre-expansion of the pipe 10x1,3mm
- integrated distribution line, multilayer pipe 20x2,0mm
- milled plasterboard with pipe 10x1,3mm pre-assembled
- laser marking of the pipe guide for maximum safety during assembly
- fittings without O-Ring for save and long-life stability
- just in time control of possible leakages



➤ CUSTOMISED LASER MARKING

Ceiling boards description

This ceiling boards makes it possible to create a radiant ceiling system for multiple applications. This system consists of modular plasterboard panels with 5 layers PE-RT pipes already inserted and arranged in a serpentine pattern in order to maximise the exchange surface between the pipe and plasterboard; there are two circuits for each loop. The plasterboard panel is supplied coupled with an insulating sheet that allows high thermal performance.

1) INSULATION

The insulating sheet in sintered EPS with graphite or in high-density glass fibre (HP version) makes it possible to avoid heat loss, increasing the system's yields.

2) PIPE

The ceiling system incorporates a 10x1,3 mm diameter pipe.

3) FITTINGS

The classic O-ring fittings are replaced by compression fittings specially designed and manufactured to ensure maximum tightness over time and reduced pressure losses.

4) PLASTERBOARD

Depending on the installation context, either "classic" or hydro

panels can be used for humid rooms such as bathrooms and kitchens. In environments that require it (e.g. offices, meeting rooms, etc.) it is possible to install a ceiling system with sound-absorbing panelling.

5) HYDRAULIC BACKBONE

The panel is complete with hydraulic piping to connect the panels in series. The pipework is made of multilayer PE-RT type (PE-RT/ALU/PE-RT) 20x2 mm.

6) RANGE OF PANELS

Our ceiling systems are available in a wide range of variants that differ in terms of material type (plasterboard, insulation), size (1200x2000 mm or 600x2000 mm) and spacing (10 / 5,5 / 3,5 cm).

The same panels can be split in half (two independent circuits).

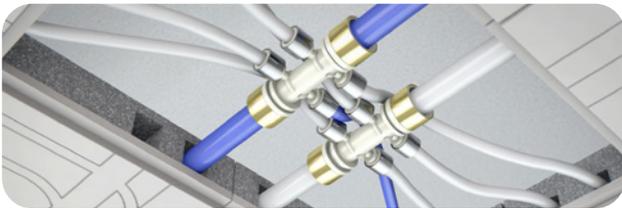
7) LASER MARKING

Laser marking clearly indicates the presence of the pipework, preventing accidental drilling during installation.

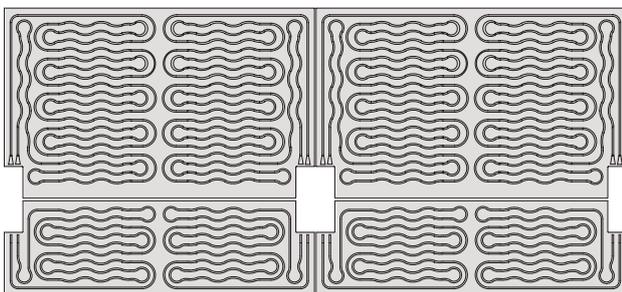


Safe installation

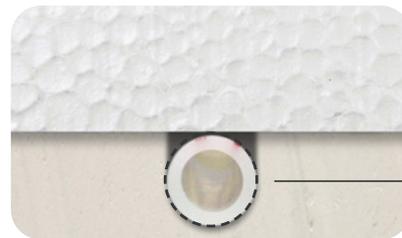
The conventional O-ring fittings are replaced by special fittings designed and manufactured for guaranteeing maximum tightness over time and for reducing head losses. The fittings are designed in such a way that, using appropriate range clamps, the pipe can be jointed practically and rapidly, thereby reducing installation times.



Integrated distribution line (multilayer 20x2 mm)



10x1,3 mm PE-RT pipe (5L)



Conventional pipe 8x1,1 mm



Pipe 10x1,3 mm

Fittings without O-rings



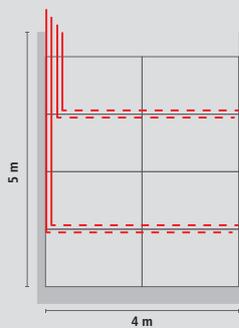
1. fitting ring
2. fitting

3. fitting ring
4. terminal element (capped)



Maximum active surface

The Ceiling system is able to maximise the active surface (up to 96%*) compared to a conventional ceiling system (~ 72%*), as it incorporates the conveyance lines. A broader active surface generates greater heating or cooling uniformity, thus improving the degree of environmental comfort.



