GIACOMINI
WATER E-MOTION

RADIANT SYSTEMS

Radiant floor systems


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Our passion never stops growing. Just like our Group.

1951
COMPANY ESTABLISHMENT

nearly **900** EMPLOYEES

70 TONS OF BRASS DAILY

130.000 m^2 PRODUCTION PLANTS

A TURNOVER CLOSE TO **170** millions

80% EXPORT

To be the best you need the **right numbers**. Such numbers are what makes **our group** one of today's **world leaders** in the production of heating, conditioning and sanitary water distribution components and systems for the residential, industrial and tertiary sectors. **A reality commercial expanding**, just like our goals.

BRANCHES, REPRESENTATIVE OFFICES AND EXCLUSIVE PARTNERS

① ITALY (Head quarter)	④ PORTUGAL	⑦ GERMANY	⑩ BRAZIL	⑬ CZECH REPUBLIC	⑯ JORDAN
② FRANCE	⑤ ENGLAND	⑧ POLAND	⑪ ARGENTINA	⑭ SLOVAKIA	⑰ INDIA
③ SPAIN	⑥ SWITZERLAND	⑨ CHINA	⑫ CANADA	⑮ TURKEY	⑱ RUSSIA

GIACOMINI
WATER E-MOTION

Radiant Systems. Technical innovation for the ideal climate.

ENERGY MANAGEMENT

Components for optimization of energy consumptions and metering, distribution of hot and cold fluids.

RADIANT SYSTEMS

Radiant floor and wall conditioning, counter-ceilings for residential and commercial use, thermoregulation and air treatment.

WATER MANAGEMENT

Components for domestic water distribution lines and sanitary water system devices.

GAS DISTRIBUTION

Distribution products and systems for safe and performing gas transfer.

RENEWABLE SOURCES

Components for renewable source energy production systems.

FIRE PROTECTION

Specialized performing components for the professional fire-prevention sector.

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RADIANT SYSTEMS

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Constant wellness. Superior domestic comfort.
Reduced energy impact. Radiant floor systems ensure the ideal climate thanks to an even, healthy, convective draught-free temperature.
Simply put, the perfect climate.

Chapter 1

Radiant floor basic principles and benefits

RADIANT FLOOR BASIC PRINCIPLES AND BENEFITS

INVISIBLE WELLNESS SYSTEMS

From a strictly technical standpoint, radiant floors are hydronic systems balancing the sensible loads of conditioned areas. From a more "functional" and basic perspective, they **confer ideal wellness in domestic environments**.

The water flowing through the plastic pipes, drowned in the concrete layer, represents the thermo-vector fluid that actually turns the entire flooring into an **invisible** radiant system.

Radiant floors, with their natural simplicity, are nothing but one of man's many successful attempts to translate a spontaneous phenomenon from nature into technology: **thermal exchange by irradiation**.

Their natural simplicity is what makes radiant floors one of man's many successful attempts to translate a natural phenomenon into technology: **irradiation thermal exchange**. The Sun transmits heat to the Earth according to the same mechanism, an effect anyone can recreate by standing under the sun and a blue sky on a winter day: with a 9-10 °C air temperature one just needs a sweater to feel comfortable. And who has never noticed that sweaters of different colors are more or less warm?

This is what we call irradiation; we cannot touch the sun and air can only make us feel cold, but the percentage of irradiation heat is higher than the one which cold air takes from us: the general sensation is pleasant. Radiant floors create the same effect.

Radiant systems have experienced a rapid development thanks to their ability to **heat** while ensuring an ideal temperature distribution. The technological evolution of thermoregulation devices has made them very popular also for summer **cooling systems** for they represent a winning alternative to air conditioning. They become **reversible systems** fully exploitable for the entire thermal cycle of the residential unit.

Hydronic radiant floors work with a small difference of temperature between water and the ambient to be heated/cooled, both for winter heating and summer cooling, as well as between the ambient and the external air: this is why they can be defined **systems with a reduced temperature difference**. Thermal-hygrometric comfort, energy saving, excellent exploitation of renewable source energy, ideal use of the spaces, these are all beneficial effects that make the "invisible system" more and more widespread both for new constructions and renovation works.

The next chapters will introduce the various radiant solutions by Giacomini to guide professionals in accurately selecting the most suitable system, for new and existing constructions, through targeted interventions of energy requalification.

THE ULTIMATE COMFORT

By definition, an individual feels "well", or by the more widely used expression **comfortable**, when he experiences no unpleasant sensation and finds himself in a condition of total neutrality toward the surrounding environment.

When defining the comfort of a conditioned room, we would generally focus on warmth, cold and humidity. But the concept of comfort is more structured and complex, it involves many subjective variables, some of which are strictly subjective: air temperature, relative humidity, air velocity and quality (olfactory sensations), lighting, noise, metabolic activity, clothing as well as personal (age, gender, culture) and psychological factors.

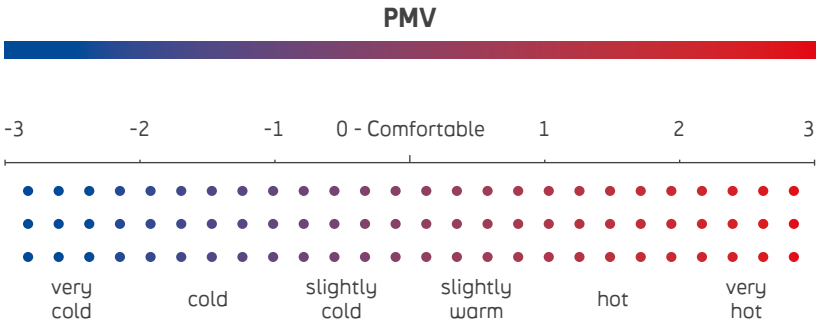
Today we can rely on objective tools and methods to quantify, and not simply qualify, the comfort level of an ambient[1]. When considering the effects of comfort - from a strictly thermal standpoint, without taking into account factors such as olfactory sensations, lighting and noise – the EN ISO7730 standard, originally issued in 1994 and subsequently integrated, assumes special relevance[2]. For a better numerical assessment of the environment conditions connected to thermal wellness, statistical experimentations have been performed to evaluate the satisfaction degree of groups of individuals inside differently conditioned rooms.

In a nutshell, the thermal comfort global index is represented by the Predicted Percentage of Dissatisfied (PPD) in relation to the Predicted Mean Vote (PMV) by which the thermal wellness level perceived by the sampling of individuals is expressed.

NOTE

[1] Standards of reference:
- EN ISO 7730: Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD
- EN 15251: Criteria for the Indoor Environment including thermal, indoor air quality, light and noise
- EN 13779: Ventilation for non-residential buildings. Performance requirements for ventilation and room conditioning systems

[2] UNI EN ISO 7730:2006, Thermal ambient ergonomics – Analytical definition and interpretation of thermal wellness by calculating the PMV and PPD and the local thermal wellness criteria.



In addition to this main index, the Regulation takes into consideration local discomfort factors:

- draughts (DR % - Draught Rate)
- vertical temperature gradient
- radiant asymmetry
- floor temperature

and it identifies three thermal comfort categories: A, B and C.
The table below shows the comfort assessment according to UNI EN ISO 7730:2006.

category	GLOBAL COMFORT		LOCAL DISCOMFORT			
	PPD %	PMV	DR %	temperature vertical gradient [°C]	warm or cold floor [°C]	radiant asymmetry [°C]
A	<6	-0,2 < PMV < 0,2	<10	<3	<10	<5
B	<10	-0,5 < PMV < 0,5	<20	<5	<10	<5
C	<15	-0,7 < PMV < 0,7	<30	<10	<15	<10

The B category, which calls for a PPD lower than 10 %, includes most applications of the residential and commercial sectors suitable for radiant floors; it should therefore represent the target comfort for new constructions and renovation interventions on existing buildings.

The temperature distribution in a room is determined by the so-called **thermal comfort ideal curve**, according to which the zones closer to the floor should be slightly warmer than those closer to the ceiling: by comparing the comfort curves of the various heating systems, the curve representing the comfort deriving from radiant floors is the one closer to the ideal (fig. 1.1).

It has been proven that radiant floors properly dimensioned and realized according to modern technologies provide the human body with higher comfort and wellness levels compared to traditional heating systems (air heating or radiators): **ideal comfort with constant and even temperatures in the various rooms**.

Floor heating systems prevent heat from layering on the ceiling – the same effect caused by the warm and light air molecules ejected from the outlets of traditional systems – offering a feeling of wellness at "man's level". The same benefits of this system are

The temperature vertical distribution in a radiant floor system follows a comfort curve very close to the ideal.

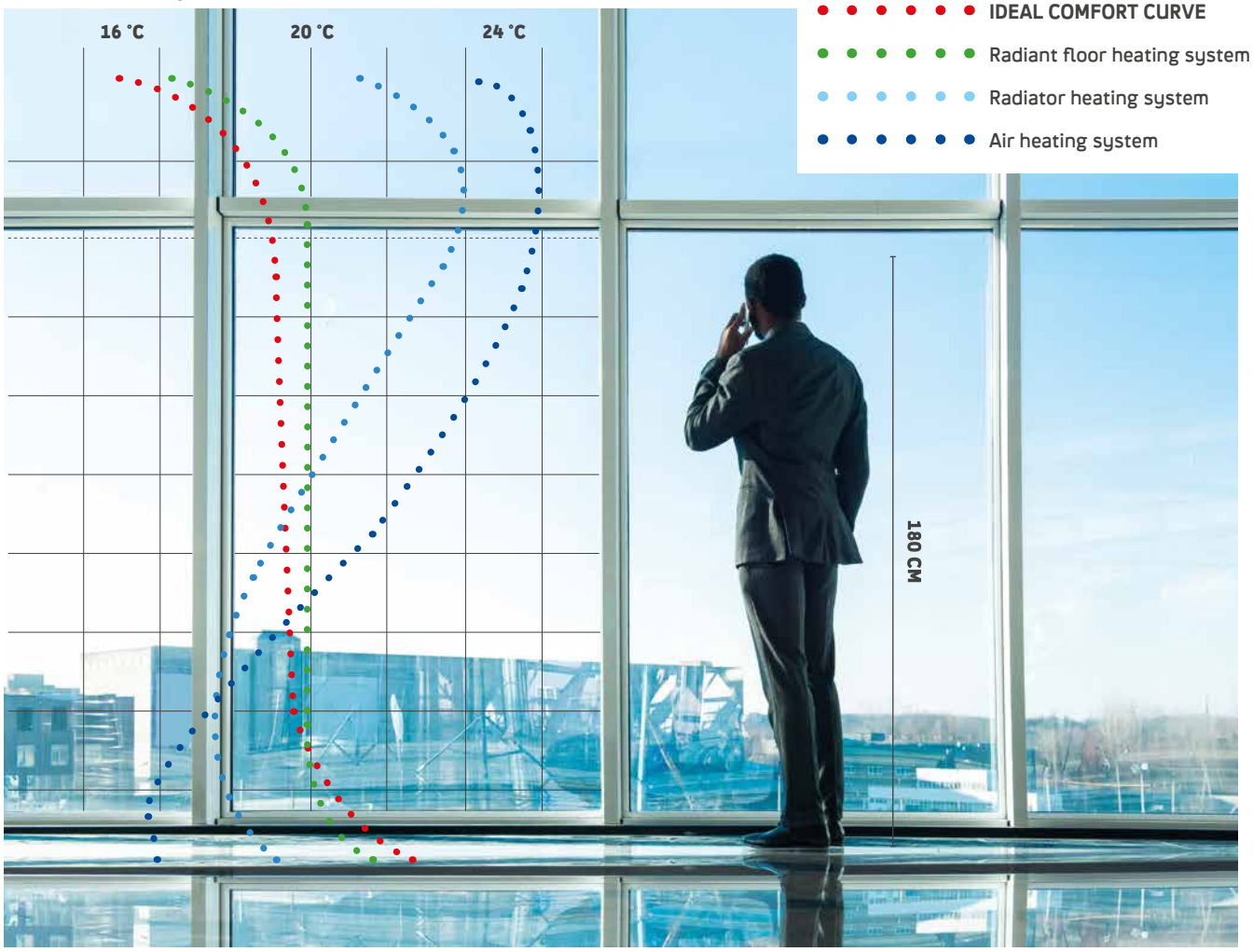


fig. 1.1

directly perceived by the human body inside buildings with high ceilings – such as churches, industrial warehouses, etc. – thanks to its vicinity.

The total thermal exchange is given by the combination of the convective and irradiation thermal exchange affecting every surface and individual inside a room.

The availability of even temperature air in the room volume prevents the presence of annoying convective draughts which cause dust circulation, an effect generally experienced by traditional heated units. Furthermore, the reduced temperature difference between the floor and the ambient minimizes the natural convective phenomena, thus reducing the presence of dust along with the bacteria it carries.

The T_{op} operating temperature is defined to assess the convective and irradiation thermal exchanges with one single index, as the arithmetic mean between the air temperature **T_a** and the mean temperature of all the radiant surfaces surrounding the environment **T_s**: T_{op} is however the temperature that our body actually perceives inside the ambient.

Picture 1.2 shows how the large radiant surface offered by the floor enables to obtain an air temperature T_a with irradiation systems lower than the temperature of convective systems, but with the same T_{op}. This prevents the foul air effect sometimes perceived when entering overheated rooms. The less warm air is also less dry and this enhances proper functioning of the respiratory system, preventing inflammation of the nasal mucous membranes as well as laryngitis and bronchitis.

The same comfort concepts described for heating apply to cooling: the goal is to control temperature and humidity and prevent draughts. The most efficient solution to obtain thermal comfort in summer, both in terms of energy saving and final result, is represented by radiant floors combined to specifically designed **dehumidification** machines. This thermoregulation theory is quite basic: the cooling radiant floor reduces the temperature by disposing of the sensible thermal loads; the dehumidification system reduces the humidity level by balancing the latent thermal loads which are generally high in summer due to the external conditions and people's activity.

HIGH-EFFICIENCY ENERGY SAVING

As described above, the influence hydronic radiant floors have on the operating temperature perceived by the individual make them **systems with a reduced temperature difference**.

The reduced difference between the air temperature of a conditioned room and the external air temperature enables to reduce **heat dispersion (or recirculation)**, thus enjoying an extremely interesting energy saving also complying with the new regulations.

The radiant floor surface temperature, strictly connected to the temperature of the delivery water flowing inside the piping, is enhanced by the irradiation thermal exchange which raises **it to the power of four**. This enables radiant systems to work with water at 15 °C for cooling and 35 °C for heating. On the contrary, traditional systems

– in which thermal exchange only, or generally, takes place by convection – require water at 6-7 °C for cooling and 50-60 °C for heating. As a consequence, radiant system delivery temperatures provide for greater energy saving and enable to exploit energy sources with a higher efficiency (solar panels, heat pumps, condensing boilers).

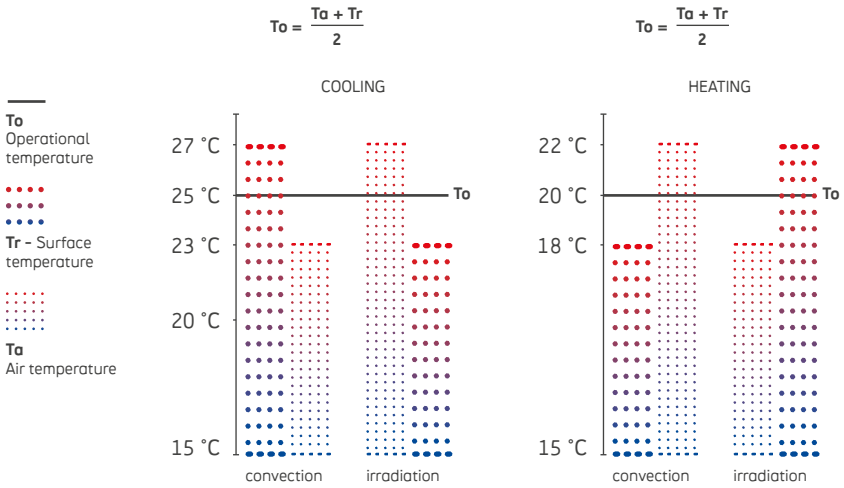


fig. 1.2

Finally, it must be noticed that the high thermal capacity of water compared to air provides for higher efficiency when distributing the same heat quantity in hydronic systems: this reduces the costs deriving from the electric energy consumed by air-only system fans.

It can be therefore stated that radiant heating and cooling systems, which feature a high yield and low consumptions, are the ideal solution to **increase the energy efficiency** of the building-installation and achieve the highest energy efficiency rates.

THE ULTIMATE DECORATION FREEDOM AND NO AESTETICAL LIMIT

Flexibility of the domestic space end decoration freedom are by now essential requirements for modern residential units. Radiant floor systems put no limit to creativity when decorating: they do not require terminals as opposed to traditional conditioning installations (radiators, fan coil units), thus **eliminating any functional and aesthetical limitation**.

Terminals occupy volume: for their overall dimensions, for the distance required for proper functioning and to offer the users an adequate comfort distance. Radiant floors do not encumber the space nor the walls of the occupied zone: the great economic benefit of this conditioning system is also reflected in terms of square meters actually exploitable. Radiant floors are also the perfect solution for historical buildings where the installation of exposed heating units would be unfeasible for explicit limits or architectonic choices: the original project remains unaltered, ensuring an impeccable aesthetic result.

QUIETNESS AND IDEAL ACOUSTIC INSULATION

The reduced velocity of the water flowing inside the synthetic plastic piping ensures total operational **quietness**. In addition, tradiant insulation panels have a **sound-absorbent** surface protecting from the noise originated by the other dwelling floors and reducing the level of trampling pressure.

LONG LASTING AND LIMITED MAINTENANCE

Every component features a long-lasting service life, generally longer than the building's. The plastic distribution line piping is not subject to corrosion breaks and cracks. The insulation panels situated under the radiant screed made with crossed-linked expanded polystyrene and lined with a protection layer suffers no installation stress or environmental phenomena. Neither the other components require specific care as they have very few mechanical parts which may be affected by wear and tear. In addition, as opposed to traditional radiators and fan coil units which require regular cleaning and painting (including the adjoining walls), the radiant system invisible terminal – the floor itself – requires no intervention.

EFFICIENCY-ORIENTED AND FLEXIBLE PLANNING

Designing represents the most important step of a building planning: the energy efficiency level greatly depends on the planning construction techniques and on the materials selected.

A **high efficiency and perfectly integrated system** plays a very important role, together with the general planning choices (orientation of the building to enhance the positive solar contribution, technique and construction materials).

The radiant system heating and cooling capacity is determined by various factors: performance of the insulation layer; minimum and maximum limit temperatures; mechanisms of thermal exchange between piping water and floor and between the latter and the ambient; temperature and humidity control.

The maximum and minimum limit temperatures for the ambient internal surfaces are defined by comfort and surface moisture. There are technical regulations (UNI EN 1264) defining the radiant floor maximum temperature for heating (29 °C for the occupied zone, 35 °C for perimetrical zones featuring a 20 °C air temperature). For cooling instead one must consider that if a surface is colder than the ambient dew temperature, a layer of moisture will form on the surface

itself, an effect which must be prevented. It is therefore necessary to maintain the flooring surface at a temperature higher than dew temperature at all times and, in any case, never lower than 19 °C to avoid individual discomfort.

