

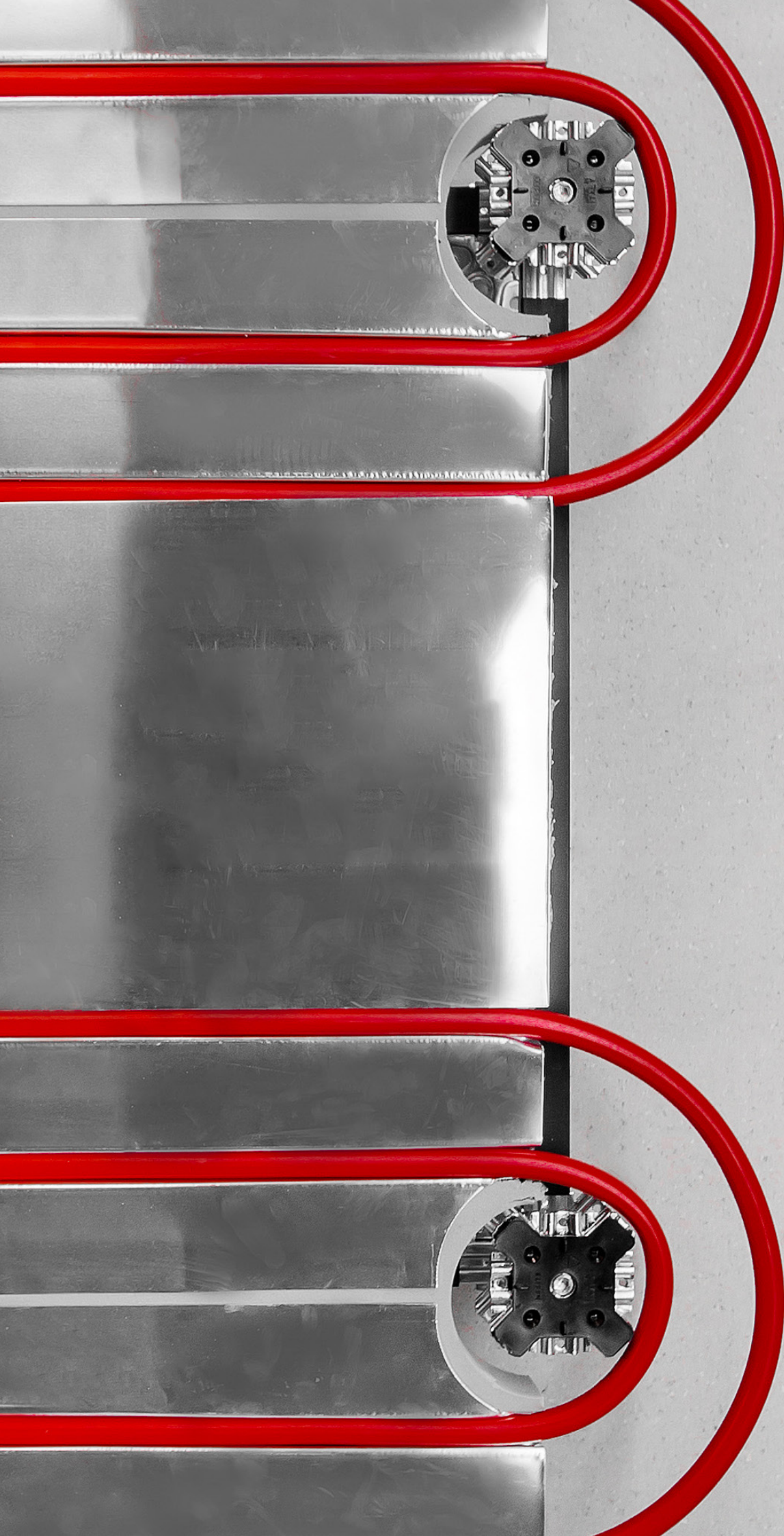


n e s i t e

diffuse

RADIANT RAISED FLOOR SYSTEM

[nesite.com](https://www.nesite.com)