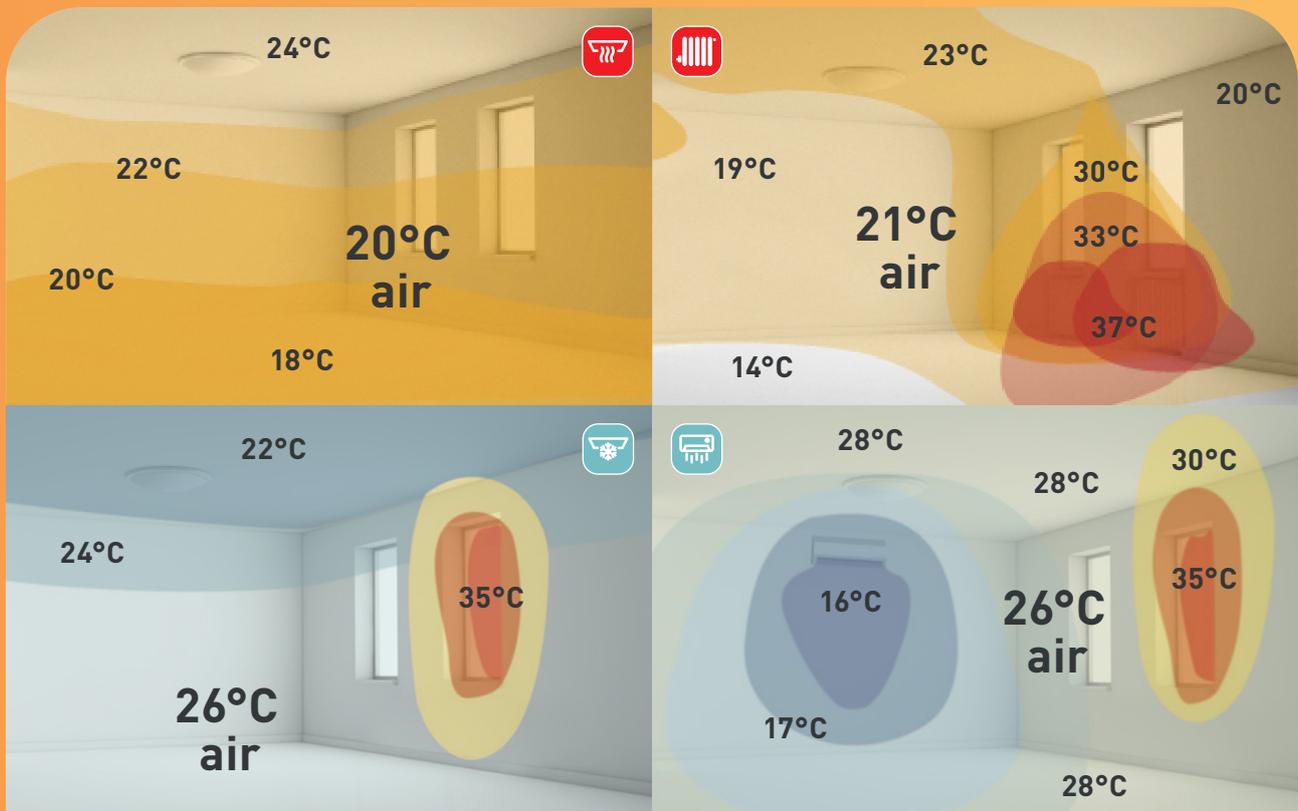
72%*
Conventional
radiant ceiling system

96%*
Ceiling system
radiant ceiling system

Certified system

Certified heating and cooling performance according to **EN 14037-5 - EN 14240**.



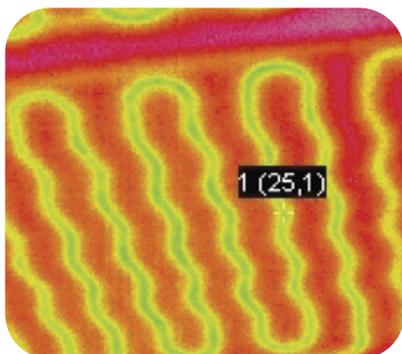


The natural environment

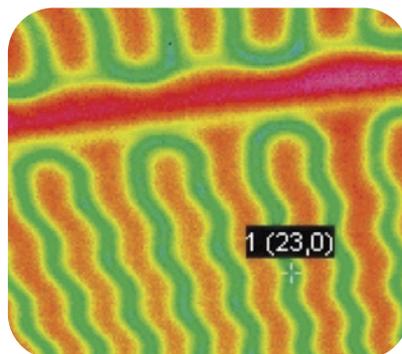
The radiant ceiling heating system transmits heat by radiation. Unlike a radiator, which heats the surrounding air by directing it upwards and generating a convective motion, radiant ceiling heating creates a uniform zone of comfort without causing air movement. In cold air systems with split or fan coil units, air movement is generated that creates stratification and often discomfort to people if the machines are not correctly positioned. The radiant ceiling system cools all the surfaces of the room homogeneously, discharging energy from the mass and creating the right thermal exchange with the people living in the room.