Thermal exchange mechanisms are affected by the following variables:

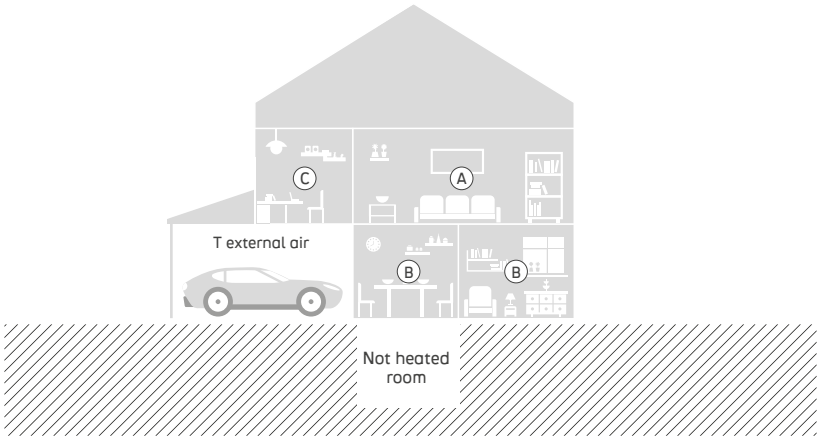
- pipe pitch: the closer the pipes, the greater the thermal exchange efficiency as the surface near the pipe is more affected by the water temperature
- pipe conductivity: mostly made with plastic by now, as it guarantees great reliability on a long term, these pipes have a reduced cost compared to metal materials, they are not affected by corrosion and offer great installation versatility
- concrete screed: the pipes must be properly fitted to the conductive layer. Today the market offers screeds specifically designed for radiant installations with an excellent fluidity, high conductivity and reduced thermal inertia
- surface finish material: the choice between more insulating (e.g. wood) or more conductive materials (e.g. ceramic) will affect the radiant system planning and management, but without compromising its regular functioning.

The radiant system performance depends largely on **the thermal insulation layer** used to limit heat dispersions between the pipes and the background ambient. The thermal resistance limit values of combined heating/cooling systems are defined by law (UNI EN 1264-4, see fig. 1.3) according to the temperature of the adjoining room or the one below. Thermal resistance is a factor depending on the material thermal conductivity, thickness, temperature and humidity under use conditions.

BENEFITS

- Ideal comfort
- One single system for heating and cooling
- Energy saving and high efficiency
- Total decoration freedom and no aesthetical limit
- Quietness and ideal acoustic insulation

Minimum insulation requirements in compliance with UNI EN 1264-4. Thermal resistance values.

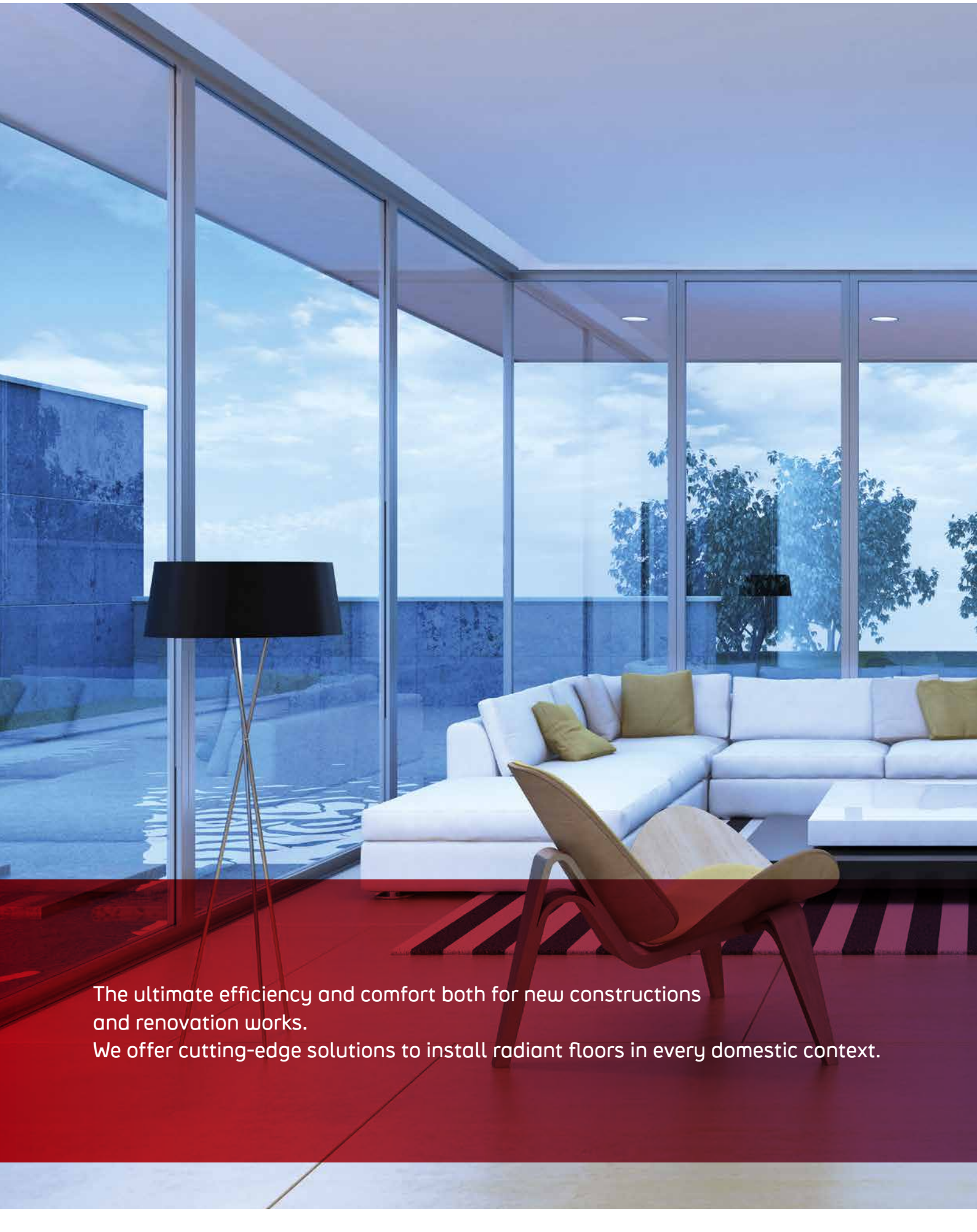


INSULATION EXAMPLE A
Room below heated
$R \geq 0{,}75\ m^2K/W$

INSULATION EXAMPLE B
Room below not heated or in direct contact with the ground
$R \geq 1{,}25\ m^2K/W$

INSULATION EXAMPLE C
Room in contact with external air.
Project external air temperature:
$-5\ °C > T_{external\ air} \geq -15\ °C$
$R \geq 2{,}00\ m^2K/W$

fig. 1.3



The ultimate efficiency and comfort both for new constructions
and renovation works.
We offer cutting-edge solutions to install radiant floors in every domestic context.

Chapter 2

Overview of Giacomini's radiant floor systems

1. KLIMA **NEW BUILDING** SYSTEM

WHY KLIMA NEW BUILDING?

- ideal for new buildings and when there is no limit of installation thickness
- wide range of insulation panels
- certified and guaranteed products
- excellent thermo-acoustic insulation performance

more details on
giacomini.com

INTRODUCTION

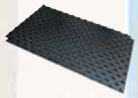
KLIMA NEW BUILDING is the radiant floor system dedicated to the installation in new buildings or when there is no installation thickness limit.

It can use smooth or protuberance panels, thus satisfying every application requirement for the residential and commercial sectors.

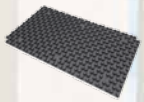
The **R979** and **R979N** models are equipped with protuberances (or mushrooms) properly shaped to enable a functional and quick pipe self-fitting system with no need to use clips.

Every model features an excellent thermo-acoustic insulation performance.

TYPE OF PANELS



R979 preformed insulation panel
- Thickness: 32 mm / 42 mm / 52 mm / 62 mm / 75 mm
- Pipe pitch: multiples of 50 mm



R979N preformed insulation panel
- Thickness: 30 mm / 50 mm / 63 mm
- Pipe pitch: multiples of 50 mm

R982Q preformed insulation panel
- Thickness: 37 mm / 50 mm / 60 mm / 75 mm
- Pipe pitch: multiples of 50 mm

R882A roll of smooth insulation panel
- Thickness: 30 mm / 40 mm

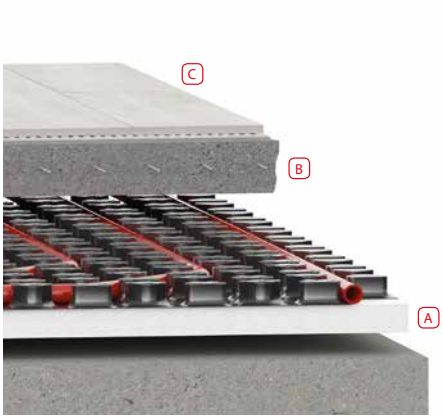
1. KLIMA **NEW BUILDING** SYSTEM

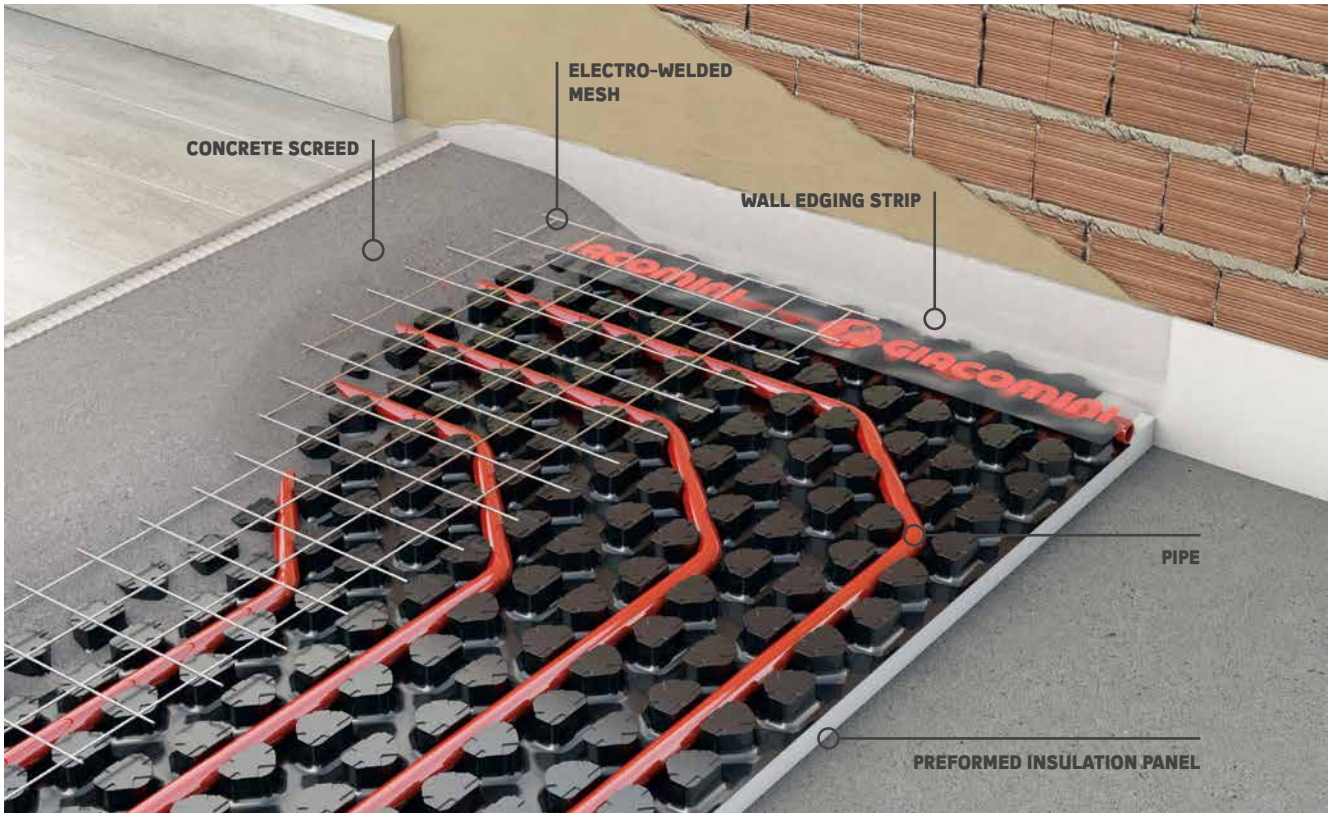
TECHNICAL DATA

	R979NY003	R979NY005	R979NY006	R979Y043	R979Y044	R979Y045	R979Y046	R979Y047	R982QY013/33	R982QY015/35
panel dimensions [mm]	1450 x 850	1450 x 850	1450 x 850	1450 x 850	1450 x 850	1450 x 850	1450 x 850	1450 x 850	1450 x 850	1450 x 850
panel surface [m²]	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23
thermal conductivity [W/(mK)]	0,035	0,040	0,040	0,033	0,034	0,034	0,034	0,034	0,034	0,034
thermal resistance [m²K/W]	0,45	0,9	1,25	0,73	1,00	1,30	1,59	2,00	0,88	1,27
density [kg/m³]	30	30-13	30-13	30	25	25	25	25	30	23
compression minimum resistance to 10 % crushing [kPa]	≥ 250	≥100	≥ 100	≥ 200	≥ 150	≥ 150	≥ 150	≥ 150	≥ 150	≥ 120

DIMENSIONS

panel code	(A) panel total height [mm]	insulation / protuberance height [mm]	(B) screed minimum height [mm]	A+B minimum height surface finish excluded (C) [mm]
R979NY003	30	11/19	30	60
R979NY005	50	31/19	30	80
R979NY006	63	44/19	30	93
R979Y043	32	10/22	30	62
R979Y044	42	20/22	30	72
R979Y045	52	30/22	30	82
R979Y046	62	40/22	30	92
R979Y047	75	53/22	30	105
R982QY013/33	37	15/22	30	67
R982QY015/35	50	28/22	30	80





R979 / R979N CHARACTERISTICS

R979/R979N preformed insulation panels are made by an expanded polystyrene (EPS) sheet combined to a 0.6 mm thermo-molded polystyrene protection layer. They offer great savings in terms of pipe installation workforce thanks to their special mushroom shape: their preformed fins lock the pipe neatly in place with no need to use clips. They can be installed with a 50 mm pitch with pipes featuring an external diameter ranging between 16 and 18 mm. In addition, the R979N model provides for **diagonal installation** of the pipe, an option which has become very popular for modern house geometries.

Their high thermal insulation characteristics are combined to the **excellent sound-absorbing performance**, even more notable for versions with a double density insulation layer (R979NY005 and R979NY006 panels, class SD20 of dynamic rigidity[1]).

R982Q CHARACTERISTICS

R982Q preformed insulation panels are made with expanded polystyrene (EPS) and a thermo-welded protection layer (0.4 mm thickness film). The special protuberances enable to easily fit the pipe in place, drastically reducing the use of pipe-fitting clips.

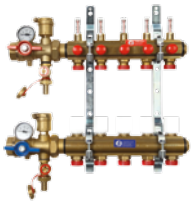
Their high thermal insulation characteristics are combined to the **excellent sound-absorbing performance**, especially for versions with a greater thickness (EN 13163 SD20 dynamic rigidity[1]).

NOTE

[1] The Dynamic Rigidity s', expressed in MN/m³ and calculated according to the EN 13172 regulation, represents the capacity of the material to muffle the vibrations of a horizontal or vertical structure stressed by an impact or aerial noise. The lower the insulation Dynamic Rigidity value the better the structure acoustic performance. Dynamic Rigidity decreases proportionally to the increase of the insulation thickness. The Dynamic Rigidity of a material must however be assessed together with its compressibility: this must in fact be able to maintain its thickness under load.

CORRELATED PRODUCTS

Pipe p. 52-55



Manifold p. 40-45

Wall edging strip p. 86

Accessories p. 86-91

Cabinet p. 45

Thermoregulation p. 64-73

Air treatment p. 80-83

Refer to the INSTALLATION chapter

1. KLIMA **NEW BUILDING** SYSTEM

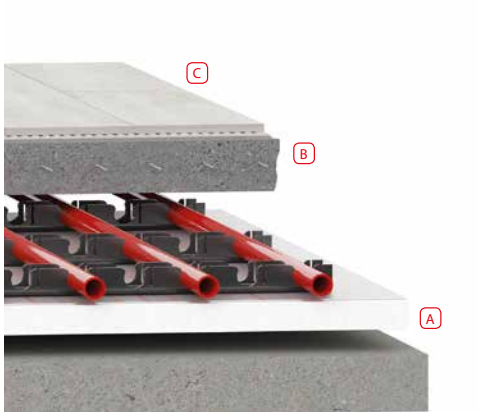
TECHNICAL DATA

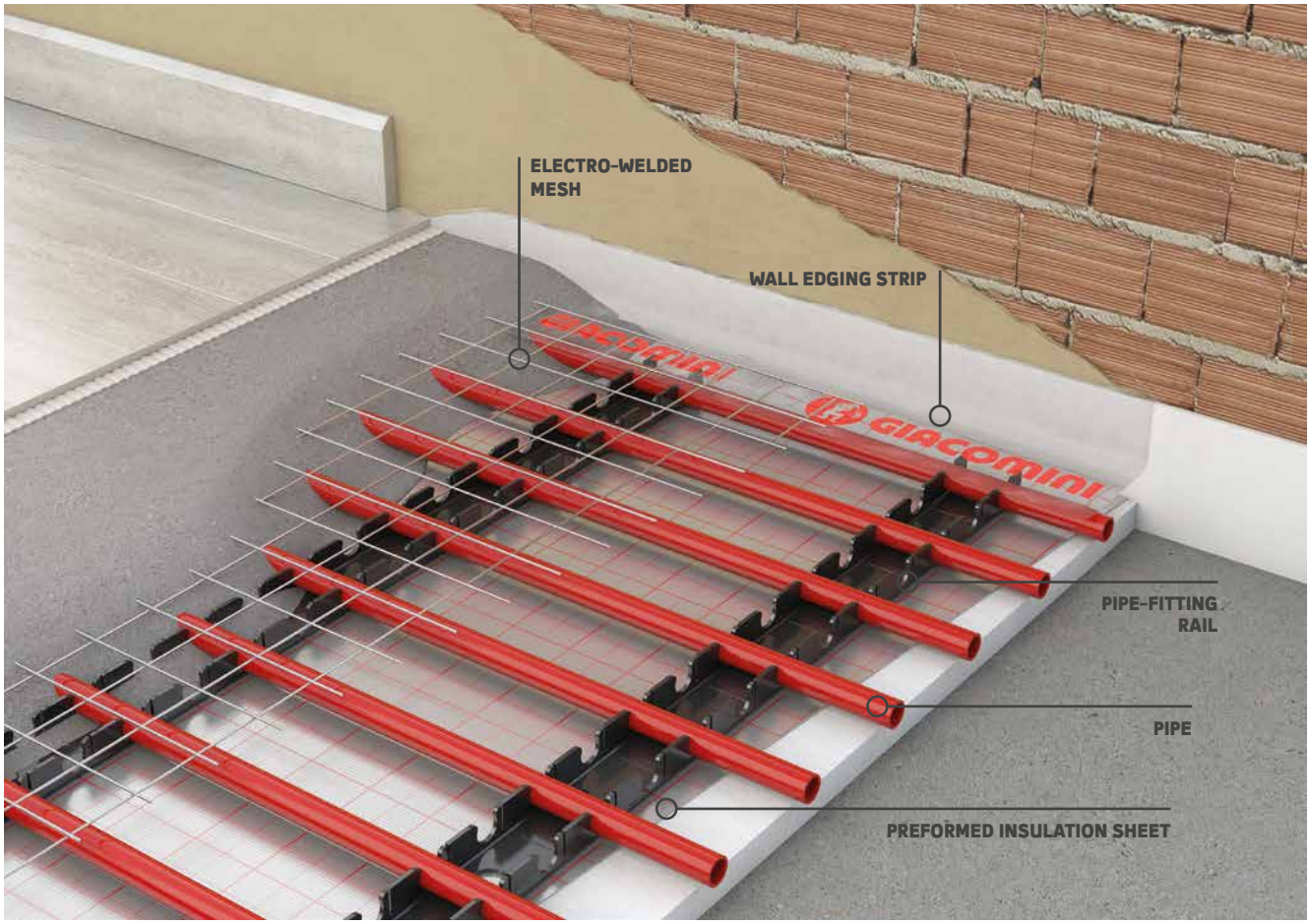
	R882AY002	R882AY003
roll dimensions [m]	1 x 10	1 x 10
panel surface [m²]	10	10
thermal conductivity [W / (mK)]	0,035	0,035
thermal resistance [m²K/W]	0,85	1,15
density [kg/m³]	30	30
compression minimum resistance to 10% crushing [kPa]	≥ 250	≥ 250

DIMENSIONS

panel code	(A) total panel height [mm]	(B) minimum screed height* [mm]	A+B minimum height surface finish excluded (C) [mm]
R882AY002	30	30*	60 + d. pipe
R882AY003	40	30*	70 + d. pipe

* starting from the pipe end





R882A CHARACTERISTICS

R882A smooth insulation panels are made by a polystyrene sheet with a surface protection layer on which a 50 x 50 mm mesh grid pattern is designed to easily position the pipe. The adhesive edge makes installation quicker and reduces the quantity of fitting-tape generally required.