Diffuse, the fully accessible radiant raised floor

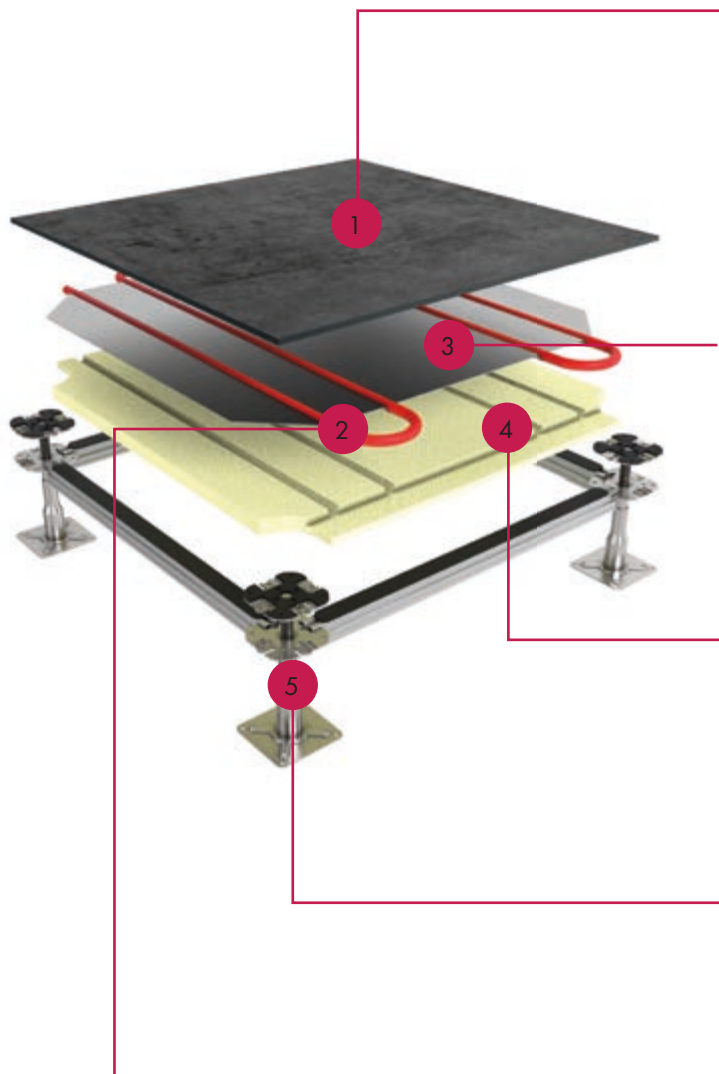
Diffuse is the only dry radiant raised floor completely accessible, that does not require cement screed.

Lightweight, easy and quick to install, Diffuse is immediately walkable and has a very low thermal inertia, which allows a fast response in terms of both heating and cooling.

The innovative radiant raised floor Diffuse by Nesite was designed to optimize the highest thermal efficiency, without sacrificing the characteristics of the raised floor: complete accessibility to the underfloor, modularity and maximum flexibility, aesthetic versatility.

Diffuse is a system certified at IGE Laboratory of Stoccarda.

The system



Removable modular finishing panels which compose the walking surface, consisting of a core made of various materials (inert and inorganic) of very high density. The top covering material can be very different, allowing a wide range of finishings, for the maximum aesthetic freedom.

Thermal radiation system in aluminum sheet, which allows the uniform distribution of heat.

Patented radiant system that, in combination with the thermal radiant system, allows the uniform distribution of heat and guarantees the perfect thermal insulation of the underfloor. Pre-shaped to allow the placement of multilayer pipes.

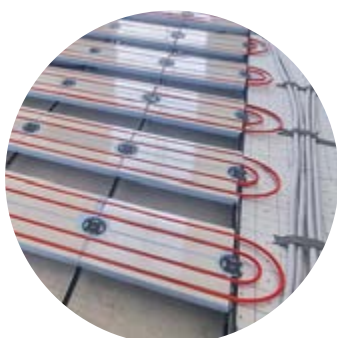
Structure that permits to raise together both the thermal insulating system and the finishing panels, thus allowing the full accessibility to the underfloor.

Distribution system of the exchange fluid (water) through special multilayer pipes (PE-RT/ALU/PE-RT) which guarantees a low linear expansion, easy installation, extreme flexibility, dimensional stability, impermeability to oxygen, resistance to corrosion and chemical agents, light weight.



Finishing panels

They are the removable panels that determine the aesthetic appearance of the floor. Can be composed of two types of core (inert or calcium sulphate) and have a wide range of coverings. Nesite's Twin Floor panels, in particular, with sintered material core coupled with ceramic or natural stone and only 26 mm thick, are recommended not only for their excellent mechanical resistance and impermeability, but also for their excellent conductivity, which guarantees the Diffuse system maximum thermal efficiency. Available in a wide range of colours and types of finish.



Radiant panels

The fundamental element that gives a high thermal efficiency to the system according to UNI-EN 1264 subtype B, is the lower thermal insulating system made of insulating panels in extruded foam polystyrene 300 kPa, 40 mm thick, to which a shaped aluminum foil 0.5 mm thick is coupled in order to allow the perfect fit with the heat exchanger tube (active element). The key element of the raised floor Diffuse by Nesite are the "neutral" radiant panels (i.e., without piping inside): these elements (removable and repositionable), while ensuring a perfect diffusion of heat (or cool), allow full accessibility to the underfloor.



Raising structure

MP structure complete with stringers type L and/or M, fully steel galvanized, with special dual-head to support together both the finishing panels and the thermal insulating panels. Height adjustment from 14 to 65 cm just acting from the top, no need to move the radiant panels already installed.