Low thermal inertia

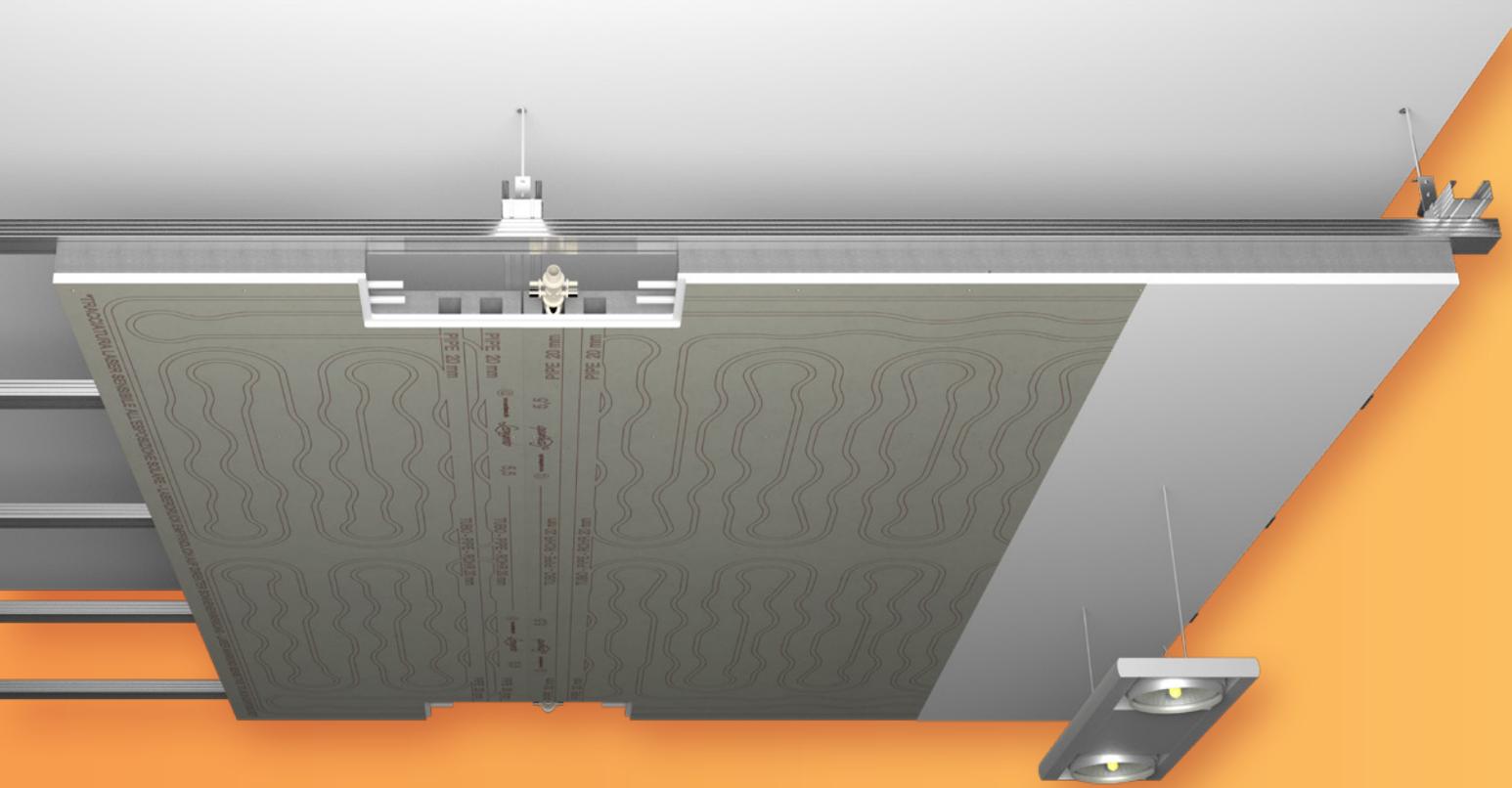
The diameter and thickness of the pipe used (10x1,3 mm), the piping integrated into the plasterboard and the special serpentine pattern of the piping make it a high-performance ceiling system with very low thermal inertia. Below are two thermographic pictures of the ceiling system operating in cooling mode with an average water temperature of 18°C. As can be noticed, after a mere 20 minutes the system has already reached full power.