Suitable for a wide range of residential or commercial applications, it is recommended especially for large surfaces (churches/temples, industrial warehouses, etc.).

Supplied in rolls, the radiant coils can be fitted using pipe-fitting rails (K389 or K389W) or the special R983 clips (using the special R863 clip-fitting pistol).

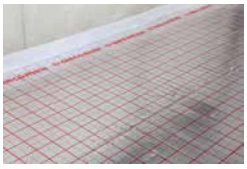
INSTALLATION STEPS

1. positioning of wall edging strip

2. first step of insulation panel positioning

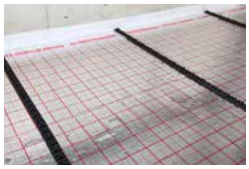
3. special panel fitting system

4. positioning of subsequent insulation panel roll



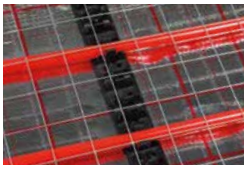
5. overview of insulation panel positioning

6. positioning of pipe-fitting rail using special clips

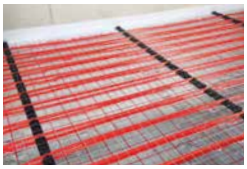


7. overview of insulation panel with fitted rail

8. pipe positioning



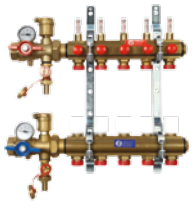
9. positioning of electro-welded mesh



10. overview of the finished system ready for screed casting

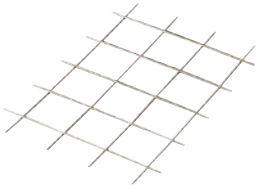
CORRELATED PRODUCTS

Pipe p. 52-55



Manifold p. 40-45

Wall edging strip p. 86



Electro-welded mesh p. 90

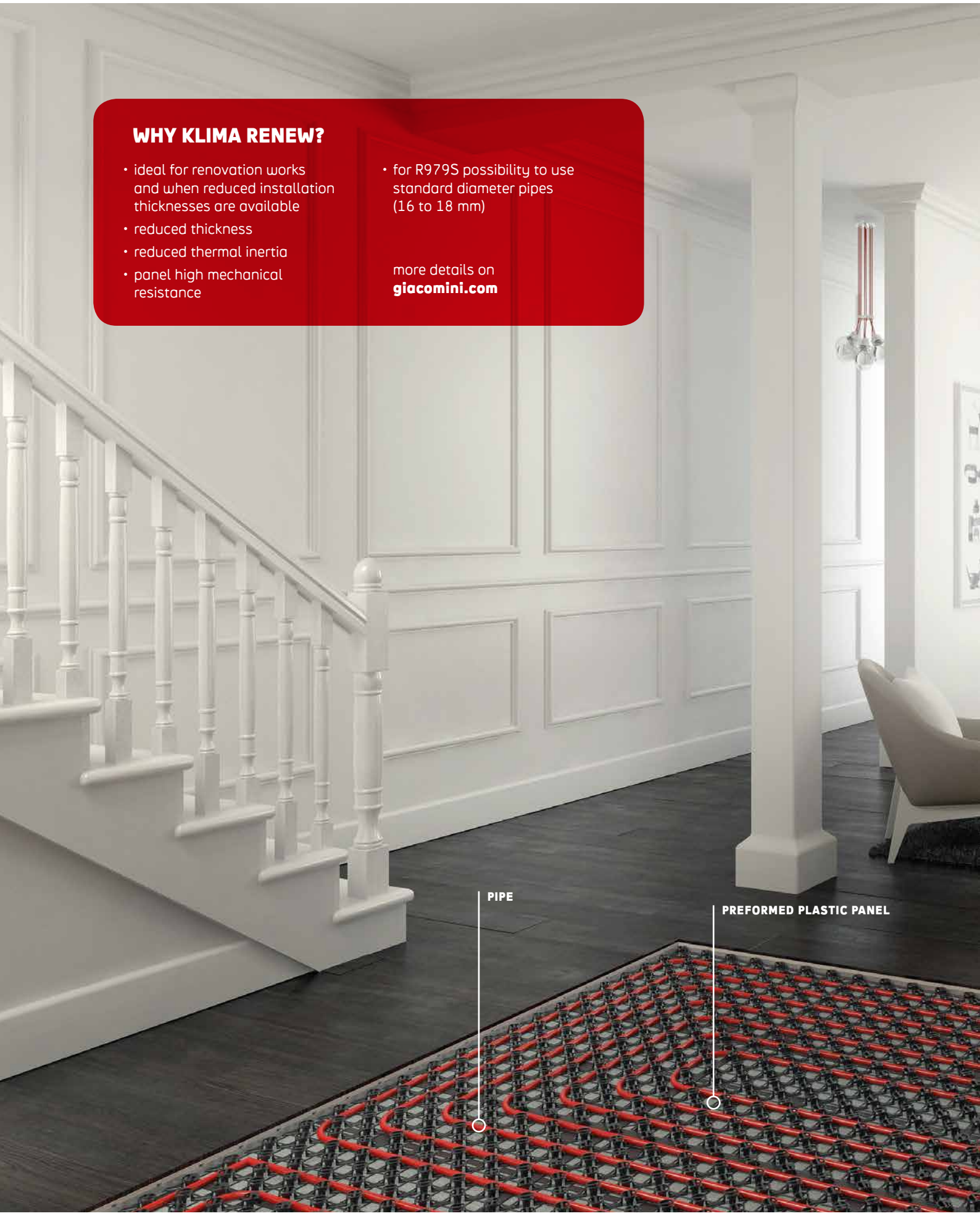
Accessories p. 86-91

Cabinet p. 45

Thermoregulation p. 64-73

Air treatment p. 80-83

2. KLIMA **RENEW** SYSTEM



WHY KLIMA RENEW?

- ideal for renovation works and when reduced installation thicknesses are available
- reduced thickness
- reduced thermal inertia
- panel high mechanical resistance
- for R979S possibility to use standard diameter pipes (16 to 18 mm)

more details on
giacomini.com

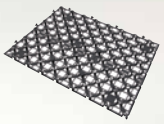
INTRODUCTION

KLIMA RENEW has been designed to satisfy the growing need of radiant floors also with reduced installation thicknesses: the **perfect solution for renovation works**.

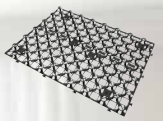
It can be realized using the Spider special plastic panels (series R979S) on which ø 16-18 mm pipes are installed, providing for very reduced losses of pressure with circuits entirely identical to the more traditional versions. As an alternative, fiber-plaster panels are available with ø 12 mm polybutylene pipes covered with a self-smoothing screed.

All KLIMA RENEW systems guarantee an extremely reduced thermal inertia to rapidly reach the operational regime after attenuation or deactivation of the radiant floor.

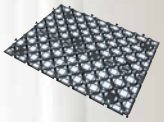
TYPE OF PANELS



R979S preformed plastic panel with adhesive base
- Thickness: 22 mm
- Pipe pitch: multiples of 50 mm
- Suitable pipes: Ø 16-18 mm

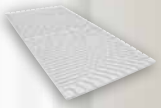


R979S preformed plastic panel with fitting pegs
- Thickness: 22 mm
- Pipe pitch: multiples of 50 mm
- Suitable pipes: Ø 16-18 mm



R979S preformed plastic pipe with high-density insulation
- Thickness: 28 mm (22 mm + 6 mm isolante)
- Pipe pitch: multiples of 50 mm
- Suitable pipes: Ø 16-18 mm

R883F fiber-plaster panel
- Thickness: 18 mm
- Pipe pitch: 10 cm
- Suitable pipe: Ø 12 mm



R884F submanifold and header fiber-plaster panel
- Thickness: 18 mm
- Pipe pitch: 10 cm
- Suitable pipe: Ø 12 mm

2. KLIMA **RENEW** SYSTEM

TECHNICAL DATA

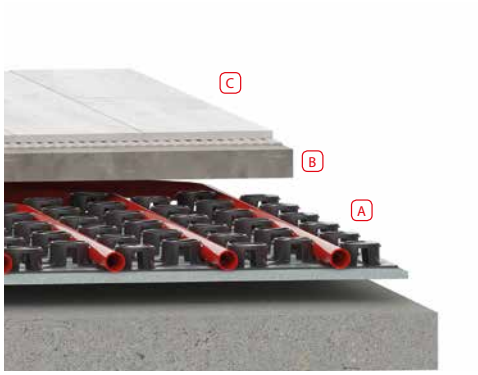
	R979SY001	R979SY011	R979SY021	R883F-R884F
panel dimensions [mm]	800 x 600	800 x 600	800 x 600	1200 x 600
panel surface [m²]	0,48	0,48	0,48	0,72
thermal conductivity [W / (mK)]	-	-	0,033	0,32
thermal resistance [m²K/W]	-	-	0,15	-
density [kg/m³]	-	-	-	1159
compression minimum resistance with 10% crushing [kPa]	-	-	≥ 200	≥ 150

DIMENSIONS

panel code	A SPIDER total height [mm]	insulation height [mm]	B screed minimum height [mm]	A+B minimum height surface finish excluded C [mm]
R979SY001	22	-	25 (self-leveling)	25 (self-leveling)
			35 (anhydrite-based)	35 (anhydrite-based)
			40 (sand+ concrete)	40 (sand+ concrete)
R979SY011	22 + pegs	S_i*	35 (anhydrite-based)	35 + S_i (anhydrite-based)
			40 (sand+ concrete)	40 + S_i (sand+ concrete)
R979SY021	28 (6 mm insulation included)	6	30 (self-leveling)	36 (self-leveling)
			35 (anhydrite-based)	41 (anhydrite-based)
			40 (sand+ concrete)	46 (sand+ concrete)

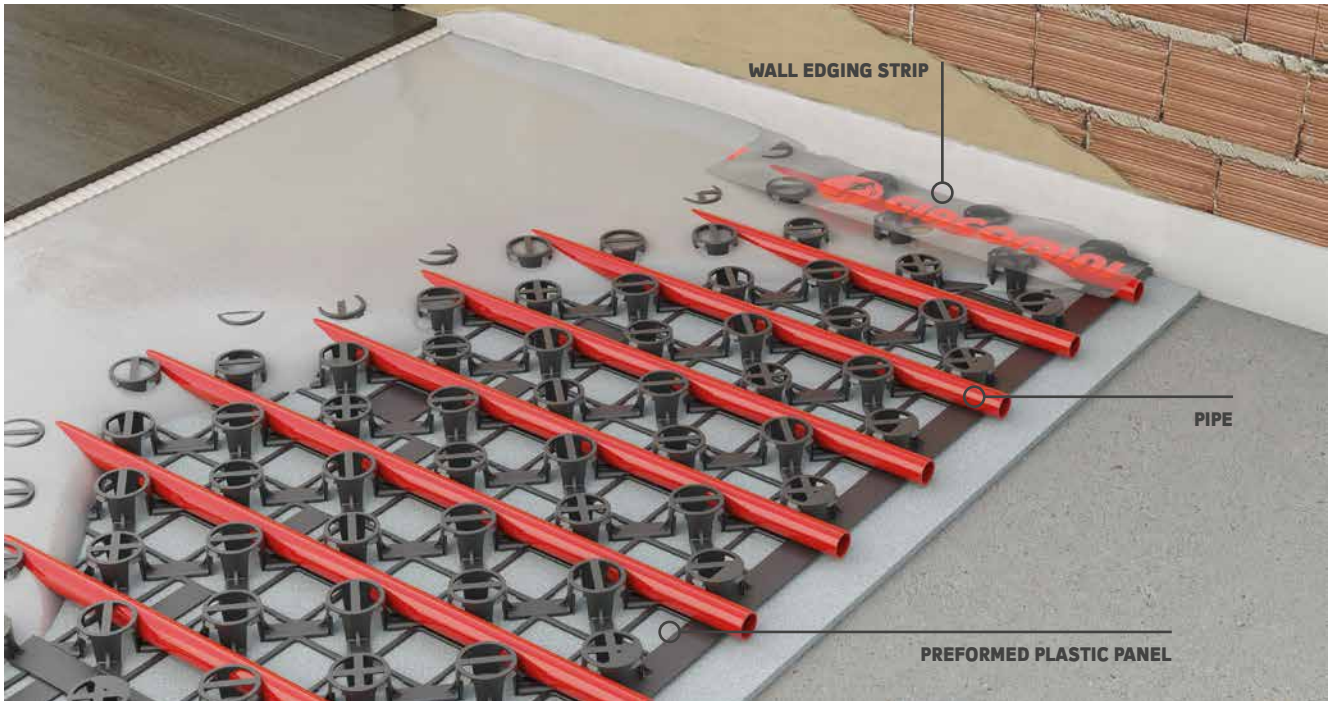
* not Included with Spider

panel code	A total panel height [mm]	B minimum self-leveling screed height [mm]	A+B minimum height surface finish excluded C [mm]
R883F-R884F	18	5	23



Section with Spider panel

The height specified above refers to minimum geometric constraints.
Technical recommendations by screed manufacturers (in terms of installation techniques and thickness) should be followed precisely.



R979S SPIDER CHARACTERISTICS

The R979S **Spider** panel is a "tridimensional" mesh printed on plastic, more specifically on high-resistance polypropylene. Its reduced overall height and shape make this panel particularly suitable for renovation and energy requalification interventions. The patented geometry of the tridimensional mesh enables to firmly fit the pipe during installation and fully conceal it in the screed. This ensures an ideal and even heat distribution combined to reduced thermal inertia.

Available in three versions: **R979SY001** with adhesive base for application on existing floors or floor roughs; **R979SY011** with fitting pegs for application on pre-existing insulation layers; **R979SY021** combined to a 6 mm thick high-density insulation layer.

The screed thickness can be calculated starting from the base of the panel, as the concrete mixture can easily penetrate the tridimensional mesh. Suitable for self-leveling screeds (only with R979SY001 and R979SY021 panels) anhydrite-based screeds and traditionl sand-concrete screeds (for all three versions).

For more details on screed layering see chapter 8 "Regulation-complying installation".

R883F / R884F CHARACTERISTICS

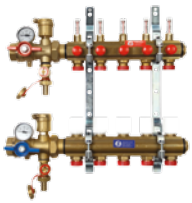
The R883F panel is made by a fiber-plaster sheet specifically milled to house the 12 x 1.5 mm polybutylene pipe, thus enabling to realize distribution circuits with a 10 cm pitch.

The reduced-thickness system, together with the R883F main component, is combined to the R884F header and submanifold panels: these enable to connect the pipes to the manifold and the various circuits and to neatly install the pipes near the manifold itself. The system requires a self-leveling screed of about 5 mm on top of the panel surface to obtain a very reduced final thickness of the radiant floor.

The system complies with certified green-building applications.

CORRELATED PRODUCTS

Pipe p. 52-55



Manifold p. 40-45

Wall edging strip p. 86

Accessories p. 86-91

Cabinet p. 45

Thermoregulation p. 64-73

Air treatment p. 80-83

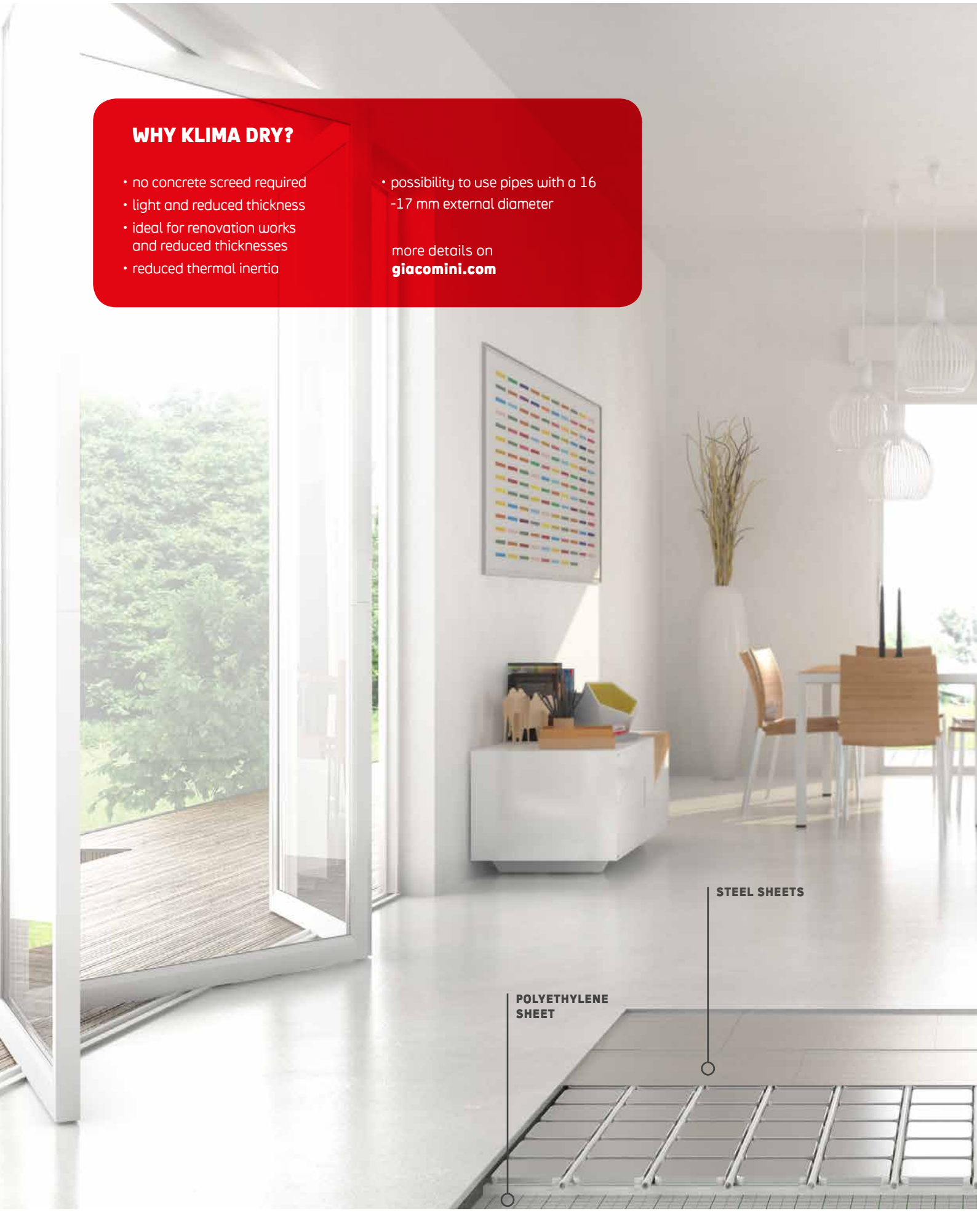
Refer to the INSTALLATION chapter

3. KLIMA **DRY** SYSTEM

WHY KLIMA DRY?