How it works

Diffuse is the maximum evolution of radiant raised access floors. It consists of special panels made of a sandwich formed by a **patented aluminium shaped radiant body**, enclosed between a lower polystyrene insulating layer and a top finish panel.

The special shaping of the aluminum foil allows the perfect fit of a multilayer pipe, thus enabling a high thermal efficiency. The pipeline supplies the Diffuse system with **water at a low temperature** (up to 35 °C in heating and 17 °C in cooling) coming from a thermal plant.

The aluminum foil acts as a diffuser of the thermal power and ensures an homogeneous distribution, which allows the optimal air conditioning of the area.

Diffuse system can be composed of more than one water circuit (for medium-sized areas up to 12m²/circuit) that converge to special manifolds with regulation driven by the room's air conditioning control system.

Such composed system is than raised from the concrete slab by a structure from 14 to 65 cm with **adjustable height** in order to create a cavity beneath the floor to collect other installations such as wiring, plumbing, telephone, computer and any fresh air system.

The total accessibility to said systems is granted through an easy operation: removing the finishing panels and the neutral diffuser panels (without piping), which are

totally independent one from the other. This operation can be repeated as many times as necessary: without intervention of skilled personnel, without any connection to existing installations which limits the handling, without special tools for removal and repositioning of the panels. **Simplicity, ease and precision for the maximum comfort.**

The great versatility of Diffuse - light, easy to install and completely dry - is applicable in any space where a raised floor can be installed. The finished panel is also removable, with the possibility of replacing the floor covering at any time, with no need for masonry.

The very low thermal inertia: this is the characteristic of dry radiant systems due to their reduced mass; it allows to bring the room to the desired temperature in the shortest time possible, avoiding the long preheating times at ignition, as well as power and energy waste at switch off, that is typical of screed radiant systems having a much higher thermal inertia than Diffuse.

The high thermal efficiency: due to the choice of materials and the composition of the system, Diffuse ensures a significant reduction in consumption (-35%) with the consequent benefit in terms of energy saving, environmental protection and spending review. These are just some of Diffuse's peculiar features, the innovative radiant raised floor ideal for new buildings and renovations.





project_ Doragno Castle
Diffuse system with ceramic finishing
format 60 x 120 cm
design_deltaZERO | deltazero.com
photo: Luciano Carugo

Main advantages

Radiant raised floors able to ensure good heating in winter and cooling in summer have very important advantages with respect to ventilation systems carrying out the same functions.

Especially in the service sector, nowadays it is essential having a versatile accessible system, able to air condition large rooms evenly, giving them maximum flexibility for the distribution of space and easy regulation. In addition, the response speed of the system, the high thermal efficiency and the resulting reduced energy consumption are also very important elements.

The endless choice of finishes makes the aesthetic choice as large as possible.

Totally accessible: each panel can be removed and repositioned without any constraint, thus allowing full accessibility to the underfloor in order to make maintenance and /or modifications to the systems (wires, plumbing, telephone and computer) or to vary the configuration of the rooms with the addition or new positioning of work-stations.

No architectural constraint thanks to the total lack of heating elements in the room (e.g. fan coils or radiators), for the maximum freedom and purity of design.

No inter-junctions between panels:
no weak point thanks to the continuous pipe.

No convective motion of air in the room,
no alteration of air quality and reduction
in the amount of dust into the room.

Energy saving
(more than 35%).

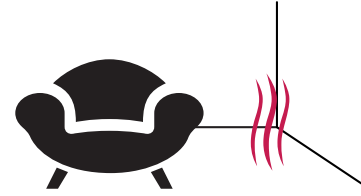
High thermal performance, fast response
speed and excellent temperature distribution
(uniform heat up to 2.5 m high).

The finishing panels are independent of the system, allowing the radiant part to be retained in case of replacement, with considerable cost savings.

Heating comfort

With a radiant floor heating system operating at 26 °/27 °C you can obtain a homogeneous heat diffusion which leads the entire area at temperatures close to 22 °C in a very short time.

The heat is evenly distributed over the entire surface of the floor and is not concentrated in certain points. The result: high and healthy comfort level.



With Diffuse, people get the maximum comfort thanks to the optimal distribution of temperature. The temperature in the room, indeed, is the closest possible to the ideal curve for the best comfort of human bodies.

With Diffuse, people can move in the room as wrapped in a pleasant “lukewarm” atmosphere, with the ideal temperature for the central part of the human body, slightly cooler in the upper part (head and shoulders) and slightly warmer in the lower part (knees, ankles and feet).

With Diffuse you never get that uncomfortable feeling of cold air flow that is typical of areas equipped with a forced ventilation system.

As can be seen from the figures below, with Diffuse the distribution of comfort is the closest possible to the ideal one and it depends on the well-being feeling that the human body gets.