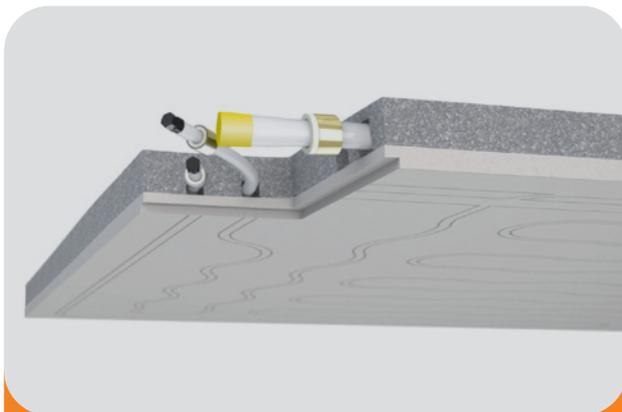
5 minutes from start-up



20 minutes from start-up

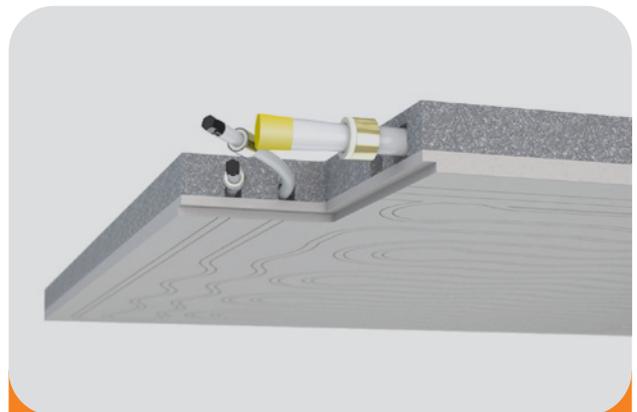


Overview ceiling systems



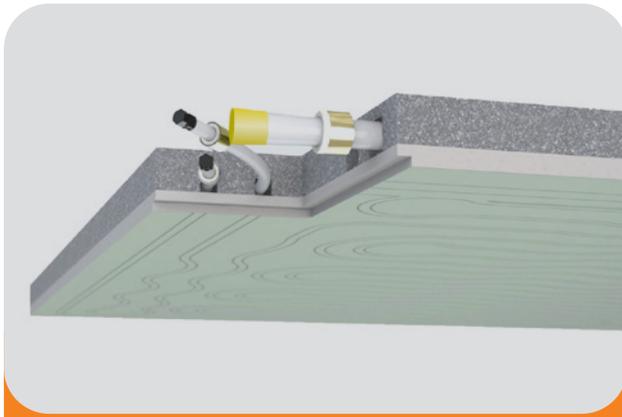
CEILING SYSTEM 10

- EPS with graphite 35 mm
- Plasterboard 15 mm
- || Pipe distance 10 cm



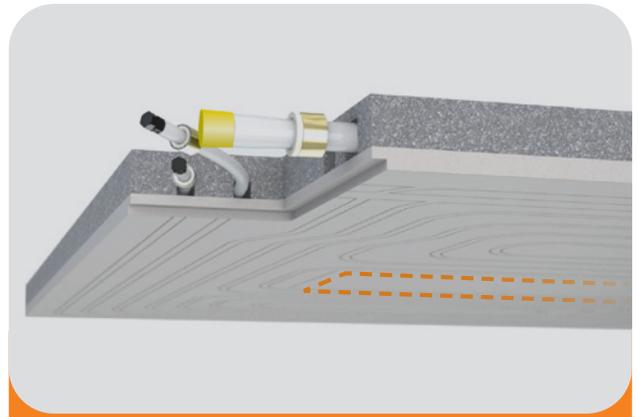
CEILING SYSTEM 5,5

- EPS with graphite 35 mm
- Plasterboard 15 mm
- || Pipe distance 5,5 cm



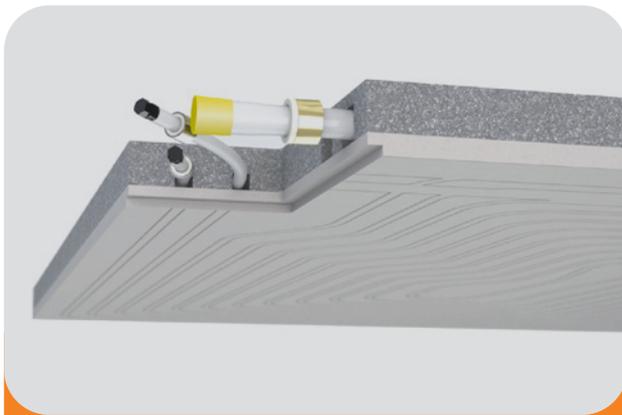
CEILING SYSTEM 5,5 HYDRO
WATER-REPELLENT

- EPS with graphite 35 mm
- Plasterboard water-repellent 15 mm
- || Pipe distance 5,5 cm