- no concrete screed required
- light and reduced thickness
- ideal for renovation works and reduced thicknesses
- reduced thermal inertia
- possibility to use pipes with a 16 -17 mm external diameter

more details on
giacomini.com



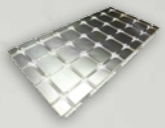
INTRODUCTION

KLIMA DRY is the **screed-free** radiant floor system, perfect for interventions where weight must be limited (e.g. renovation works or galleries): this major requirement is satisfied by not using a concrete screed to support the finish surface while reducing installation times and thicknesses.

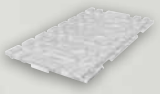
It is generally combined to R883-1 panels, pre-shaped expanded polystyrene sheets coupled with an aluminum diffusion layer which enhances thermal exchange between the piping (preferably multilayer) and the surface. These panels present a special fitting system to prevent thermal bridging.

A double layer of dry-laid galvanized steel sheets supports the floor finish and guarantees an even distribution of the mechanical loads.

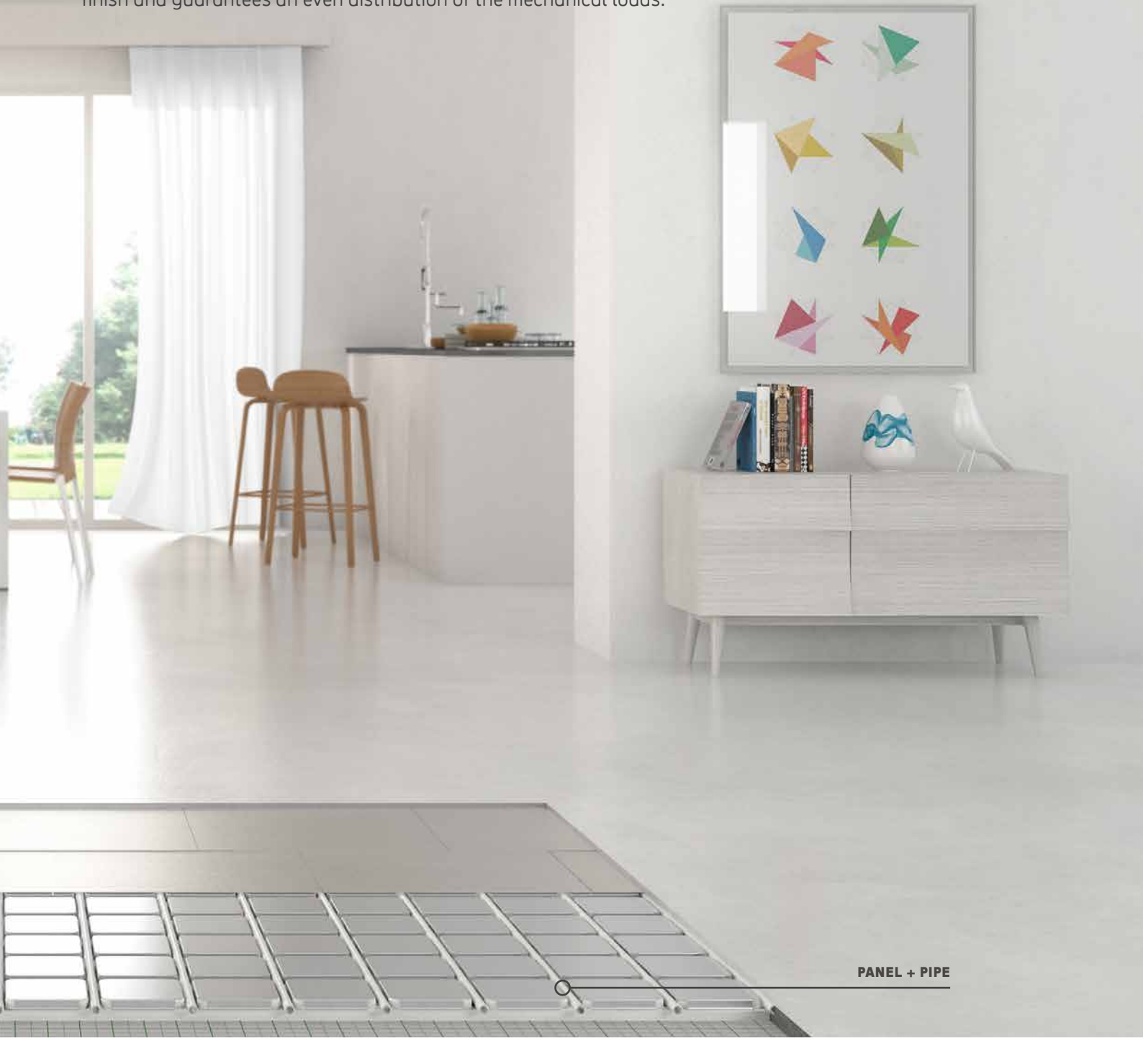
TYPE OF PANELS



R883-1 preformed panel with aluminum thermo-conductor profile
- Thickness: 28 mm
- Pipe pitch: multiples of 150 mm
- Suitable pipes: Ø 16-17 mm



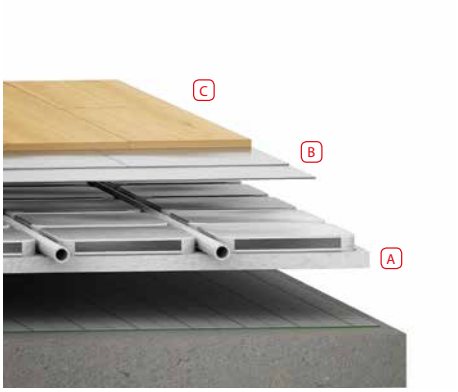
R884 preformed header panel
- Thickness: 28 mm
- Pipe pitch: multiples of 150 mm
- Suitable pipes: Ø 16-17 mm



3. KLIMA **DRY** SYSTEM

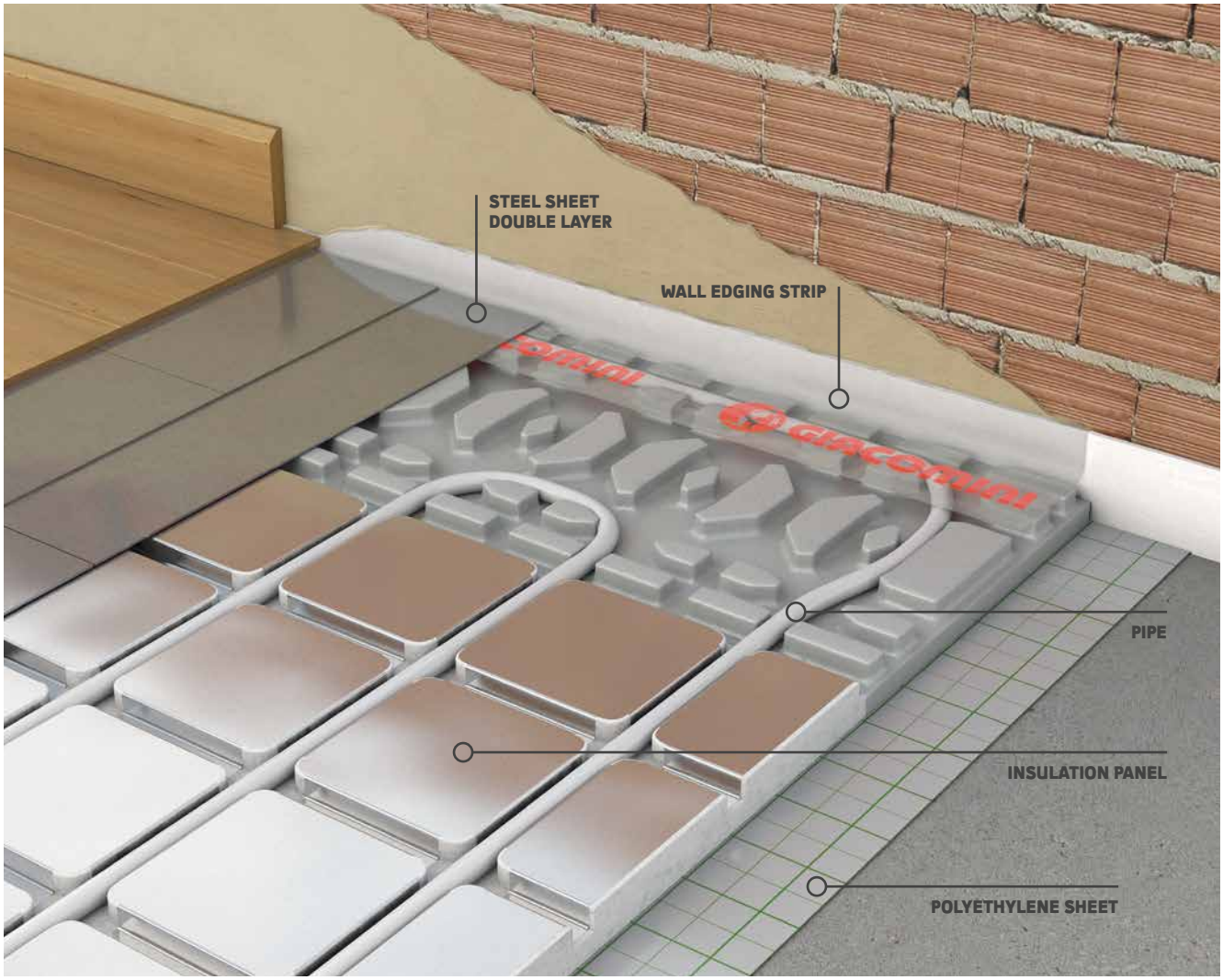
TECHNICAL DATA

	R883-1	R884
panel dimensions [mm]	1200 x 600	600 x 300
panel surface [m²]	0,72	0,18
thermal conductivity [W / (mK)]	0,034	0,034
thermal resistance [m²K/W]	0,55	0,034
density [kg/m³]	30	30
compression minimum resistance with 10% crushing [kPa]	200	200



DIMENSIONS

panel code	A panel total height [mm]	B distribution layer height [mm]	A+B total height surface finish excluded C [mm]
R883-1/ R884	28	2 (1+1)	30



R883-1 / R884 CHARACTERISTICS

R883-1 preformed insulation panels are made with expanded polystyrene jointed to a 0.3 mm thick aluminum thermo-conductor sheet.

The special joints on the four sides enable to easily fit the panels together and prevent thermal bridging. The R884 expanded polystyrene header panels with thermoformed and aluminized film allow to correctly connect the adduction piping to the circuits and support the bendings. A double layer of galvanized steel sheets supports the floor finish for an even distribution of the mechanical loads: R805P for the first layer, R805P-1 with double-sided tape for the second. The layers must be properly staggered to seal the gaps between the sheets.

1. laying of wall edging strip

2. laying of steam barrier/polyethylene sheet

3. laying of R884 insulation header panel

4. laying of R883-1 insulation panel with coupled aluminum thermo-conductor sheet

5. pipe installation

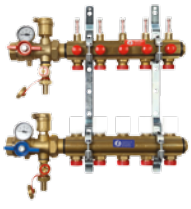
6. positioning of first galvanized steel sheet layer

7. positioning of second steel sheet layer properly staggered

8. laying of surface finish (floating parquet on special mat recommended)

CORRELATED PRODUCTS

Pipe p. 52-55



Manifold p. 40-45

Wall edging strip p. 86

Accessories p. 86-91

Cabinet p. 45

Thermoregulation p. 64-73

Air treatment p. 80-83

Galvanized steel sheet

4. KLIMA **WALL** SYSTEM

WHY KLIMA WALL?

- ideal when no other radiant systems are feasible
- even heat distribution
- reduced thermal inertia
- easy installation
- possibility to use pipes with a 16 -17 mm external diameter

more details on
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INTRODUCTION

KLIMA WALL is the radiant wall system suitable when no other radiant system can be installed or, more frequently, when **thermal integration** is required.

The radiant wall circuits can be derived directly from the distribution manifolds of the floor system

COMPONENTS

Pipe-fitting rail for radiant walls
> Pipe pitch: multiples of 50-100 mm
> Suitable pipes: Ø 12-22 mm

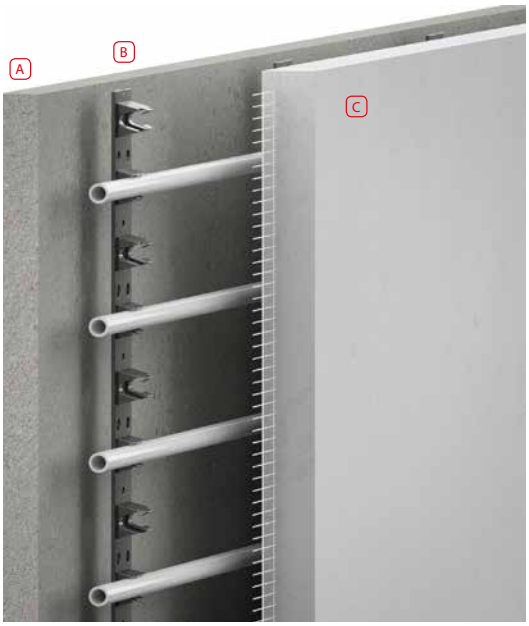
4. KLIMA **WALL** SYSTEM

TECHNICAL DATA

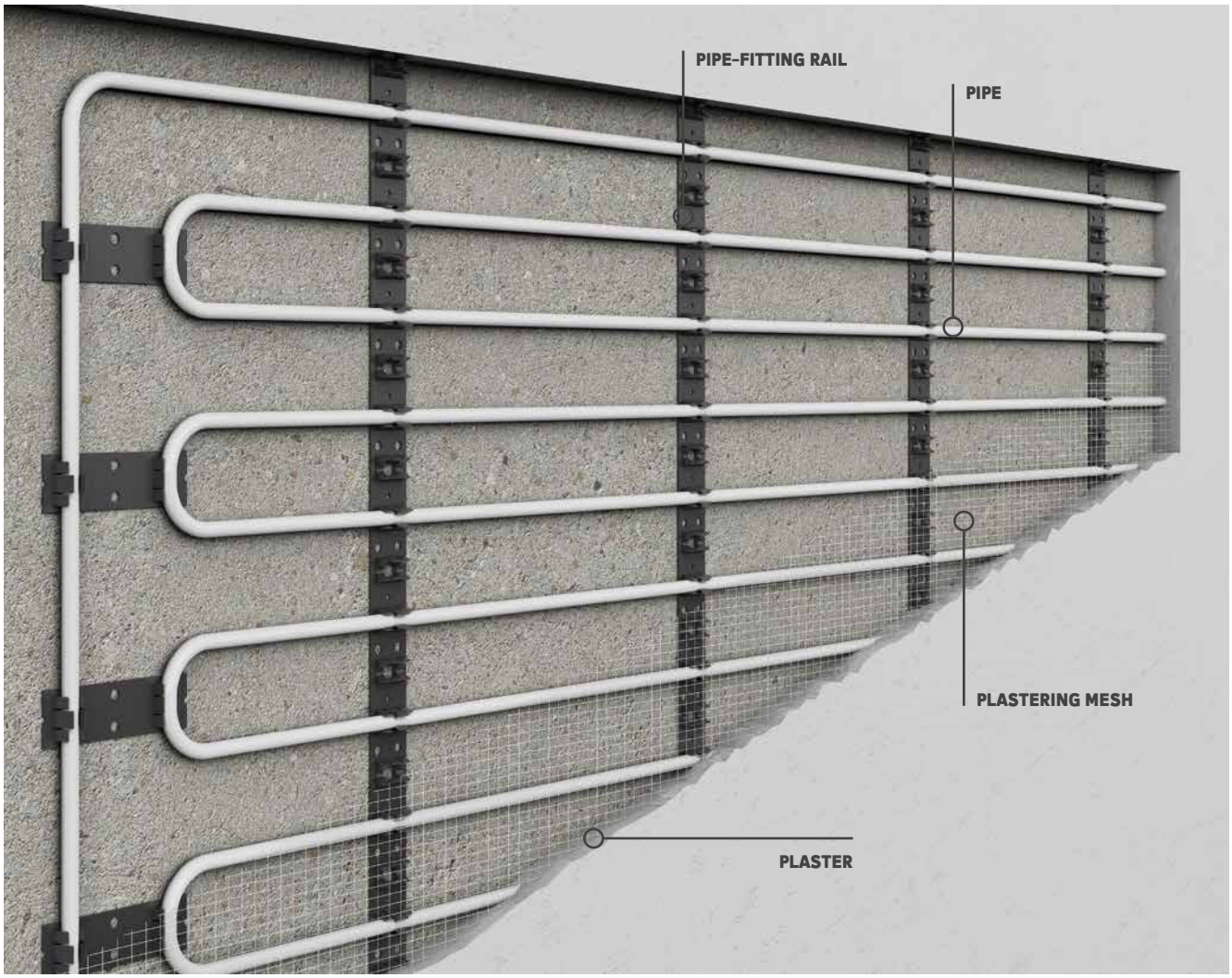
pipe diameter [mm]	pitch [mm]
12 - 15	multiples of 100
16 - 18	multiples of 50
20	multiples of 100

B rail + pipe [mm]	C minimum plaster thickness [mm]	minimum thickness in addition to wall A [mm]
28	10	~ 40

DIMENSIONS



A Brick wall
B Pipe-fitting rail
C Mortar plaster with plastering mesh



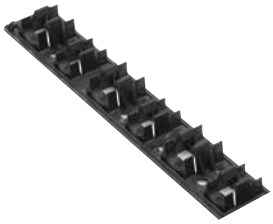
CHARACTERISTICS

Radiant wall systems are generally – but not exclusively - dedicated to units where the exploitable floor surface is not sufficient to install a radiant system: stairwells, bathrooms, that is rooms where the specific thermal need is relatively higher than the rest of the domestic environment.

The best way to reduce to the minimum the wall surface dedicated to the radiant system and enhance the thermal yield while minimizing thermal expansion is to lay the pipes with a 10 cm pitch; this, in addition to the reduced thickness of the piping plaster, enables to enjoy thermal yields not lower than those developed by the radiant floor as the wall system can exploit the same distribution manifold[1].

KLIMA WALL can be installed using the convenient K389W rails provided as 1 m pieces that can be easily fitted together to offer the required support to the circuits. The rails must be fitted vertically to the wall using the provided screw and plug holes. The distance between two adjoining rails must not exceed 50 cm, while the circuits deriving from the manifold must be preferably laid at a 2-2.5 m maximum height from the ground. Pipes can be neatly fitted in the rail housings.

A mortar-based plastering with plaster and concrete binders is recommended as coating for the KLIMA WALL system. The plaster layer must be reinforced with a plastering mesh. However, the thickness of the surface finish must not be lower than 10 mm. To prevent dispersions we recommend to install the system on an externally insulated surface.

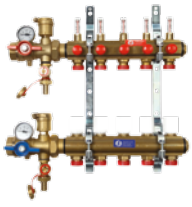


NOTES

[1] Considering a bathroom with a 21 °C temperature and a 40 °C delivery temperature, the yield would be approx. 100 W/m². Note: the average temperature of radiant walls must not exceed 40 °C (according to UNI EN 1264-3) and that when using plaster-based plaster to install the piping, the delivery temperature must not exceed 50 °C (according to UNI EN 1264-4.