Figure A refers to convection systems, i.e. fan coils which generate forced air flows (convective motions) in the room; they cause the accumulation of masses of warmer air in the highest part of the room with consequent comfort problems for people, also because of noise levels and movement of particles.

Figure B refers to systems with radiators that, even if they use the same convective motions of the previous case, they do not force the air movement; consequently, there is a more natural distribution of the air temperature. Nonetheless, they do not eliminate the accumulation of warm air upwards.

Figure C refers to the system Diffuse, which allows a distribution of air temperature in the room very close to the ideal temperature for the human body. The maximum comfort and well-being, with Diffuse.

Figure A - convection systems

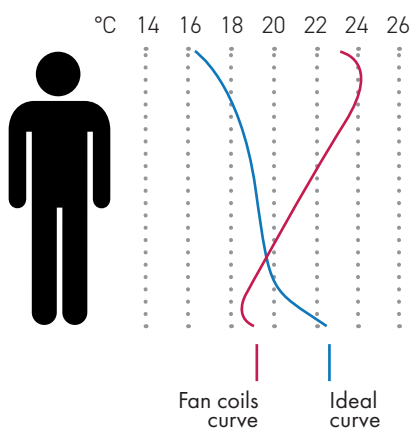


Figure B - systems with radiators

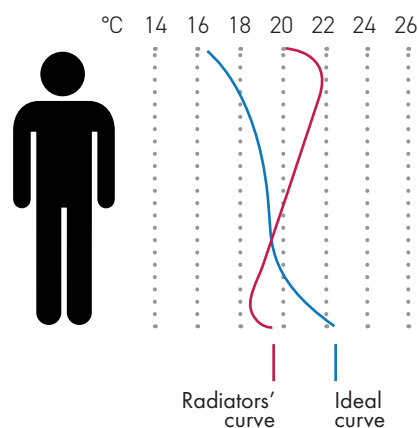
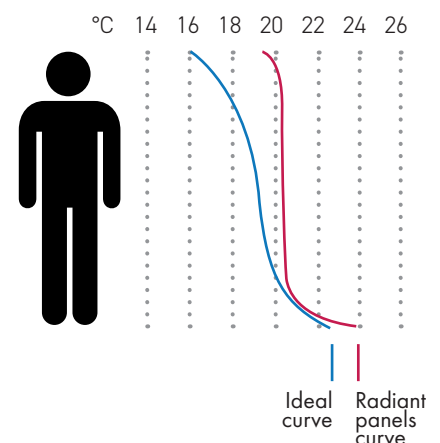


Figure C - Diffuse system



project_ S. Michael Church in Milan
Diffuse system with ceramic finishing
format 60 x 60 cm

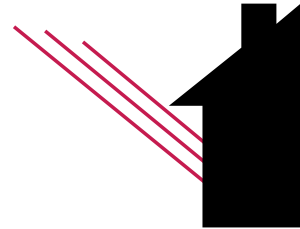


Cooling comfort

Diffuse ensures a high degree of comfort also in the cooling phase.

In this case the thermal plant will be composed of a heat pump unit capable of delivering both warm and cold water; in case of cooling the average water temperature will be of 17 ° C.

When used in cooling, it is advisable to use the radiant floor system in combination with a dehumidifying and air exchange system.

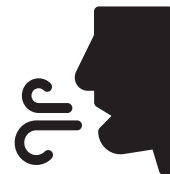


Advantages for the respiratory system

When air is less warm, it is also less dry, and that goes all for the benefit of the respiratory system. In fact, the excessive heating of the air (typical of ventilation systems) with consequent excessive dryness, is a cause of inflammation of nasal membranes, of laryngitis and bronchitis.

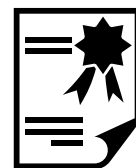
The healthy function of the mucous membranes of the respiratory system (first natural barrier to pathogens) depends on the correct level of humidity you breathe. For this reason we can define the Diffuse system as healthy and beneficial.

pathogens



Certifications and patents

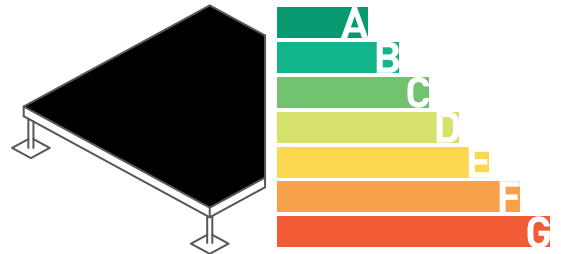
The Italian patent for "RAISED AND THERMO-REGULATED FLOORING MADE OF PREFABRICATED ELEMENTS" was filed registered on 24th October 2013; its heating and cooling performances have been certified at the University of Stuttgart.