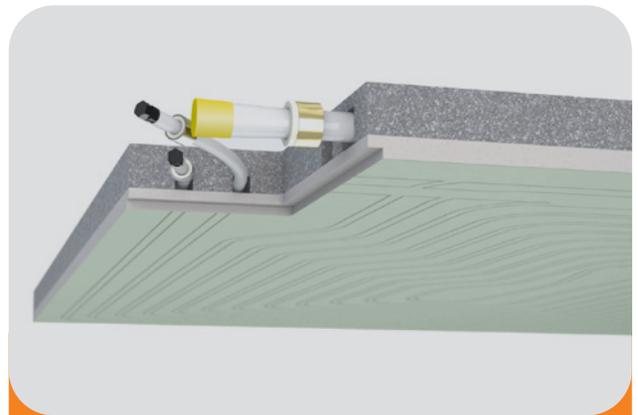
CEILING SYSTEM LUX
BUILDING INTEGRATION

- EPS with graphite 35 mm
- Plasterboard 15 mm
- || Pipe distance 5,5 cm



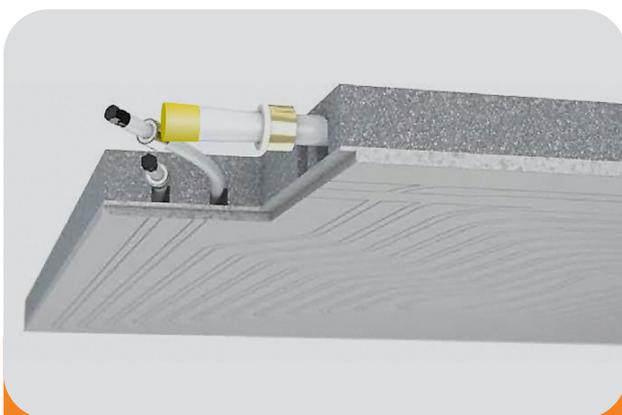
CEILING SYSTEM 3,5

- EPS with graphite 35 mm
- Plasterboard 15 mm
- || Pipe distance 3,5 cm



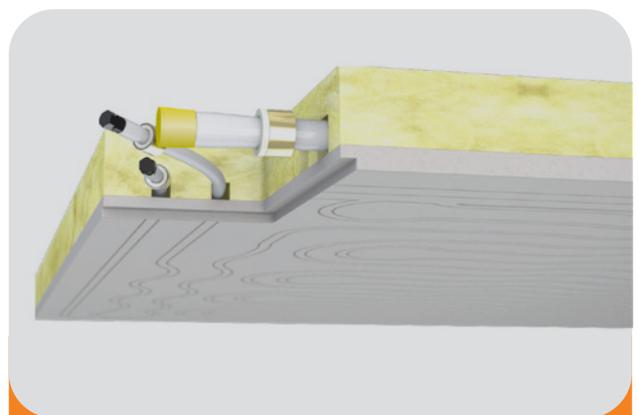
CEILING SYSTEM 3,5 HYDRO
WATER-REPELLENT

- EPS with graphite 35 mm
- Plasterboard water-repellent 15 mm
- || Pipe distance 3,5 cm



CEILING SYSTEM 3,0 PLUS

- EPS with graphite 40 mm
- plasterboard + Activ'Air® 10 mm
- || Pipe distance 3,0 cm



CEILING SYSTEM RF
FIRE RESISTANT

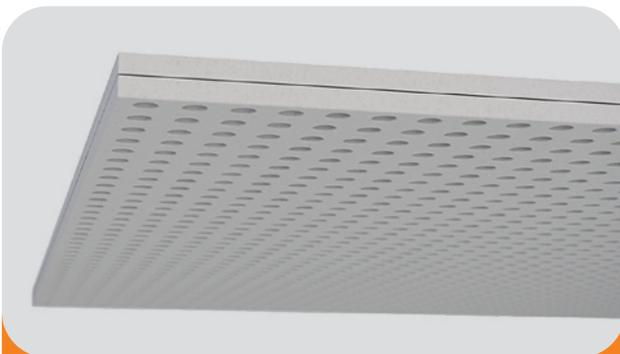
- Fibreglass 50 mm
- Plasterboard 15 mm
- || Pipe distance 5,5 / 10 cm



Thermal and acoustic comfort in one solution

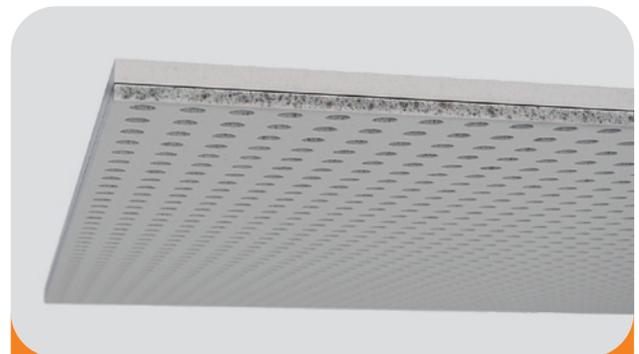
The acoustic ceiling is the ideal radiant system to be installed in all those environments that require a high degree of thermal and acoustic comfort such as offices, meeting rooms, auditoriums, shops, etc. The bagged glass wool guarantees excellent insulation, while the pipework, with a diameter of 10x1.3 mm, allows for greater energy exchange, which increases the speed of inertia and performance.