CORRELATED PRODUCTS

Pipe p. 52-55



Manifold p. 40-45

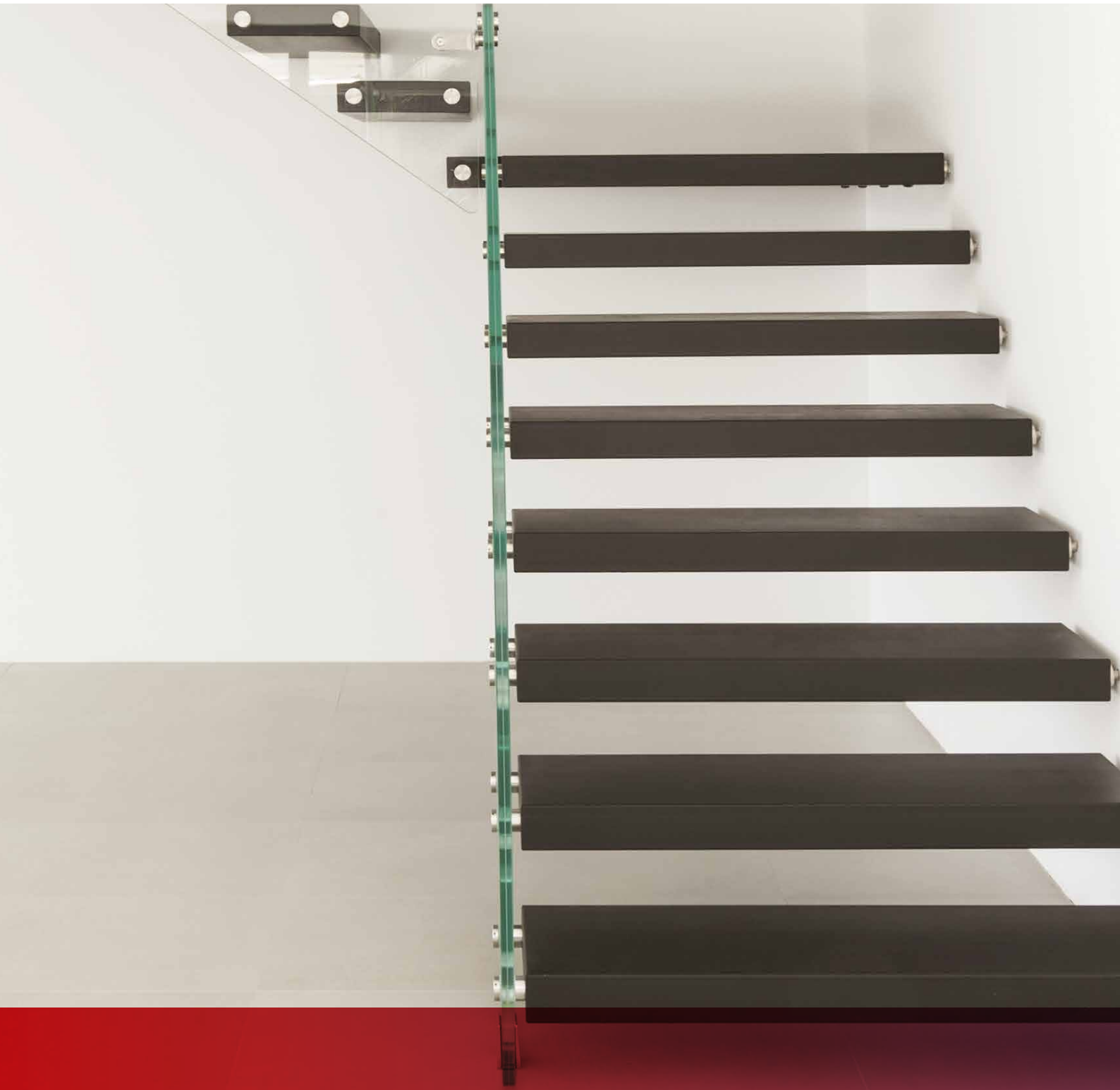
Wall edging strip p. 86

Accessories p. 86-91

Cabinet p. 45

Thermoregulation p. 64-73

Air treatment p. 80-83



Complete range. User-friendly installation. Reduced installation times.
A manifold line designed to satisfy every installation requirement.
From basic distribution terminals up to preassembled groups integrating water mixing and distribution. Brass or plastic, the plumbing solution for every radiant circuit.

RADIANT SYSTEMS

Chapter 3

Mixing and distribution manifolds

R559N MIXING AND DISTRIBUTION MANIFOLD

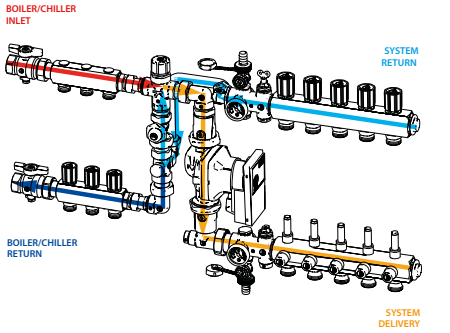
WHY R559N?

- suitable also for cooling
- preassembled
- easy to install
- equipped with self-modulating circulator
- possibility to add manifolds for non-mixed water circuits
- cabinet with reduced dimensions and depth

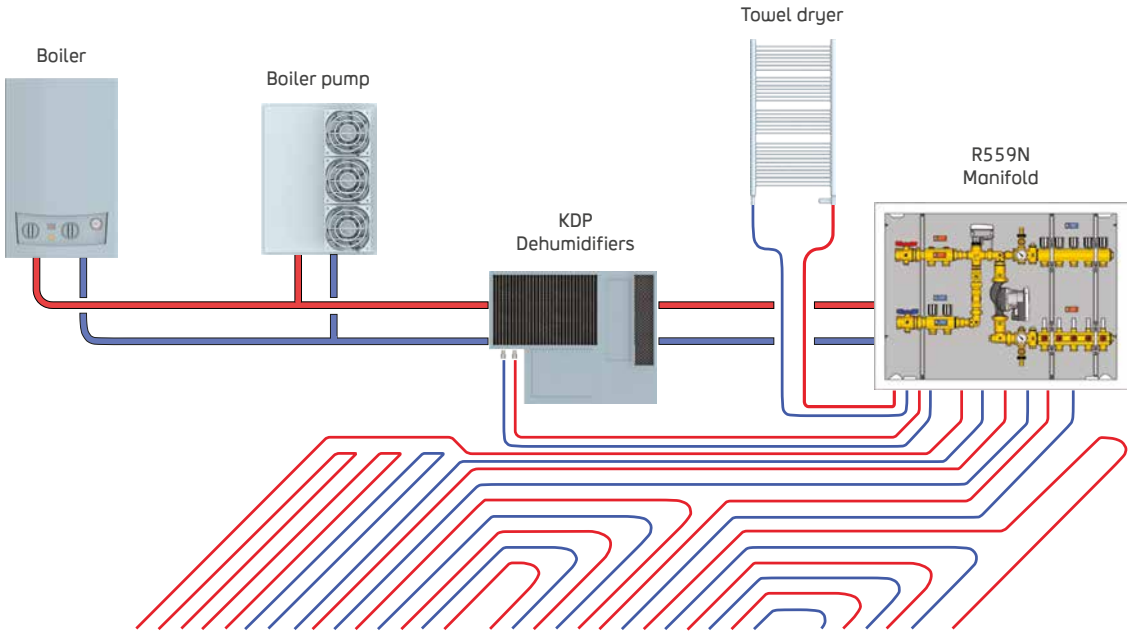
R559N manifolds are used for **heating and cooling** control of combined systems, that is when high-temperature heating units (heated towel rails or radiators) are installed with low-temperature components (fan coils and dehumidifiers for dehumidification and cooling integration) and radiant panel circuits working with appropriately mixed water.

The distribution manifolds of the preassembled group have 4-12 outputs for mixed water circuits, while the non-mixed water circuits (direct outputs) are sold separately. The optional metering kit (1" delivery and return with filter, zone valve and metering unit spacer) can be used with centralized systems. The circulator is self-modulating and complies with the ErP 2009/125/CE energy saving directive. The Giacomini Klimabus thermoregulation system controls the temperature electronically through the K281 motor. The group is completed by interception vales, drain taps, air vent valves and delivery and return thermometers.

FLOW DIAGRAM



CONNECTION EXAMPLE



R557R-2 MIXING AND DISTRIBUTION MANIFOLD

WHY R557R-2?

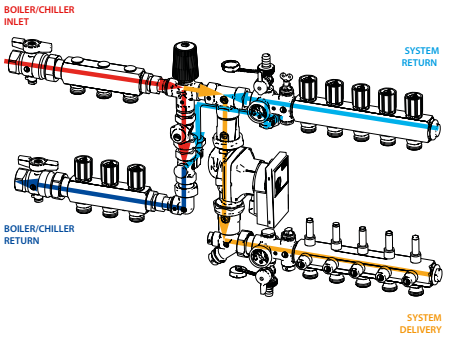
- preassembled
- easy to install
- equipped with self-modulating circulator
- possibility to add manifolds for non-mixed water circuits
- cabinet with reduced dimensions and depth

R557R-2 manifolds are fixed-point regulation mixing groups. They are generally used with radiant floor circuits for **heating only**.

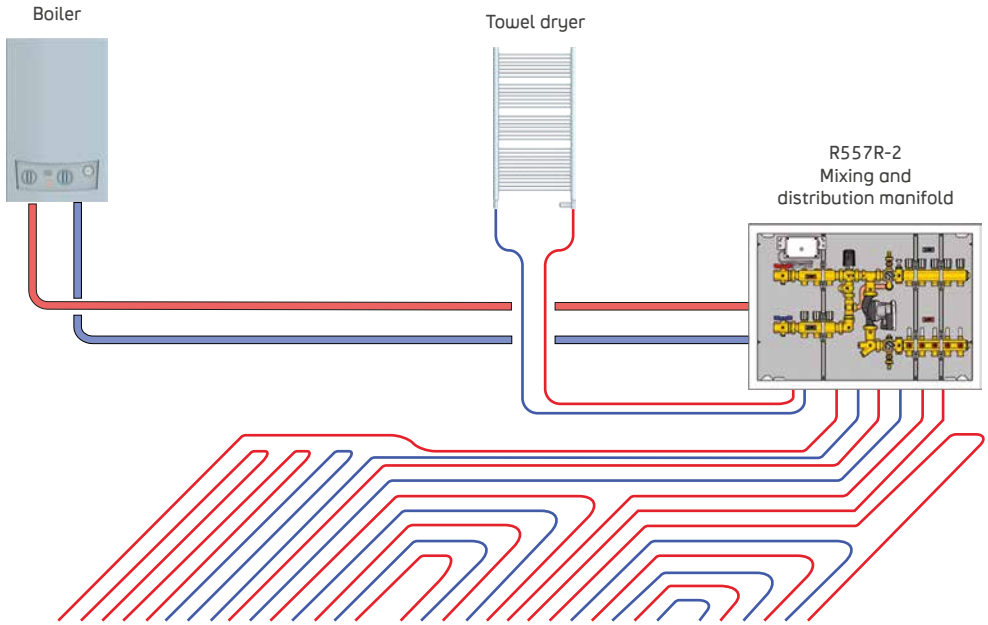
A 3-ways valve equipped with a limiting thermostatic head regulates the temperature of the radiant system delivery water.

This model can be installed with a mixed system and special kits available separately, thus enabling to combine high-temperature heating units (towel heated rails or radiators) with radiant panel circuits working with low-temperature water. Optional accessories also include metering kits (1" delivery and return with filter, zone valve and metering unit spacer) for centralized heating systems. The group is already preassembled and pre-wired in the cabinet for a quick and easy installation and it includes a variable flow circulator, complying with the ErP 2009/125/CE energy saving directive, and the K373 safety thermostat.

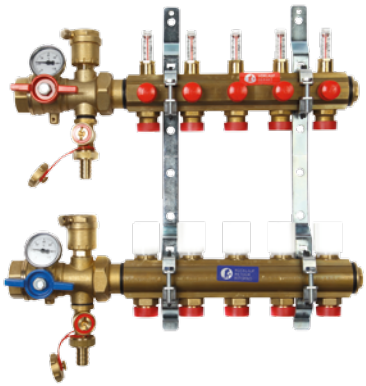
FLOW DIAGRAM

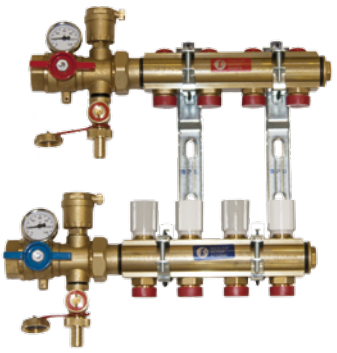


CONNECTION EXAMPLE



BASIC DISTRIBUTION MANIFOLDS





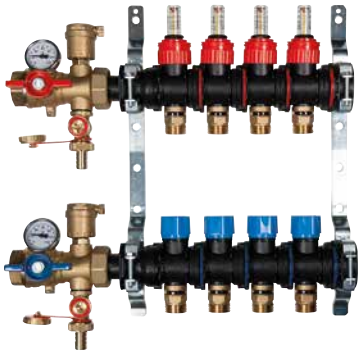
R553FK AND R553DK BRASS MANIFOLDS

The perfect solution for water **distribution** within radiant conditioning systems: the group, preassembled on brackets or clamps, includes a delivery manifold equipped with balancing lockshield valves, flow meters (only R553FK) and a return manifold with interception valves on which electrothermal actuators can be installed.

It also includes the convenient R269T multifunction valves for water flow interception, temperature display, system filling/discharge or air venting.

WHY R553FK AND R553DK?

- complete preassembled kit
- easy to install
- R269T multifunction valve included
- equipped with flow meters (R553FK)
- insulation set (optional)



TECHNOPOLYMER R553FP

Technopolymer manifold for water **distribution** in radiant conditioning systems. **Ideal for cooling** as its plastic material ensures an excellent insulation performance and does not require additional insulation of the manifold.

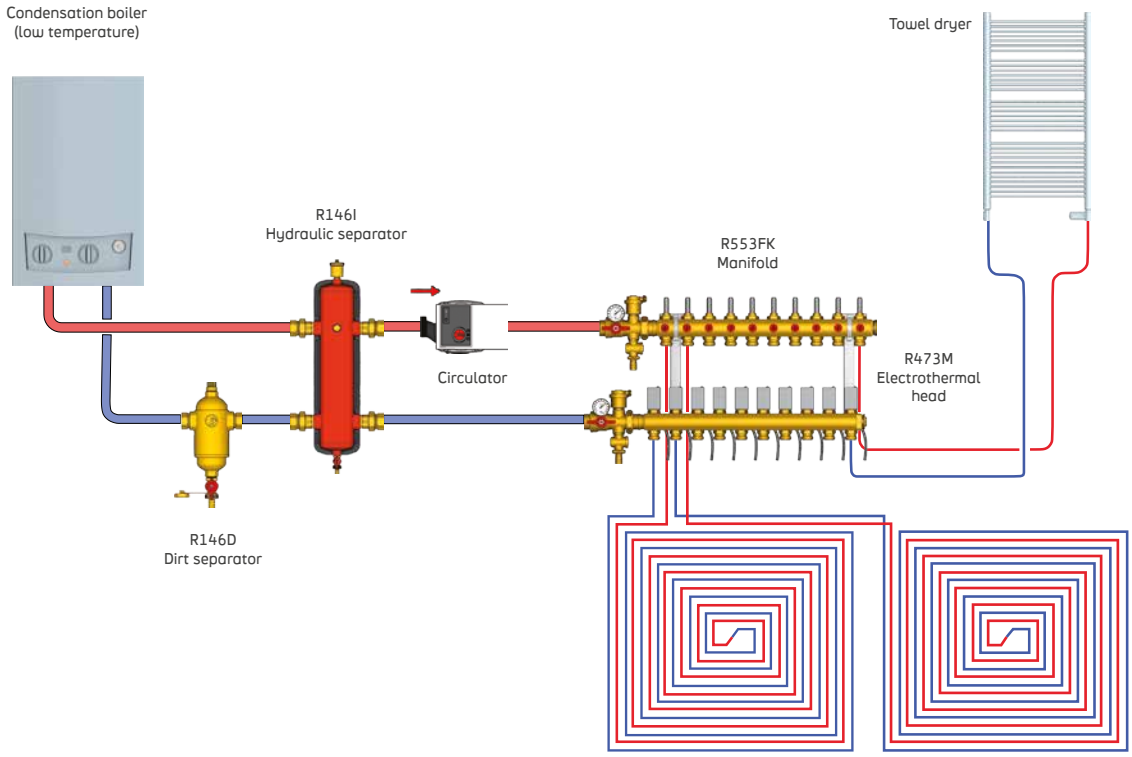
It includes a delivery manifold with balancing lockshield valves, flow meters and a return manifold with interception valves where electrothermal actuators can be installed.

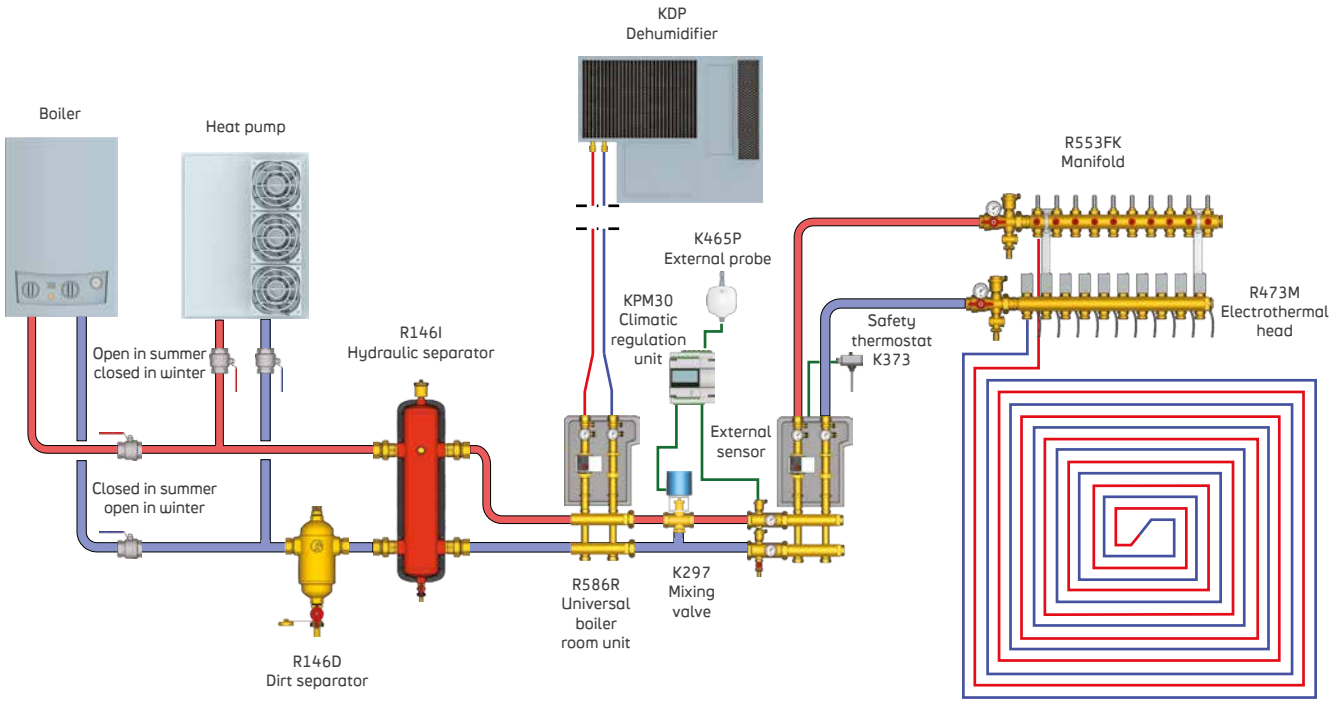
Its modular configuration enables to add or remove the modules (outlets). Plumbing seal is guaranteed by special o-rings while appropriate plastic clips ensure mechanic fitting. It also includes the convenient R269T multifunction valves for water flow, temperature display, system filling/discharge or air venting.

WHY TECHNOPOLYMER R553FP?

- complete preassembled kit
- easy to install
- R269T multifunction valve included
- equipped with flow meters
- possibility to add or remove the modules (outlets)
- not co-molded brass threads
- ideal for cooling (insulation-free)

BASIC DISTRIBUTION MANIFOLD DIAGRAM





R53 SERIES MODULAR MANIFOLDS

WHY R53 MODULAR MANIFOLDS?