Energy saving

Thanks to the time response and the low temperature of supply, it is possible to save up to 15% energy more than a traditional floor on screed.

Moreover, thanks to the possibility of maintaining the air temperature at about 2 ° C lower than a ventilation system, with equal comfort, in an area varying in height from 3 to 5 meters, it is possible to reach an energy saving from 20 to 40%.

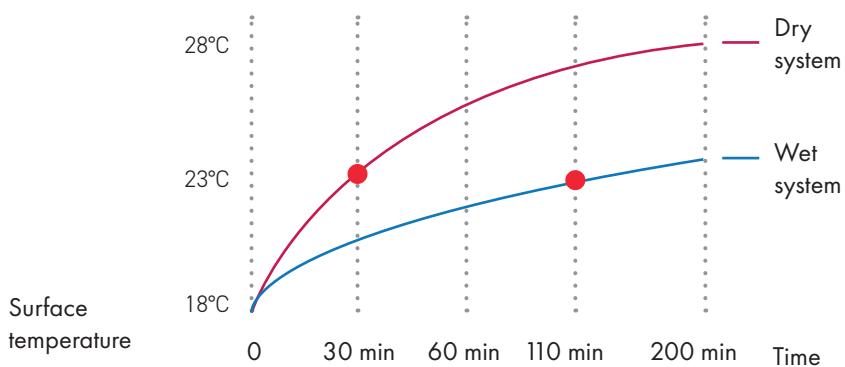
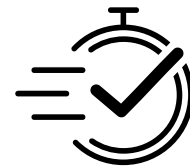


Speed of response and optimal functioning

A floor heating with cement screed takes several hours before being able to reach the desired temperature in the room. With the dry system it is possible to reach the desired temperature in 30 minutes.

Dry systems, unlike traditional systems with cement screed, can be used even in ON-OFF modality.

Thanks to the materials' thermal conductivity and the reduced thickness, heat is distributed quickly and uniformly over the entire surface.



Operation with lower flow temperature

In dry systems, the flow temperature is approx. 5 ° C lower than in screed systems. This leads to significant energy saving.

In case of use with a heat pump, for each lower degree there is an increase of about 2.5% of the COP. In this situation you can get an increase of 12% of the COP, that is, for example, a passage from COP 4 to COP 4.48 with the same heat pump.

Fast installation

Thanks to the constructive principle of dry systems, it is not necessary to wait for the drying time of the screed.

It is possible to install the floor system, complete with the top covering, in about one week against the 4-6 weeks required in case of a floor system with screed.



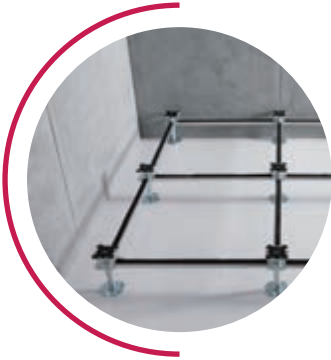




project_ S. Michael Church in Milan
Diffuse system with ceramic finishing
format 60 x 60 cm

Installation steps

01



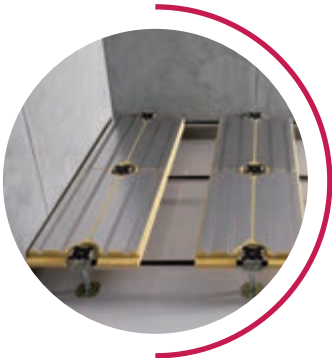
Distribute the pedestals for module 60x60 cm approximately and connect them by snap-stringers on lower heads. Level the pedestals with theodolite laser, or bubble level and levelling rod, and apply the gaskets on stringers.

02



Lay the "active" (with locations for piping) radiant panels aligned on the middle of the pedestal row.

03



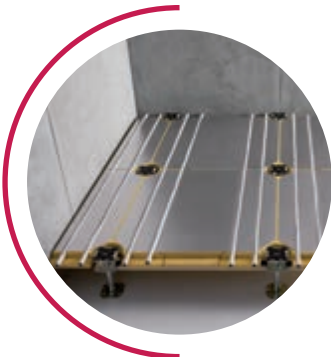
Complete the laying of "active" panels on all the pedestal rows.

04



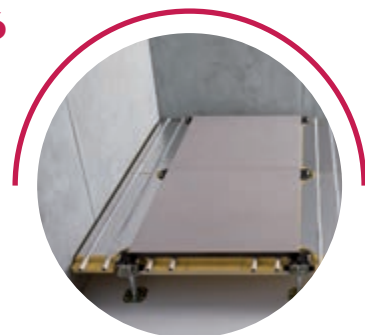
Install the pipes in the cavities of the "active" panels and connect them with the manifolds.

05



Lay the "neutral" radiant panels to close the underfloor cavity and to complete the radiant layer.