Thanks to the double acoustic plasterboard sheet, this system combines the benefits of the climatic comfort of a radiant ceiling system with the high soundproofing power that eliminates all those annoying phenomena of environmental resonance.



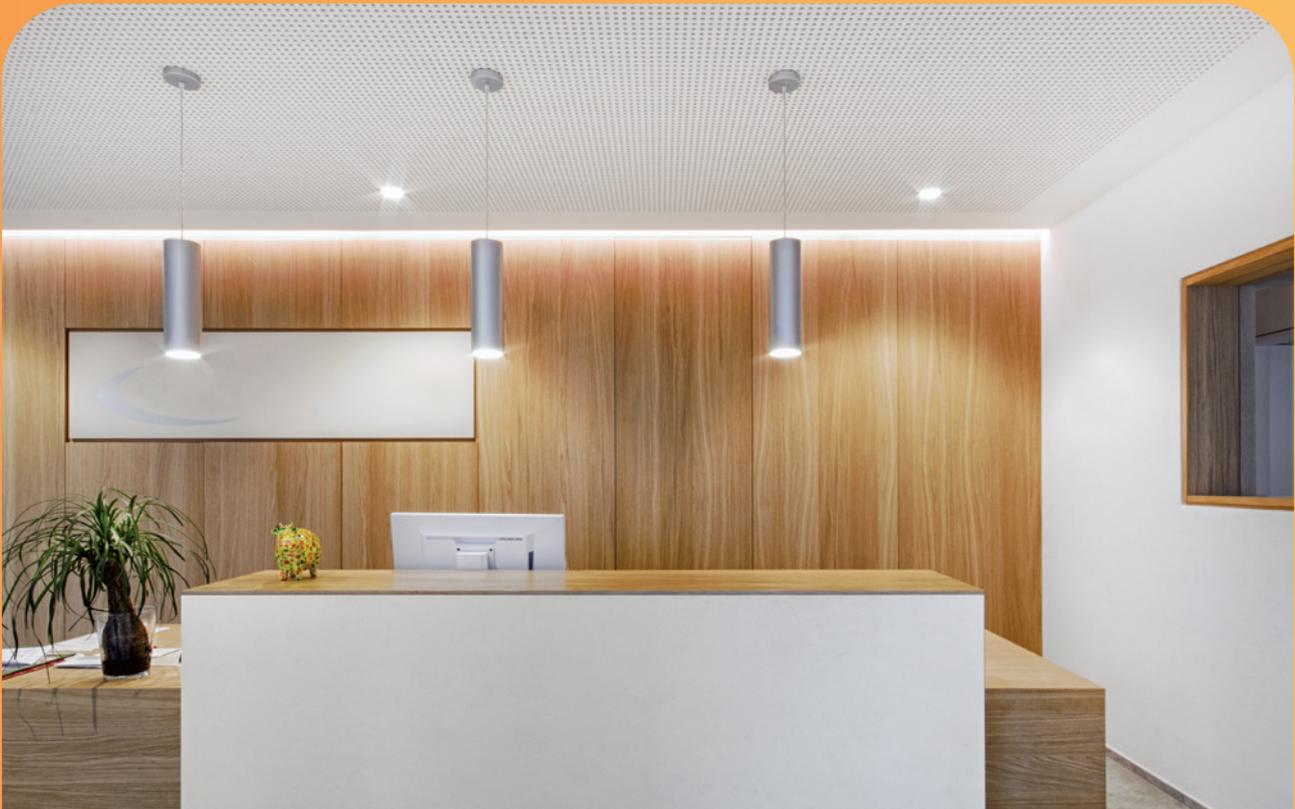
ACOUSTIC CEILING SYSTEM

- Double Plasterboard 12,5 mm
- Pipe distance 6 cm



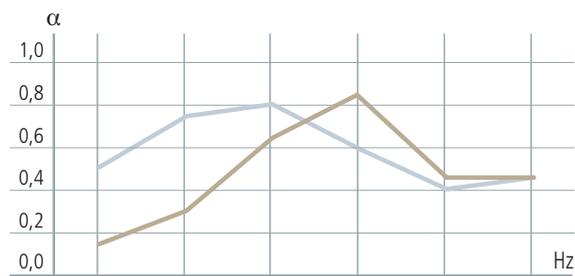
ACOUSTIC CEILING SYSTEM HIGH PERFORMANCE