- extremely easy to install
- reduced workforce
- versatility
- wide range of models (with manual valve, lockshield valve, flow meter and lockshield valve)
- few codes to manage

Quick-fit modular manifolds represent an extremely versatile solution for rapid installation with a number of outputs varying based on the worksite requirements.

Installation does not require tools or additional sealing devices as they already include highly reliable seal rings.

The single modules can be quickly fitted by positioning them side by side with the vertical axis rotated by 90° one towards the other, gently pushing them all the way in the axial direction. The two modules must then be rotated by 90° connecting the male/female ends of the bayonet fitting.

This modular solution offers an easier management both of distributors and plumbers' warehouses, thus reducing the economic commitment required for the entire range: just two codes (terminal pair and intermediate module) to assemble manifolds with two or more outlets. In fact, a distribution manifold requires a pair of R53MT/ST/VT terminals and R53MM/SM/VM modules according to the number of circuits.

1. place the R53M/S/V modules side by side with a vertical axis rotated by 90° one towards the other and lightly push all the way in the axial direction

2. to finish the distribution manifold and connect it to the accessories use a pair of R53MT/ST/VT terminals with 1" or 1 1/4" threads

3. the protection cap of the balancing lockshield valve is on the front of the modules

4. balance the circuits with a R558 wrench

MANIFOLD ACCESSORIES

R269T multifunction valves

Designed for installation on the bottom of the distribution manifold, they integrate the following functions:

- interception ball valves with red and blue handle
- automatic air release device equipped with self-sealing interception valve
- filling/discharge tap
- contact thermometer
- inlet for immersion temperature probe

They can be easily and reversibly installed at the manifold inlet with fluid adduction both from left and right.

R259D ball valves

To ensure interception of manifold delivery and return water

- female with tail piece
- red or blue T handle
- temperature range: - 20÷185 °C
- max. working temperature 20 °C with water: 42 bar (3/4") and 35 bar (for larger dimensions).

R554D manifold intermediate fitting

The perfect accessory for basic distribution manifolds

- automatic air relief device
- system filling/discharge tap
- 0÷80 °C thermometer
- self-sealing fitting.

R179 / R179AM / R179E adaptors

For piping-manifold connection

- for plastic or multilayer piping
- for plumbing systems equipped with EN681-1 complying black o-rings
- temperature range 5÷110 °C
- max. working pressure: 10 bar.

R500-2 manifold concealed metal cabinet

For proper wall concealed installation of distribution manifolds

- adjustable depth and height
- plastering metal mesh
- easy to assemble on site
- extremely reduced packing thickness.

Temperature gauge R540

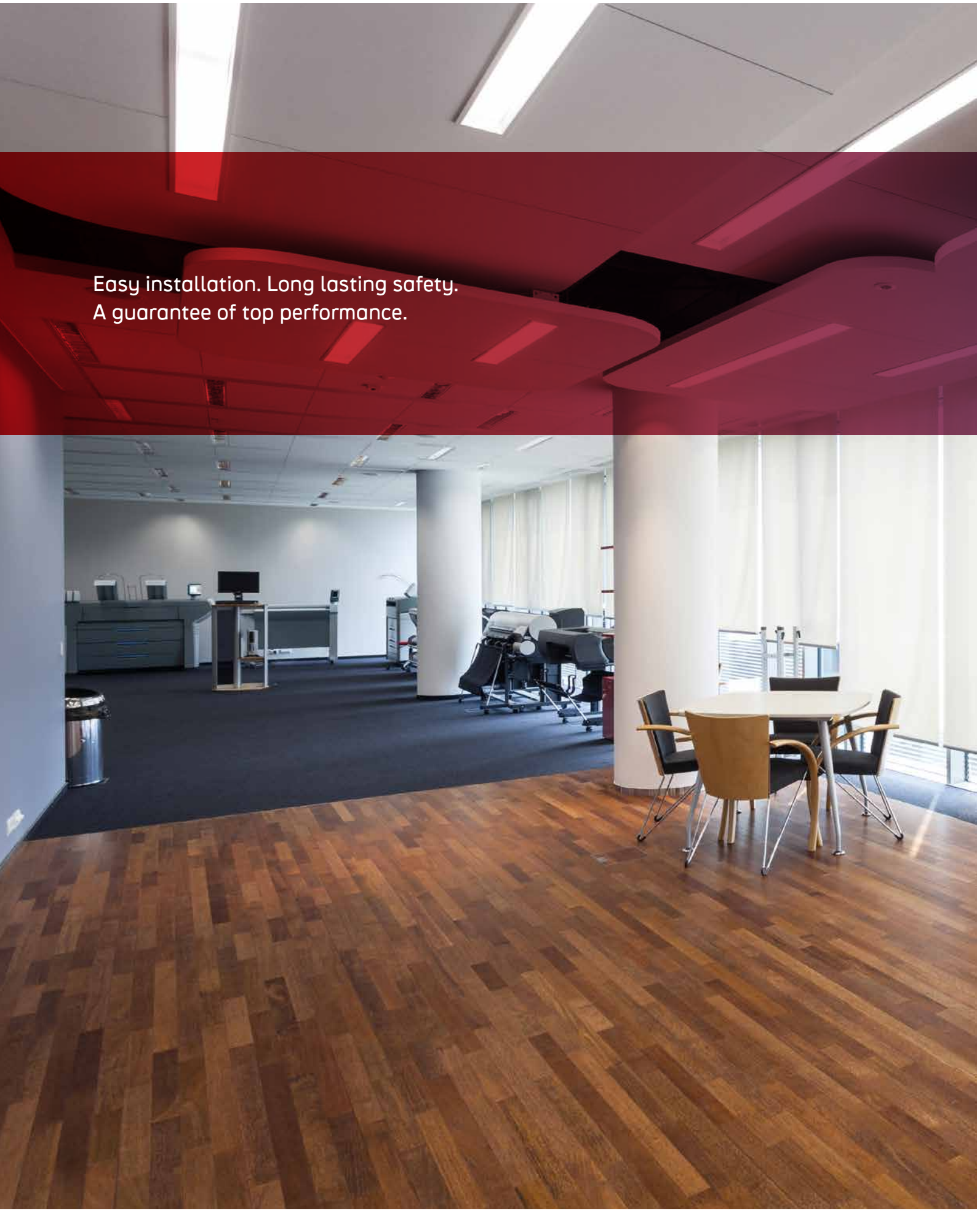
To keep radiant circuits delivery and return temperatures under control

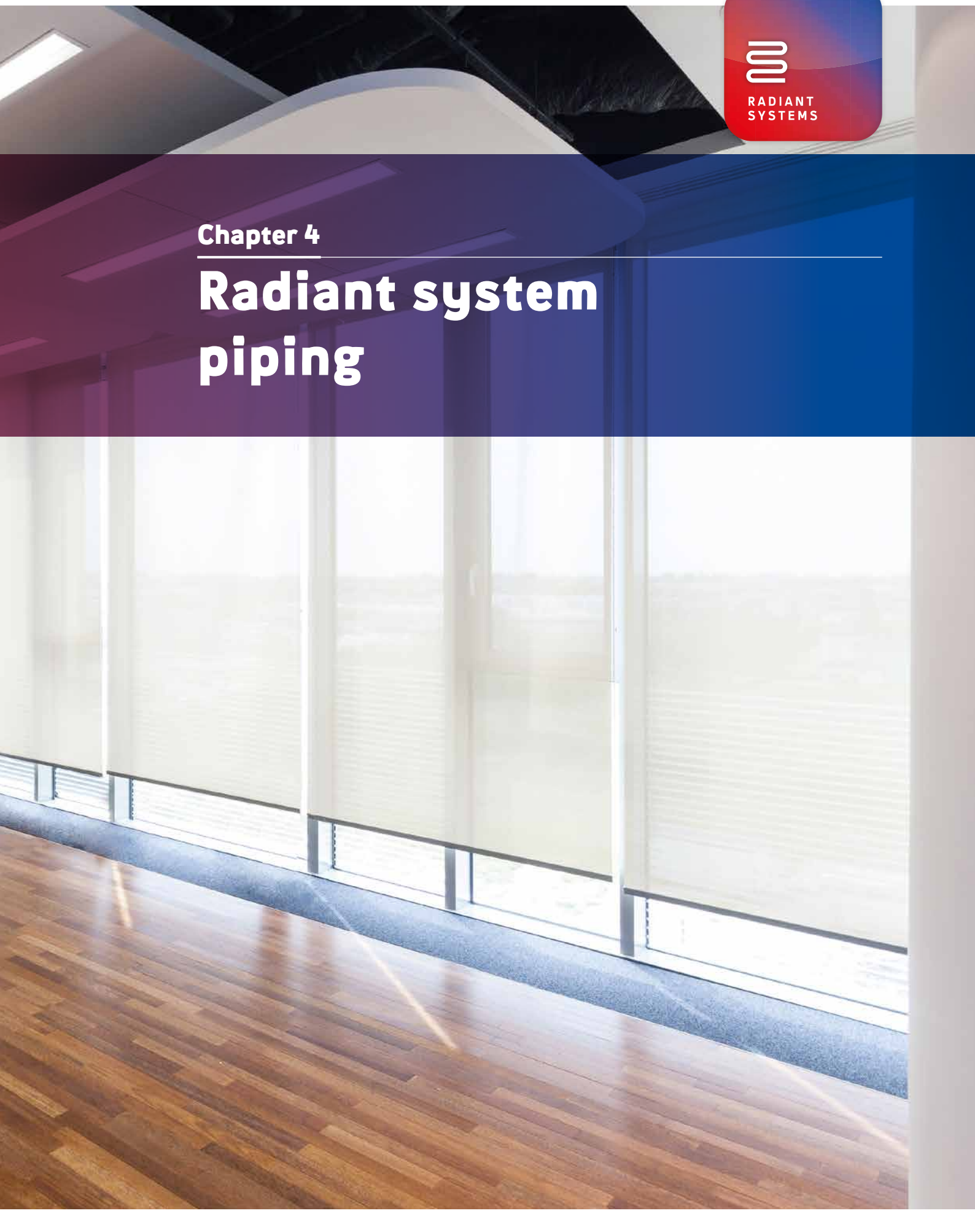
- housing
- rear fitting
- temperature range 0÷80 °C or 0÷120 °C
- max. working pressure: 10 bar.

R553W insulation set

To prevent manifold dispersions and localized moisture in cooling systems

- for bar and/or modular manifolds
- for R259D ball valves and/or R269T multifunction
- for R554D intermediate connection.


Easy installation. Long lasting safety.
A guarantee of top performance.



RADIANT SYSTEMS

Chapter 4

Radiant system piping

PLASTIC PIPING

The pipes through which the thermo-conductor fluid flows play a key role in radiant floor systems.

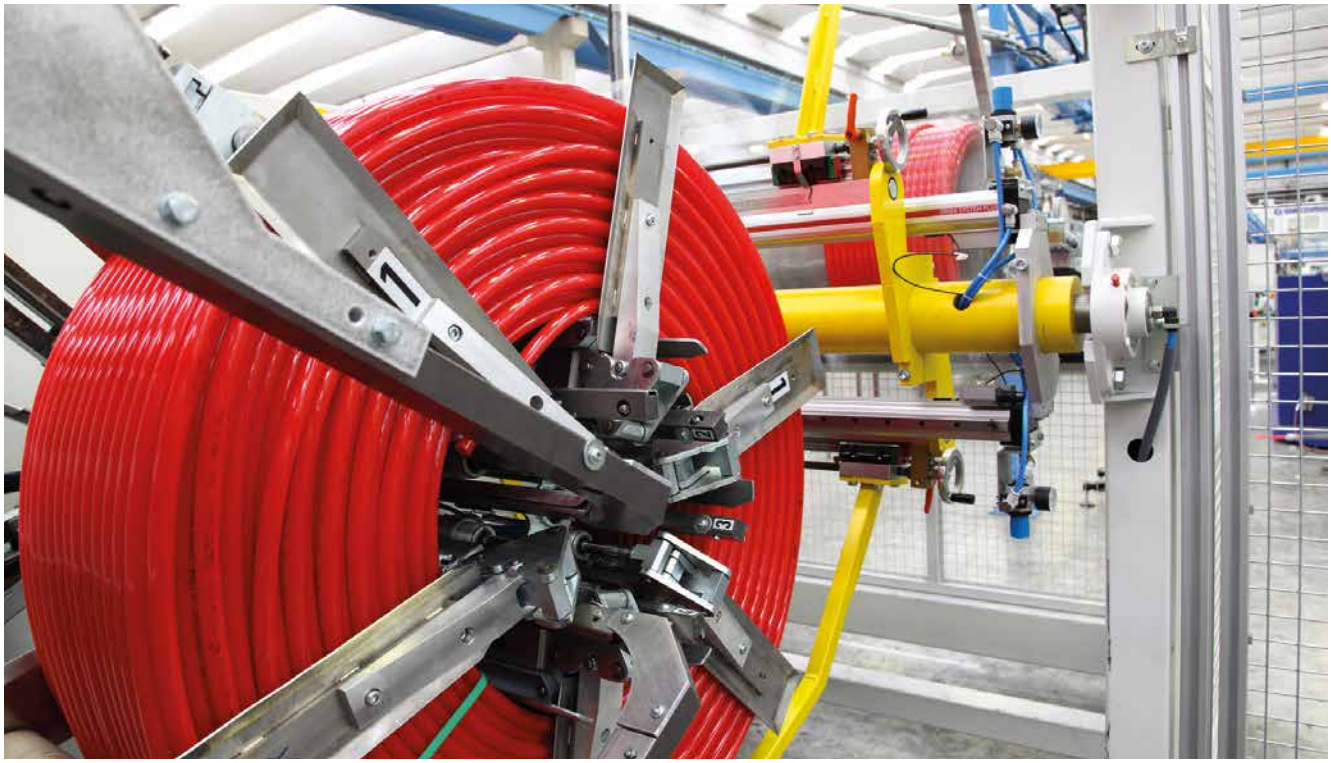
From a strictly physical-technical standpoint, it would be advisable to use highly conductive materials such as copper or steel, considering their importance in thermal exchange for the transmission of radiant power to the ambient. However, **the radiant market favors plastic pipes** for modern engineering installations as they provide much more advantageous benefits notwithstanding their low conductivity coefficient.

What are the benefits deriving from the chemical-physical properties of plastic pipes?

- high and long lasting reliability, that is mechanic resistance to temperature and pressure stress
- no corrosion, a phenomenon typical of metals (the piping is drowned in the floor, a characteristic definitely beneficial)
- great versatility of installation: the flexible pipes enable the installer to easily create spiral and coil radiant circuits
- reduced cost, as the production capacity of modern installations is constantly growing.

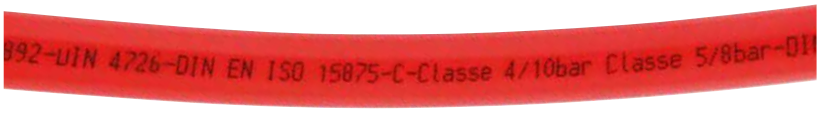
The radiant piping range by Giacomini includes:

- PEX Cross-Linked Polyethylene
- PE-RT Polyethylene of raised temperature resistance
- PB Polybutylene
- PEX /Al /PEX Multilayer



Production is carried out at Giacomini's factories by means of last generation extruders, which starting from the pellet base polymer, create the pipes in line up to winding in coils. The pictures below show some steps of the extrusion process.

Every production step is carried out in compliance with the provisions in force and technically tested according to regulation standards.



EN-ISO 15875 is the regulation of reference for hot and cold water plastic pipes. It identifies pipes in "Classes of Application".

application field	class (marked on the pipe with its max. working pressure)	REPRESENTATION ICON
hot domestic water (60 °C)	1	
hot domestic water (70 °C)	2	
heating floors and low temperature radiators	4	
high temperature heating radiators	5	

fig. 4.1

All Giacomini pipes for radiant applications belong to Class 4 and are manufactured to **guarantee 50 years of constant operation** with a 4 bar working pressure according to the conditions defined by the "regression curve" of the table shown in figure 4.2.

application class	typical application field	project temp T_D [°C]	operation time (years) at T_D temperature	T_{max} [°C]	working life (years) at T_{max} [°C] temperature	T_{mal} [°C]	working life (hours) at T_{mal} [°C] temperature
4	heating floor and low-temperature radiator	20	2,5	70	2,5	100	100
		followed by					
		40	20				
		followed by					
		60	25				
		floowed by - next column		floowed by - next column			
5	high-temp radiator	20	14	90	1	100	100
		followed by					
		60	25				
		followed by					
		80	10				
		floowed by - next column		floowed by - next column			

NOTE: With reference to class 4 applications, the temperature profile provides for 20 °C for 2.5 years, followed by 40 °C for 20 years, 60 °C for 25 years, 70 °C for 2.5 years and 100 °C for 1000 hours.

T_D [°C] Water temperature (or set of temperatures) based on which the system has been designed
T_{max} [°C] The highest project temperature achievable only for short times
T_{mal} [°C] The highest project temperature achievable in case of malfunctioning of the control systems

fig. 4.2

So far we have described the positive characteristics that make plastic piping the best choice for radiant floor applications, but there is also a potentially problematic aspect: **oxygen permeability**. Oxygen may penetrate the circuits. For this reason, the water enriched with oxygen may corrode the metal parts of the entire thermal system (including the generator), forming ferrous deposits and micro algae which in time would lead to malfunctions and decrease the overall output.

This can be prevented during the extrusion phase by applying an **EVOH resin film working as barrier** (in an intermediate or terminal position) on the pipe. The reduced quantity of oxygen permeating the pipe will be then negligible.

R996T PEX PIPE

WHY CHOOSE R996T?

- highly flexible
- easy and quick installation

R996T FEATURES

PEX pipes are no doubt the most commonly used in radiant systems. The cohesion level between the molecules of the base polymer used for its production, **the PE polyethylene**, cannot guarantee sufficient performances in terms of resistance and duration: for this reason, the **cross-linking process** adding chemical-molecular bonds to the existing ones to enhance mechanical and temperature resistance plays a key role.

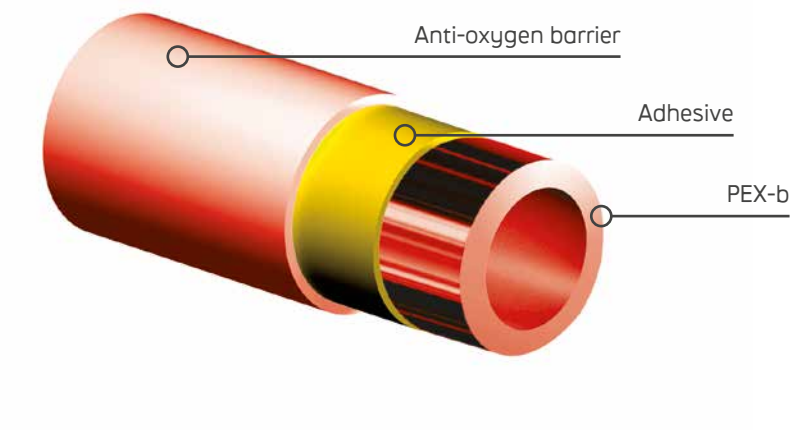
There are two methods to carry out this reinforcement process: chemical or physical.

In the first case, the cross-linking process takes place along with extrusion by means of chemical additives. In the second, on the contrary, the manufactured pipe is bombarded with electron beams.

There are different PEX types according to the cross-linking process used:

- **PEX-a**: chemical cross-linking by means of catalysts known as peroxide which cross link the pipe permanently during extrusion
- **PEX-b**: chemical cross-linking by means of catalysts known as silanes. In this case though the cross-linking process is accelerated after extrusion by submerging the product in water at steady temperature or in steam
- **PEX-c**: physical cross-linking by means of electron bombarding.

It must be pointed out that the quality of a pipe does not depend on the cross-linking method but on many other factors such as: base compound formulation, type of extrusion machines, accuracy of production quality control and subsequent verifications and lab tests on the final product.