06



Lay the finishing panels paying attention to correctly resting the panel on the four supporting pedestals.



project_ Doragno Castle
Diffuse system with ceramic finishing
format 60 x 120 cm
design_ deltaZERO | deltazero.com
photo: Luciano Carugo



project_ Doragno Castle
Diffuse system with ceramic finishing
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Fields of application

The Diffuse system can be applied wherever there are the conditions for using a raised floor. It is recommended for areas subject to space reconfigurations (e.g. open space offices, banks, museums, public offices, etc.) because it is completely accessible and, therefore, allows various changes to the underfloor systems at any time and without having to resort to a costly demolition.

RESIDENTIAL RENOVATIONS

- reduced lead time;
- simplification of the worksite's logistics;
- total costs very close to those of the wet solutions (with cement screed).

HISTORICAL BUILDINGS RENOVATION

- Diffuse is a non-invasive technical solution in the conservative restoration works of historical buildings;
- preservation of architectural heritage;
- cost savings for buildings with very high ceilings;
- reduced lead time.

RENOVATION OF TERTIARY BUILDINGS

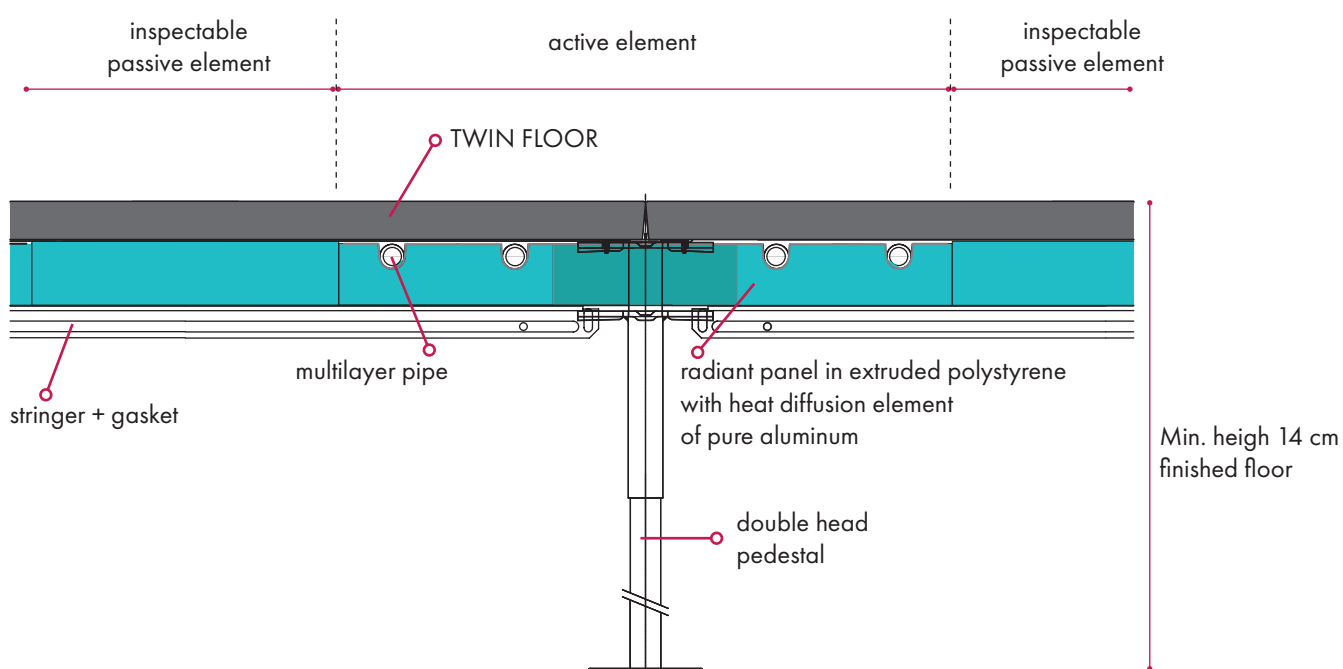
- reduced lead time.