- Plasterboard 12,5 mm
- Plasterboard with graphite 10 mm
- Pipe distance 6 cm



Acoustic performance

Thanks to the double plasterboard acoustic board, this system combines the climatic comfort advantages of a radiant ceiling system with a high sound-absorption power capable of eliminating the bothering effects of environmental reverberation.



| f(Hz) | 125 | 250 | 500 | 1000 | 2000 | 4000 |
|----------|------|------|------|------|------|------|
| α | | | | | | |
| a | 0,50 | 0,75 | 0,80 | 0,60 | 0,40 | 0,45 |
| b | 0,15 | 0,30 | 0,65 | 0,85 | 0,45 | 0,45 |

a — $\alpha_w = 0,50$ absorption (LM)
 b — $\alpha_w = 0,50$ absorption (M)

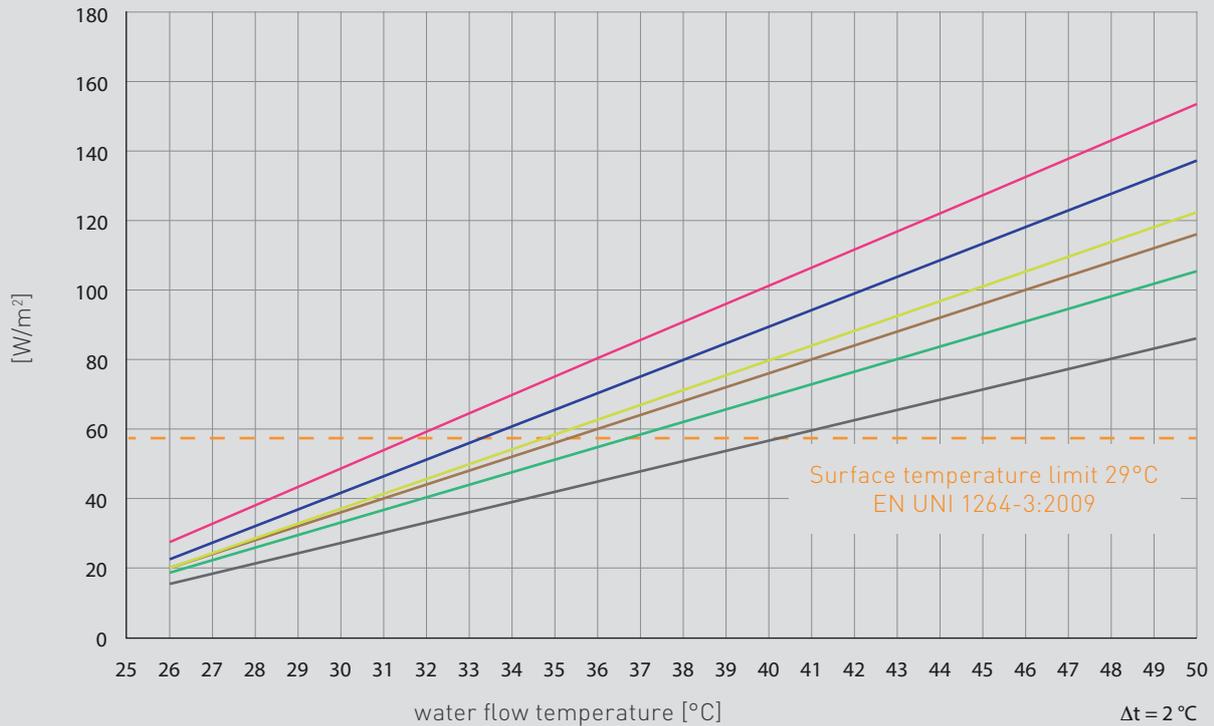
| f(Hz) | 125 | 250 | 500 | 1000 | 2000 | 4000 |
|------------|-----|-----|------|------|------|------|
| α_s | 0.7 | 1.0 | 0.95 | 0.9 | 0.95 | 0.90 |

Sound absorption values relative to the single sound-absorbing board (Knauf technical sheet data).

Sound absorption as calculated for the acoustic ceiling + 50 mm rock wool panel combination. Calculated according to the EN 29053 and ASTM C522 standards, assuming a gap of 200 mm.