The only regulation of reference for the production of PEX pipes (EN-ISO 15875) specifies the physical and dimensional features of the product along with the minimum cross-linking degree to guarantee an adequate resistance to temperature and pressure: for PEX, 65% is enough.

Giacomini manufactures directly its polyethylene pipes by cross-linking them with the silane chemical method.

PEX-b Pipes of the R996T series feature a high thermal resistance along with a very contained **extremely flexible** elastic module. This provides for quick and easy installation and consistent reduction of tensions even after installation.

R996T pipes are extruded with an external anti-oxygen barrier in EVOH complying with EN ISO 15875 e DIN 4726, to eliminate the permeability to oxygen.

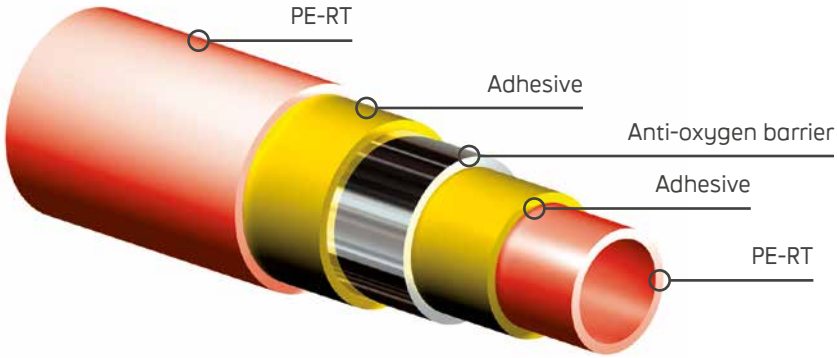
TECHNICAL DATA

field of use	class 4 and class 5 (EN ISO 15875)
density [g/cm^3]	0,939
thermal conductivity [W/(m K)]	0,38
thermal expansion coefficient [1/K]	(1,9 x 10^{-4})
ultimate tensile strength [MPa]	31
breaking extension point %	520
elasticity module 23 °C [MPa]	540

PE-RT **R978** PIPE

PE-RT pipes from the R978 series, made with **polyethylene with enhanced thermal resistance**, differs from cross-linked polyethylene PEX right from its raw material: the basic compound used for PE-RT is specific for this production. On a molecular level, it is a polyethylene polymeric chain containing also a very small percentage of the **1-octene molecule**, which confers an enhanced temperature compared to classic polyethylene. In this way the extruded pipe requires no additional molecular reinforcement.

The level of resistance to the "pressure/temperature" stress of a PE-RT pipe makes this product suitable for mixed water distribution within floor radiant systems.

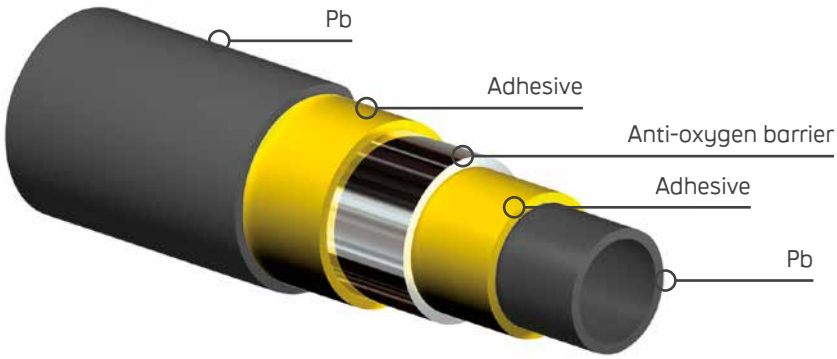


R986-1 POLIBUTYLENE PIPE

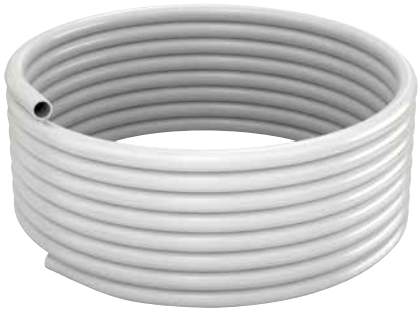
Polybutylene Pb is produced starting from the 1-butene monomer by performing a chemical polymerization assisted by specific catalysts: this enables to obtain regular crystal molecular structures with high mechanical features.

It stands out for its high flexibility offering great advantages in terms of functionality and quickness of installation.

Used for hot and cold water distribution in radiant panel cooling and heating systems.



R999 PEX-AL-PEX MULTILAYER PIPE



The **PEX /Al /PEX metal-plastic multi-layer pipe** includes two layers, inner and outer, of PEX-b and one intermediate layer of aluminium longitudinally welded with laser technology. The special intermediate glue layers evenly connect the aluminium layer to the inner and outer PEX-b.

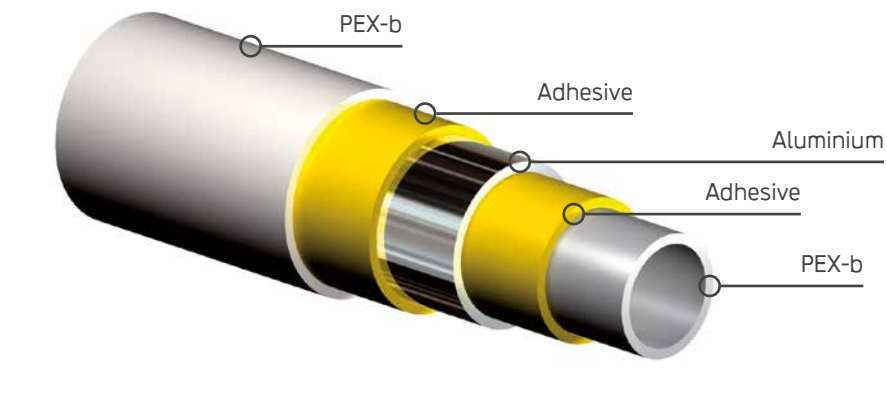
It combines the mechanical features of steel pipes with excellent resistance to wear and tear and possible electrochemical interaction typical of plastic piping.

The intermediate **aluminium layer butt welded with laser technology** offers a safe protection barrier against oxygen and other gases, as well as conferring great flexibility for bending with a reduced angle radius while maintaining the installation shape of the circuits.

PEX /Al /PEX series R999 multi-layer pipes are widely used for cooling/heating systems – among which floor and wall installation – and domestic water distribution.

TECHNICAL DATA

max. working temperature [°C]	95
working pressure [bar]	10
thermal linear expansion coefficient at 20 °C [1/K]	$(2{,}6 \cdot 10^{-5})$
ultimate tensile strength [N/mm²]	17,6 (176 bar)
thermal conductability [W/mK]	$\lambda = 0{,}4$
internal roughness [m]	$\varepsilon = 7 \cdot 10^{-6}$
minimum bending radius without pipe bender	$5 \cdot D_{est}$



Temperature control for every climate need.
Functional wellness and total convenience for enhanced thermal comfort in every season of the year.

RADIANT SYSTEMS

Chapter 5

Evolved climate regulation

EVOLVED CLIMATE REGULATION

MANAGEMENT OF INDOOR COMFORT

In order to enjoy the desired benefits offered by a radiant floor, also with heating only, users must manage multiple devices playing a key role in complex systems. These schematically include:

- **heating and cooling terminals**: the radiant floor – possibly integrated with a radiant wall and towel heated rails in the bathrooms – and dehumidification or controlled mechanical ventilation machines which manage the ambient thermal balance
- **hot and cold fluid production machines (generators)**: condensation boilers, heat pumps, biomass generators housed by special technical spaces
- **fluid temperature control devices**: mixing groups that enable to adjust the temperature of the fluids supplying the various devices

An evolved climate regulation should be able to properly manage indoor comfort, both in winter and summer, with a corresponding air exchange and humidity control. It can be articulated as:

- **ambient** regulation: the ambient thermostats, possibly with an integrated relative humidity probe, enable users to set the desired comfort conditions
- **boiler room** regulation: based on the user's preferences and set through the thermostat set-points, the electronic control panel – or master regulator – controls the mixing groups, activation and deactivation of the generator, centralized summer/winter commutation, air treatment. The basic functions of the installed devices can be extended.

PRIMARY REGULATION METHODS

The primary regulation technique – or **boiler room regulation** to adjust the delivery temperature – adopted for Giacomini's control systems is based on various strategies, two for heating and the other for cooling.

Heating: fixed-point regulation

This is the most basic regulation means: a constant delivery fluid temperature is guaranteed by setting the thermostatic valve manually.

However, there is a major limit: the user must adjust the system every time the external conditions change. To satisfy this requirement the thermostatic valve can be set on the project temperature (max. temperature required on the coldest winter day) and electro-thermal actuators controlled by zone thermostats should be mounted on the circuits. The thermostat can be simply connected to the circulator supplying all the other circuits if no zoning is required for the heated ambient.

The thermostat can possibly open the actuator after comparing the temperature set by the user with the actual one so as to fill the radiant circuit with hot water.

Heating: winter climate regulation

Adjustment of the heating delivery temperature is provided by a **characteristic climate curve** (fig. 5.1), based on which the heat generators are required low delivery temperatures when the external one is relatively high. On the other hand, when the external temperature gradually decreases to minimum values, the delivery temperature is increased up to the maximum value provided for by the system project. A safety thermostat prevents accidental overheating of delivery water.

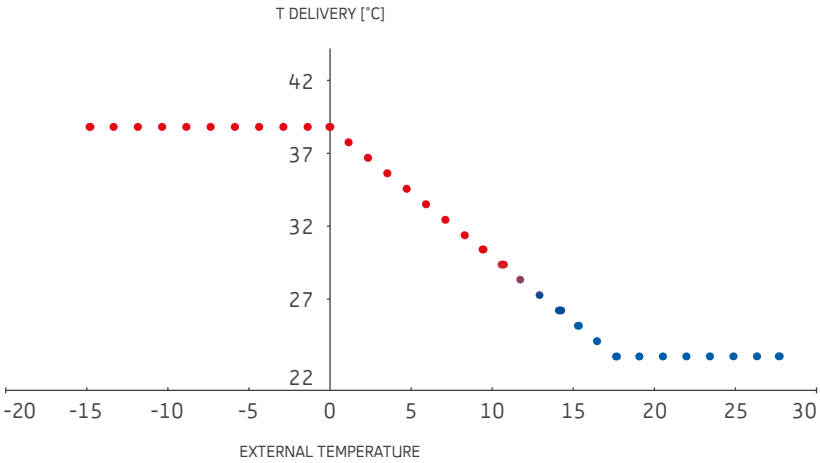


fig. 5.1

This approach is particularly important for uninterrupted functioning applications and aims at modulating thermal emissions according to the gradual increasing dispersion of the building – or apartment. This also offers the possibility to enhance the heat generator output and reduce to the minimum the dispersions of the distribution network.

Cooling: maximum output set point

When set on cooling, regulation of the delivery temperature unit searches for **the value maximizing the radiant floor refrigerating power**.

This technique requires ambient thermostats with integrated relative humidity sensors by which the user can read the dew temperature of every single ambient; the delivery temperature set-point is immediately set according to the highest dew temperature so as to maximize the system power:

$$T_m = Max\ (T_{min}, T_{dp} + F_s)$$

The delivery temperature Tm is thus selected as the maximum value of two: the T_{min} minimum delivery temperature set for the regulator and the highest dew temperature T_{dp} increased by a proper safety factor F_s.

THERMOREGULATION SYSTEMS BY GIACOMINI

For radiant systems to work at their best, it is not sufficient to adjust centrally the temperature of the water delivered to the radiant circuits: this may affect the comfort or heat in vain some ambients. There are different needs according to individual perception of heat and cold, ambient destination of use, exposition or free external or internal energy. Individual thermoregulation offers a rational and convenient solution to every situation, providing the most suitable temperature in every ambient or zone by combining comfort and energy saving to the best.

The wide range of thermostats and thermoregulation units by Giacomini can satisfy every installation need, from basic up to the most refined and automated systems which have become by now essential in modern buildings. It includes two different technological classes:

- the **stand alone** series, including thermostats, chronothermostats and chronothermohumidistats able to work autonomously from the thermoregulation units
- the **klimabus** series, including blind probes and thermostats with relative humidity sensors part of a logic, smart and articulated system culminating with the master thermoregulation unit. This type of device is able to express the maximum potential of radiant floors.

The stand alone series

The most characteristic aspect of stand alone thermoregulation systems is the interfacing between primary – inside the heating plant – and secondary regulation inside the ambient; this is achieved through a basic exchange of a clean contact. This is clearly shown by the diagrams of fig. 5.2 and 5.3.

The strategy provides for separating thermoregulation from the boiler room unit. The ambient is equipped with a chronothermohumidistat which provides for master functions and activates the dehumidifier in addition to regulating the temperature of the interested zone; other thermostats manage the temperature of the corresponding zones. Should the system be installed in an apartment with a heat metering module, the master chronothermohumidistat could also turn ON/OFF the zone valve installed in the metering module itself. The thermoregulation unit turns ON/OFF the circulator and controls the mixing valve serving the radiant system.

Its simplicity represents the true value of this thermoregulation technique: the fewest number of devices controls a complex installation successfully. However, this approach prevents the radiant floor from expressing its maximum power when set on cooling.

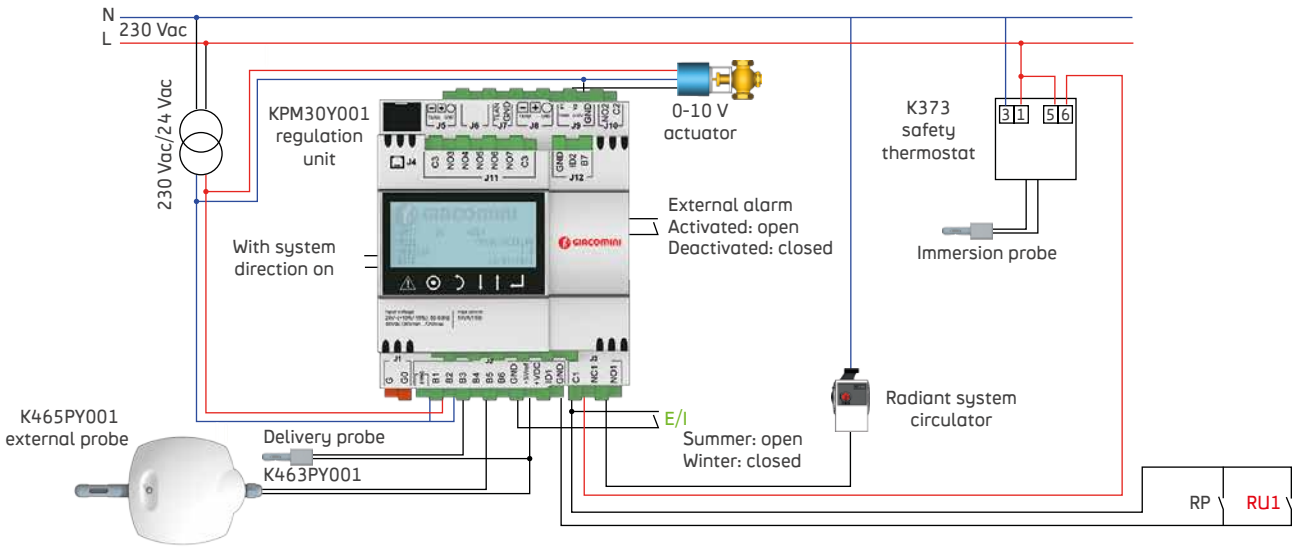


fig. 5.2 Stand alone thermoregulation: control of mixing valve

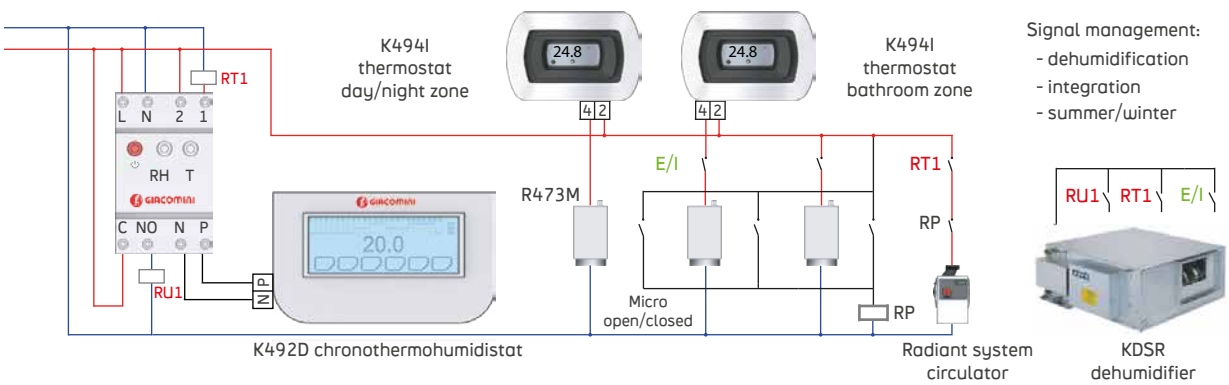


fig. 5.3 Stand alone thermoregulation: control of the radiant floor and dehumidifier

The klimabus series

A field bus-based thermoregulation system enabling to achieve the highest results in terms of efficiency and comfort. The devices of this series can share information as they are wired one to the other – i.e. the **bus – to transfer appropriately encoded messages**. Communication between the connected devices is possible thanks to their addressing.

The basic scheme of reference to better understand their potential is shown in fig. 5.4.

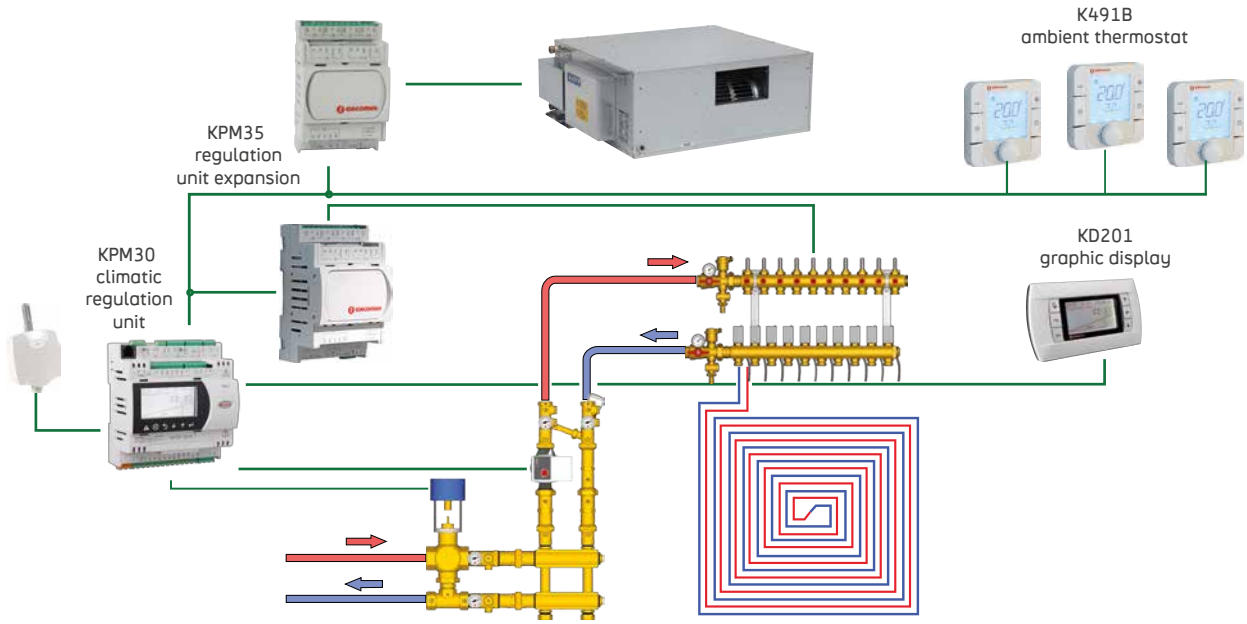


fig. 5.4

The KPM30 unit acts as master and exchanges information with the zone thermostats (up to three with the KPM30Y003 basic version) through its bus. KPM30Y003 provides three output clean contacts to activate the actuators corresponding to each zone; it also exposes clean contacts for activation of the dehumidification feature, to integrate the dehumidifier or a possible fan coil. And there is more: the operational set-point can be controlled or modified through the integrated display and chronoprograms can be defined and associated to each circuit. The KPM31 display-free control units can use a graphic terminal as programming interface.