RESTRUCTURING OF SHOPS AND COMMERCIAL BUILDINGS

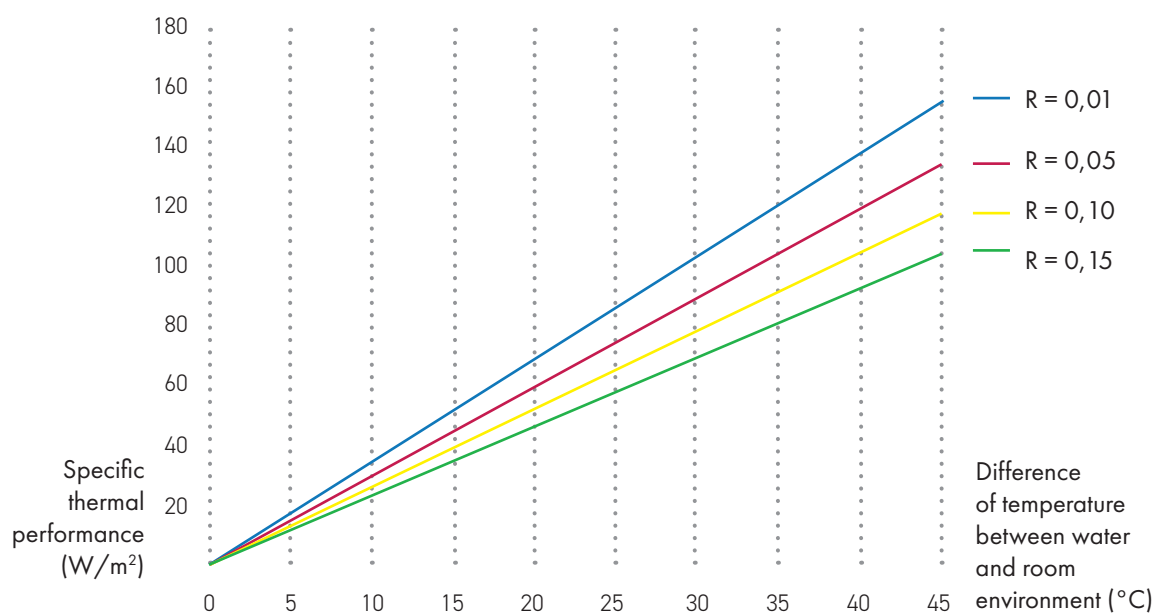
- drastic reduction in the realization times, resulting in rapid returns on investment due to a faster start-up of the business activity;
- simplification of the worksite's logistics: about 4 weeks, with consequent economic advantages resulting from a rapid re-opening.

Technical characteristics

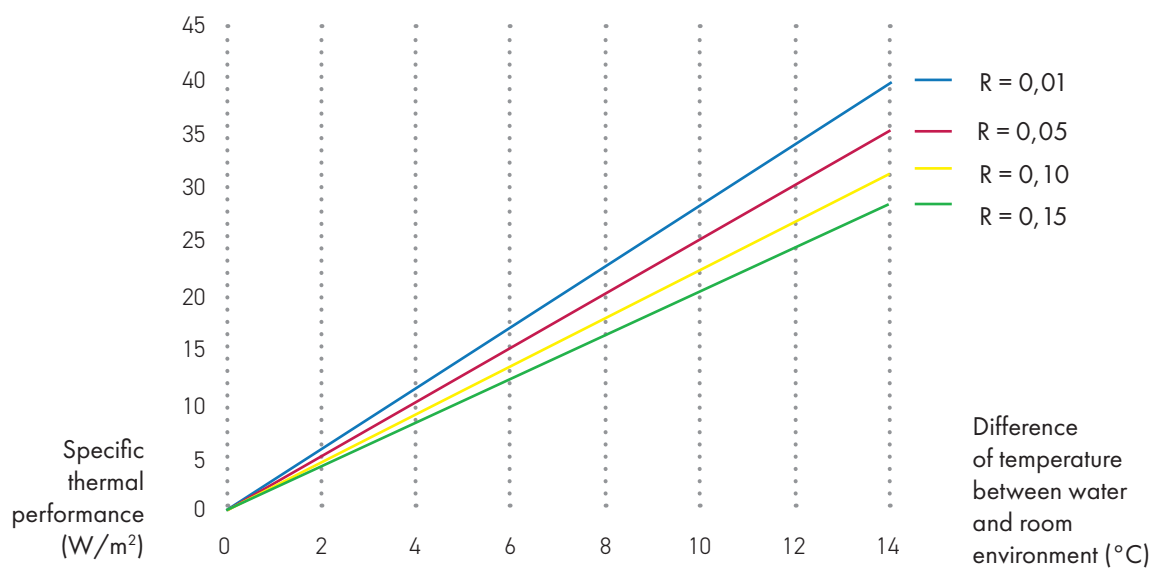
Radiant panel's total thickness	40 mm
Total thermal resistance of the insulation	1,212 m ² K/W minimum thermal resistance according to standard UNI-EN 1264 for heated underfloor
Declared thermal conductivity (at 10°C)	0,033 W/mK UNE-EN 12667
Compression resistance of the insulation (compression to 10% of the thickness)	330 KPa UNE EN 826
Active element dimension	1220 x 400 mm
Passive element dimension	1220 x 210 mm
Pipe diameter	Multilayer 16 x 2 mm
Particularity	Completely accessible radiant raised floor



Heating characteristics



Cooling characteristics



LEGEND

- Twin Floor panels
- sulphate + ceramic panel
- sulphate + parquet panel
- sulphate + cork panel