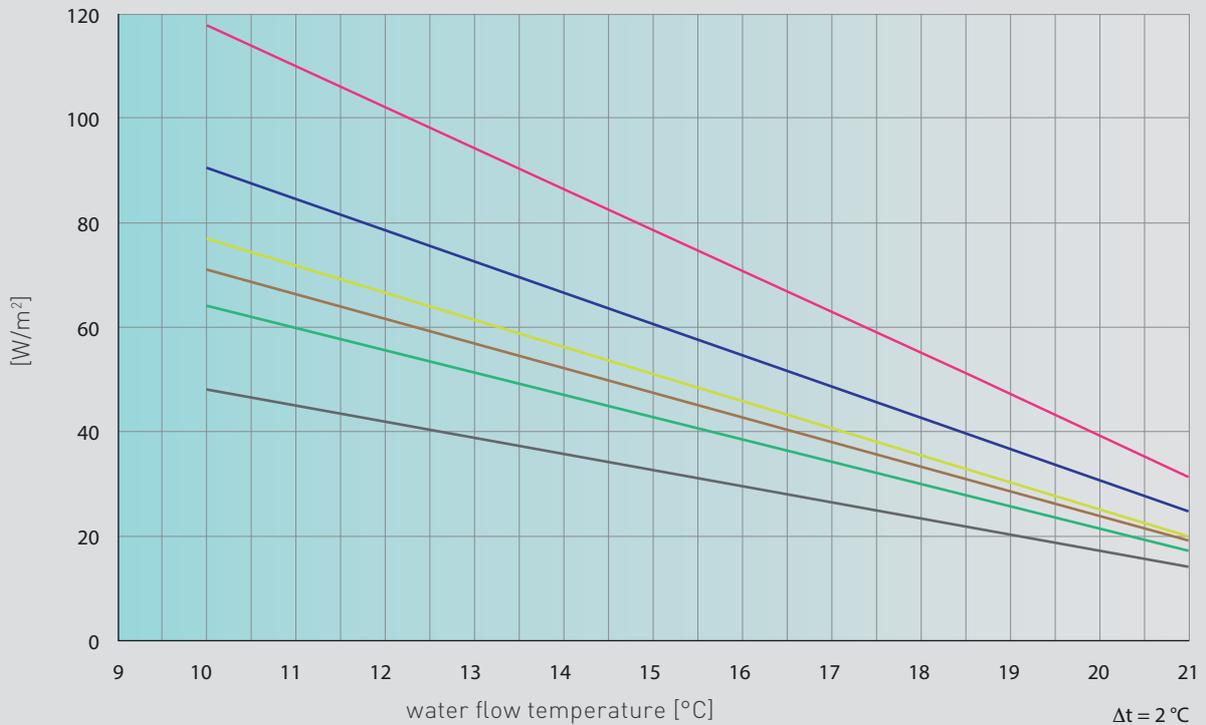
Heating

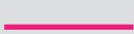
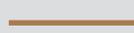
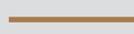
Curves deriving from the output certificates according to prEN 14037-5:2011 in heating mode **WSP^{lab}**



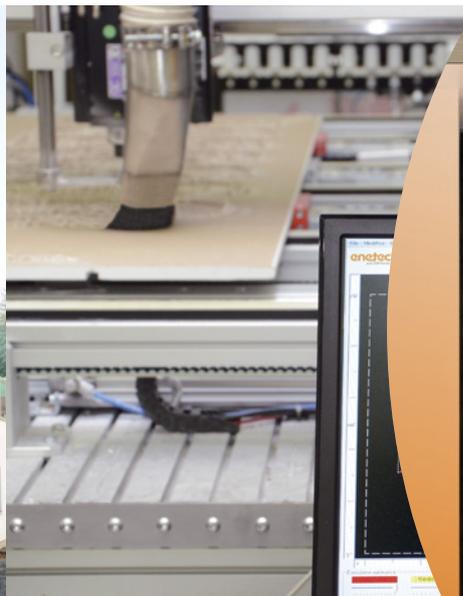
Cooling

Curves deriving from the output certificates according to UNI EN 14240:2005 in cooling mode. **WSP^{lab}**



- | | | |
|---|---|--|
|  CEILING 5,5 |  CEILING 3,5 |  CEILING 3,0 PLUS |
|  CEILING 5,5 HYDRO |  CEILING 3,5 HYDRO |  ACOUSTIC CEILING |
|  CEILING LUX |  CEILING 10 |  HP ACOUSTIC CEILING |
|  CEILING RF 5,5 |  CEILING RF 10 | |

PRODUCTION PLANT BOLZANO/BOZEN (ITALY)



www.enetec.info

Enetec spa

Pillhof 89
I-39057 Frangarto (BZ)
T +39 0471 051 508
F +39 0471 051 509
mail@enetec.info

Enetec GmbH

International sales
Kalkarer Str. 81 – Halle 26
D-47533 Kleve
T +49 2821 89 88 00
sales@enetec.info

Plant Bolzano/Bozen

Molding & Milling
Pillhof 89
I-39057 Frangarto (BZ)
T +39 0471 051 508
F +39 0471 051 509
mail@enetec.info

Plant Enetec Plastics

Extrusion
Kalkarer Str. 81 – Halle 26
D-47533 Kleve
T +49 2821 89 88 00
pipes@enetec.info

Plant Verolanuova

EPS Production
Via IV Novembre, 34
I-25028 Verolanuova (BS)
T +39 030 933163
F +39 030 9923998
eps@enetec.info