Heating performance UNI-EN 1264

Water temperature	Room temperature	Panel TWIN FLOOR 25mm finishing: ceramic	Surface temperature	Panel in calcium sulphate 30mm finishing: primer /aluminum foil	Surface temperature	Panel in calcium sulphate 30mm finishing: parquet	Surface temperature
θ_m	θ_i		θ_F		θ_F		θ_F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	51,4	19,8	41,4	18,8	38,9	18,6
30	18	41,1	21,8	33,1	21,1	31,1	20,9
30	20	34,3	23,2	27,6	22,6	25,9	22,4
30	22	27,4	24,5	22,1	24,0	20,7	23,9
30	24	20,6	25,9	16,5	25,5	15,6	25,4
35	15	68,6	21,3	55,2	20,1	51,8	19,8
35	18	58,3	23,4	46,9	22,3	44,1	22,1
35	20	51,4	24,8	41,4	23,8	38,9	23,6
35	22	44,6	26,1	35,9	25,3	33,7	25,1
35	24	37,7	27,5	30,3	26,8	28,5	26,6
40	15	85,7	22,9	69,0	21,4	64,8	21,0
40	18	75,4	25,0	60,7	23,6	57,0	23,3
40	20	68,6	26,3	55,2	25,1	51,8	24,8
40	22	61,7	27,7	49,6	26,6	46,7	26,3
40	24	54,8	29,1	44,1	28,1	41,5	27,8
45	15	102,8	24,5	82,7	22,7	77,8	22,2
45	18	92,6	26,6	74,5	24,9	70,0	24,5
45	20	85,7	27,9	69,0	26,4	64,8	26,0
45	22	78,8	29,3	63,4	27,9	59,6	27,5
45	24	72,0	30,7	57,9	29,4	54,4	29,0
50	15	120,0	26,1	96,5	23,9	90,7	23,4
50	18	109,7	28,2	88,3	26,2	82,9	25,7
50	20	102,8	29,5	82,7	27,7	77,8	27,2
50	22	96,0	30,9	77,2	29,2	72,6	28,7
50	24	89,1	32,3	71,7	30,6	67,4	30,2

Heating performance - Decree Law 81 of 2008

During the winter season, the temperature to be maintained in the rooms must not exceed 20°C, with a tolerance of ±2°C; the ideal temperature is therefore between 18°-22°C.

The UNI EN 1264 standard states that the temperature of the walking surface must not exceed 29°C, with a maximum limit of 33°C in sanitary rooms; areas in red indicate values above 29°C.

Cooling performance UNI-EN 1264 - 5

Water temperature	Room temperature	Panel TWIN FLOOR 25mm finishing: ceramic	Surface temperature	Panel in calcium sulphate 30mm finishing: primer /aluminum foil	Surface temperature	Panel in calcium sulphate 30mm finishing: parquet	Surface temperature
θ_m	θ_i		θ_F		θ_F		θ_F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
22	28	17,2	25,5	14,3	26,0	13,5	26,1
22	27	14,3	25,0	11,9	25,3	11,3	25,4
22	26	11,4	24,4	9,6	24,6	9,0	24,7
22	24	5,7	23,2	4,8	23,3	4,5	23,4
22	22	0,0	22,0	0,0	22,0	0,0	22,0
20	28	22,9	24,7	19,1	25,3	18,0	25,4
20	27	20,0	24,1	16,7	24,6	15,8	24,7
20	26	17,2	23,5	14,3	24,0	13,5	24,1
20	24	11,4	22,4	9,6	22,6	9,0	22,7
20	22	5,7	21,2	4,8	21,3	4,5	21,4
18	28	28,6	23,9	23,9	24,6	22,5	24,8
18	27	25,8	23,3	21,5	23,9	20,3	24,1
18	26	22,9	22,7	19,1	23,3	18,0	23,4
18	24	17,2	21,5	14,3	22,0	13,5	22,1
18	22	11,4	20,4	9,6	20,6	9,0	20,7
16	28	34,3	23,1	28,7	23,9	27,0	24,1
16	27	31,5	22,5	26,3	23,2	24,8	23,5
16	26	28,6	21,9	23,9	22,6	22,5	22,8
16	24	22,9	20,7	19,1	21,3	18,0	21,4
16	22	17,2	19,5	14,3	20,0	13,5	20,1
14	28	40,1	22,3	33,4	23,2	31,6	23,5
14	27	37,2	21,7	31,0	22,6	29,3	22,8
14	26	34,3	21,1	28,7	21,9	27,0	22,1
14	24	28,6	19,9	23,9	20,6	22,5	20,8
14	22	22,9	18,7	19,1	19,3	18,0	19,4

Cooling performance - Decree Law 81 of 2008

During the summer season, the temperature of any room must never exceed 26-28 °C. It therefore represents the maximum room temperature in summer.





project_ Adriatic LNG Hq
Diffuse system with ceramic finishing
format 60 x 60 cm



n e s i t e

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