Management of the boiler room unit is extremely rational: by interrogating the ambient thermoregulation unit the thermostats are able to activate the mixing valve and the radiant floor circulator. The thermoregulation unit reads the dew temperature for each of the three zones through the field bus. According to these values it can adjust the temperature set-point of the water to be delivered to the radiant floor so as to maximize the output refrigerating power while preventing the formation of moisture.

With four or more zones to be controlled, the field bus must be extended: each KPM30Y004 thermoregulation unit – controlling only one mixing valve - or KPM30Y005 – controlling two – can manage up to 16 thermostats and 7 dehumidification machines. The special KPM35 expansion models are designed to control the more extended systems.

This approach requires an expansion module for each pair of thermostats to control the actuators based on a temperature signal, while other expansion modules are dedicated exclusively to management of the dehumidifiers (or fan coils, when applicable) based on one or more humidity signals, according to the installation set up.

The **klimabus** flexibility and potential becomes even greater when adding special cards to the regulation modules that make it **easily integrable with other communication protocols**: thermoregulation can then become part of a more extended domotic installation thus enabling the user to control the system via web.

KLIMABUS BENEFITS

EXTENDABILITY

The system modularity enables to correctly dimension the installation and easily extend it according to the client's actual needs.

VERSATILITY

The system can be configured for different regulation methods (fixed-point or climate compensation), thus efficiently satisfying the requirements of the most varied types of buildings.

SAFETY

The extended availability of data and possibility to interface the bus system on site or remotely offers new opportunities to enhance its functioning, maintenance and management of events and alarms.

COMMUNICATION

Every device can communicate on the bus and this enables to set up centralized functions. In addition, the final user, service engineer or owner can display more information.

COMFORT AND ENERGY SAVING

The "smarter" devices enhance the level of ambient comfort and control it individually so as to enjoy every energy saving opportunity.

KPM30 / KPM31
CLIMATE THERMOREGULATION UNIT

WHY KPM30 / KPM31?

- easy to program
- wide range of versions
- expandable
- configuration and monitoring through integrated graphic display (KPM30) or optional
- open communication protocol for domotic integrations

KPM30 CHARACTERISTICS

KPM30 thermoregulation modules and KPM35 expansion units represent the core of Giacomini's thermoregulation system. They can manage both single mixing modules, for heating and cooling, and dehumidification, sensible thermal power integration and controlled mechanic ventilation machines.

According to the models, they can be used in "stand alone" or "klimabus" systems.

KPM30 thermoregulation modules include an integrated display and six multifunction buttons by which the user can program the system parameters and their monitoring through a guided menu. The module provides for rapid connection to the ambient thermostats from the Giacomini product range and KPM35 expansions; it also automatically manages the circulator and activation of the mixing valve servocontrols. The product range includes: two "stand alone" models to manage one or two mixing valves; three models compatible with the "klimabus" protocol for integrated management – combined to the KPM35 expansion modules – of mixing valves (up to 2), ambient thermostats (1 to 16) and air treatment machines (up to 7).

KPM31 CHARACTERISTICS

The KPM31 thermoregulation module features the same characteristics of KPM30 but has no integrated graphic display: it must therefore be installed with the KD201 remote graphic terminal (optional accessory for KPM30).

ACCESSORIES

KPM35
expansion module

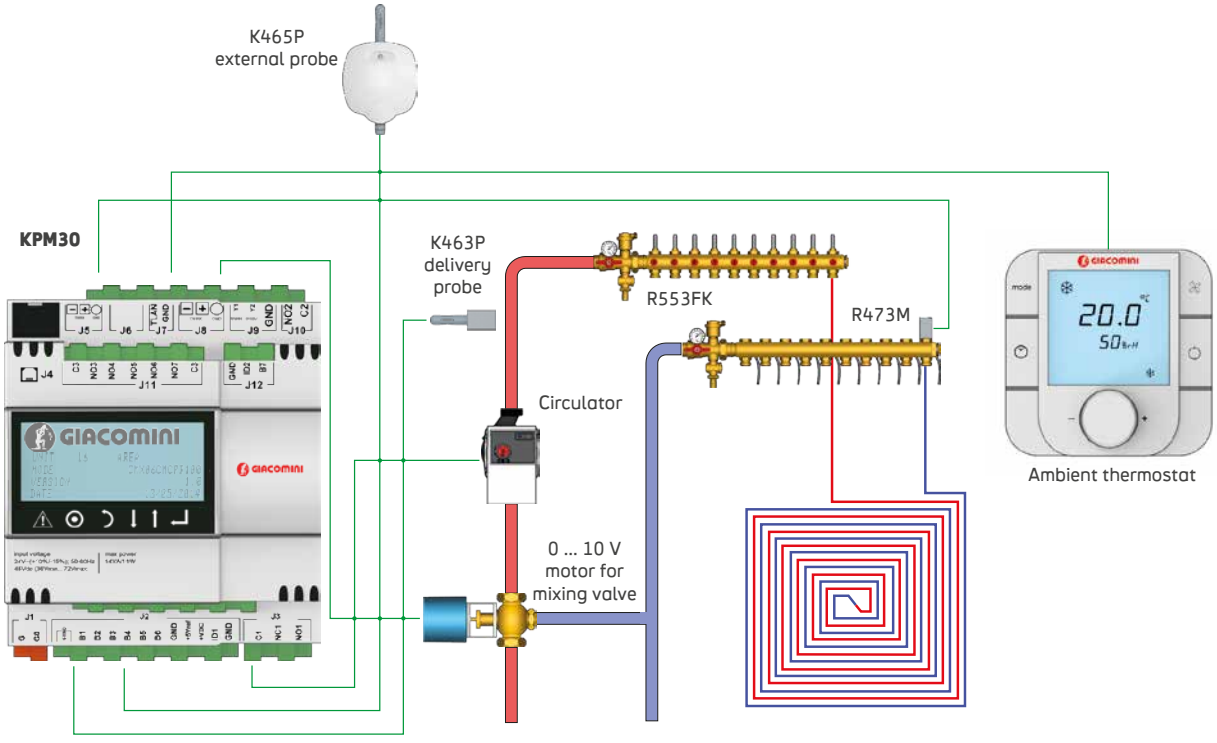
KD201
graphic terminal

K465P
external probe
K463P
delivery probe

KPM36
interfacing card for domotic systems

product code	technology	n. of mixing valves	n. of ambient thermostats	n. of air machines
KPM30Y001 KPM31Y001	stand alone	1	-	-
KPM30Y002 KPM31Y002	stand alone	2	-	-
KPM30Y003 KPM31Y003	klimabus	1	1÷3	1
KPM30Y004 KPM31Y004	klimabus	1	1÷16 (with KPM35)	7 (with KPM35)
KPM30Y005 KPM31Y005	klimabus	2	1÷16 (with KPM35)	7 (with KPM35)

CONNECTION EXAMPLE



R586P MIXING GROUP

WHY R586P?

- complete preassembled solution
- wide range of solutions (Kv mixing valves)
- easy to assemble

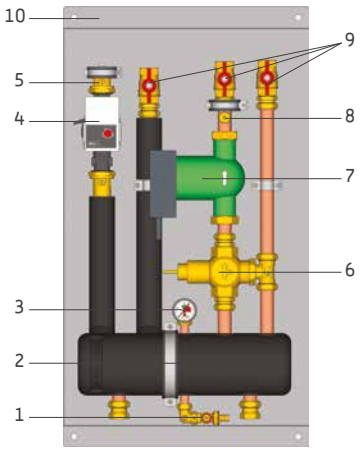
R586P mixing groups control the delivery temperature of radiant systems based on indications provided by the primary regulation devices. In addition to the mixed zone, they offer a direct non-mixed outlet thus becoming the perfect solution for radiant installations requiring an integration of high-temperature radiators in winter or low-temperature fan coils in summer.

The electronic regulation unit, sold separately, activates both heating and cooling regimes.

The available versions are all equipped with self-modulating circulators complying with the ErP 2009/125/CE directive and include motorized mixers to manage a wide range of flows.

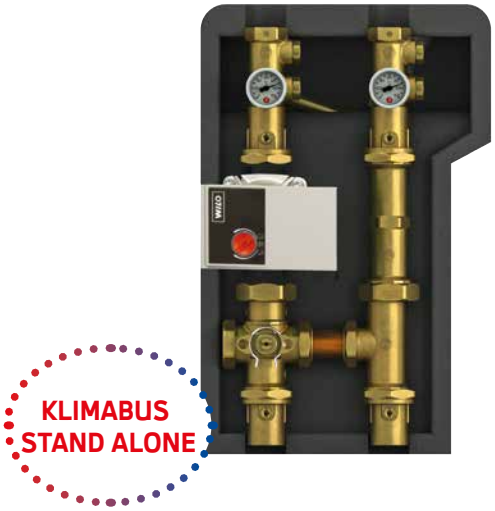
	R586PY014	R586PY015	R586PY016
primary fitting [" F]	3/4	1	1
primary flow range [m³/h]	1 ÷ 3	2 ÷ 4	2 ÷ 5
mixing DN / Kv	DN20 / Kv 5	DN25 / Kv 10	DN32 / Kv 16
fitting mixed flow range [m³/h]	0,6 ÷ 1,6	1.6 ÷ 3	3 ÷ 5
fitting non-mixed flow range [m³/h]	1 ÷ 3	1 ÷ 3	1 ÷ 3

COMPONENTS



1 Drain tap (position interchangeable with the pressure gauge)
2 Hydraulic separator
3 Pressure gauge (position interchangeable with the drain tap)
4 Direct area circulator
5 Interception valve
6 Mixing valve
7 Mixed area circulator
8 Safety thermostat probe housing
9 Interception valve
10 Template with wall-fitting holes

R586R MIXING GROUP



WHY R586R?

- complete preassembled solution
- compact dimensions
- expandable
- flexibility of use

R586R groups are preassembled modules for mixing or basic circulation which can be combined to control the various system zones: with a mixing delivery or non mixed direct temperature.

Highly flexible, they can be assembled in parallel to the R146IR hydraulic separator (fig. 6.5) to create, for example, a mixed zone and one with direct connection. They can also work as re-launching groups – combined to the special R586I modular fitting group – for multiple mixed zones deriving from the same K297R mixing group, positioned on the bottom (fig. 6.6).

As for R586P groups, they can be combined to an electronic thermoregulation unit – sold separately – for activation both with heating and cooling. The model equipped with fixed-point mixing through thermostatic actuator is available for heating only.

To enjoy maximum energy efficiency, all available versions include self-modulating circulators complying with the ErP 2009/125/CE directive and cross-linked expanded polyethylene insulation cover.

APPLICATION EXAMPLES

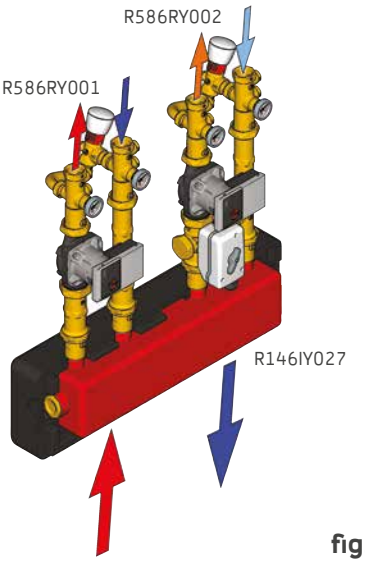


fig. 6.5

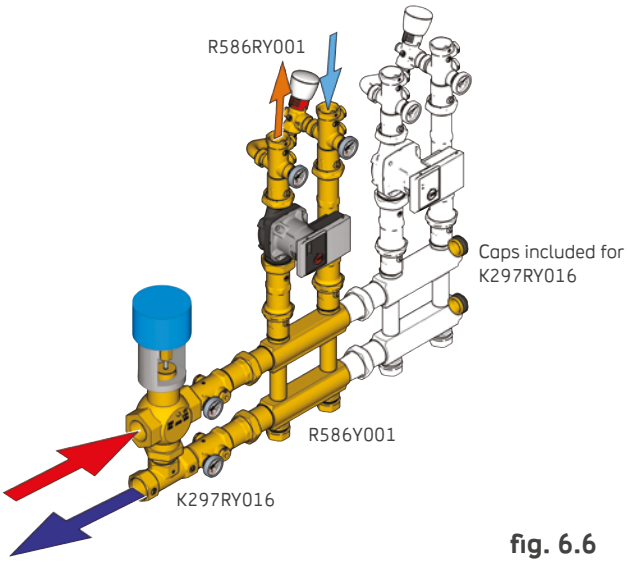


fig. 6.6

K492B AMBIENT THERMOSTAT

WHY K492B?

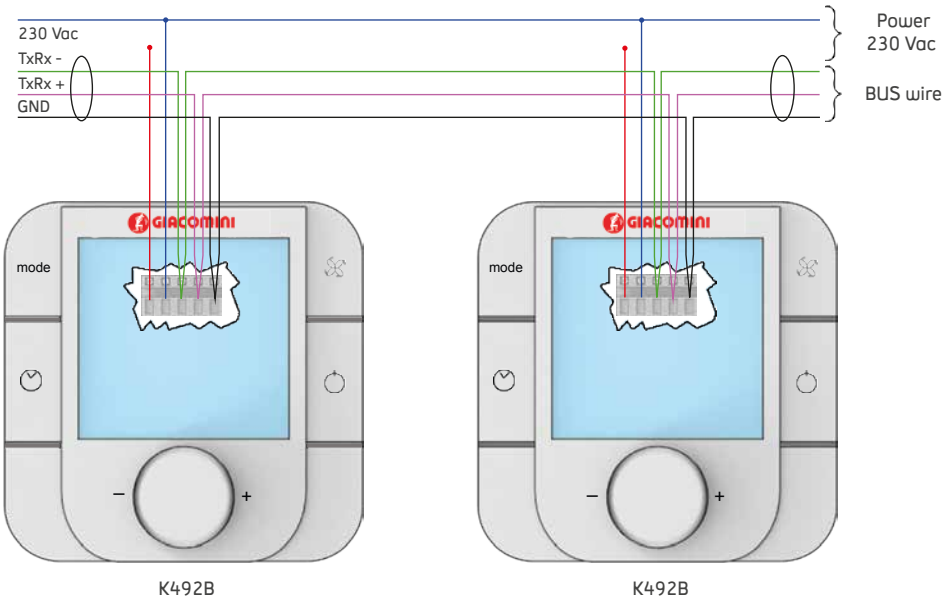
- semi-concealed product
- user-friendly display
- easy to use
- equipped with temperature and humidity sensor

The K492B thermostat enables users to control the local ambient temperature and humidity of an ambient by means of its temperature and humidity sensor. The set-point can be adjusted in an easy and intuitive way using the front knob.

It requires bus connection with the KPM30 or KPM31 regulation modules. 230 Vac power.

K492B thermostat are suitable for the main wall fitting boxes available on various international markets (type 502, 65 mm diameter and 31 mm min. depth). Their reduced dimensions and refined design make them suitable for every kind of ambient.

CONNECTION DIAGRAM



K495L AMBIENT THERMOSTAT

WHY K495L?

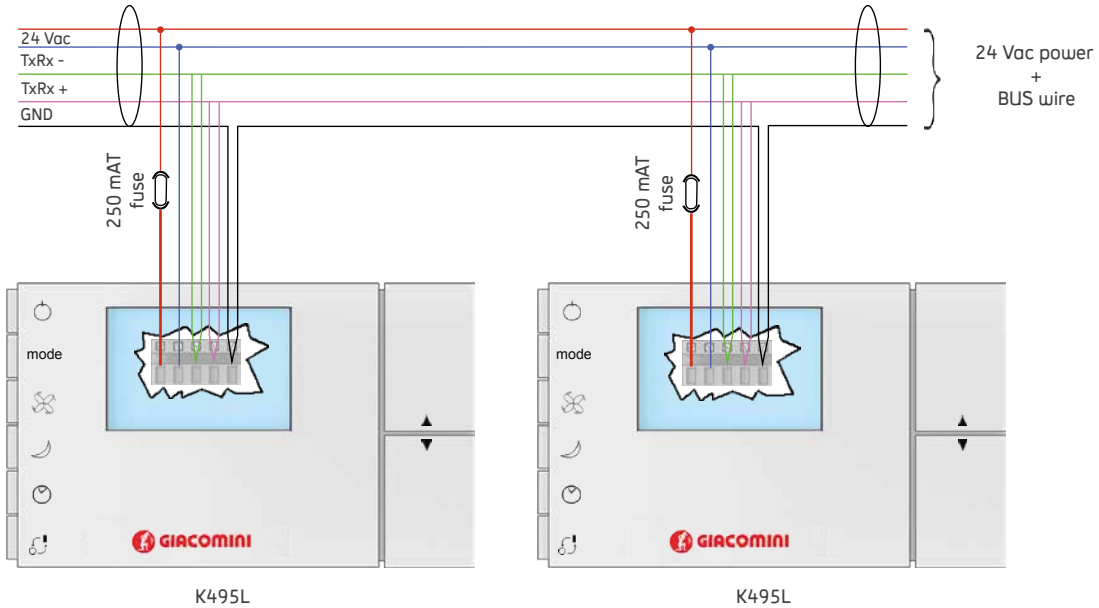
- wall mount
- user-friendly (+ / - button)
- equipped with temperature and humidity sensor

The K495L ambient thermostat with temperature and humidity sensor controls the heating and cooling systems when combined with the KPM30 or KPM31 regulation modules: the thermostat communicates ambient temperature and relative humidity to the regulation module through bus connection. 24 Vac voltage.

The K495L thermostat can be installed on an Italian standard 3-module built-in box (type 503) or mounted directly on the wall with screws and screw anchors.

The user can read and set the desired ambient temperature directly from the backlit display or centrally from the regulation module.

CONNECTION DIAGRAM



K493T AMBIENT TOUCH THERMOSTAT

WHY K493T?

- touch display
- winning design
- user-friendly
- equipped with temperature and humidity sensor

The K493T ambient thermostat with temperature and humidity sensor controls the heating and cooling systems through bus connection with the KPM30 or KPM31 regulation modules. 12 Vdc voltage. It features the same functions of K492B and K495L models, but differs for its user-friendly and winning "touch" display which makes all set-up and display operations even easier. It can be mounted on the wall or semi-concealed on a standard 3-module box (type 503).

K495B / K493I BLIND AMBIENT PROBES

WHY K495B / K493I?

- the perfect solution to block direct modification of the parameters (school installations, public offices, etc.)
- compatible with all concealed civil series (K493I)

K495B and K493I blind probes work as thermohumidistats for all heating and cooling applications where no local temperature/humidity set-up and display is required. All parameters can be entered or monitored through the KPM30 regulation module (or KPM31 combined to KD201 display) to which the blind probe is connected through field bus.

K373 SAFETY THERMOSTAT

The K373 device works as a limiting thermostat for overheating of radiant floor systems: in case of operational anomalies, the delivery water temperature exceeds the pre-set limit and the thermostat sends an outgoing signal (clean contact) which can be used to block the circulator. This is a safety device, provided for by the technical rule, which must function also in case of power blackout. K373 safety thermostats include an immersion probe, LEDs for visual signaling of the operational status, automatic reactivation. The intervention temperature can range between 40÷80 °C (factory set on 50 °C). Network voltage 230 Vac.

ELECTRO-THERMAL HEADS

WHY ELECTRO-THERMAL HEADS?

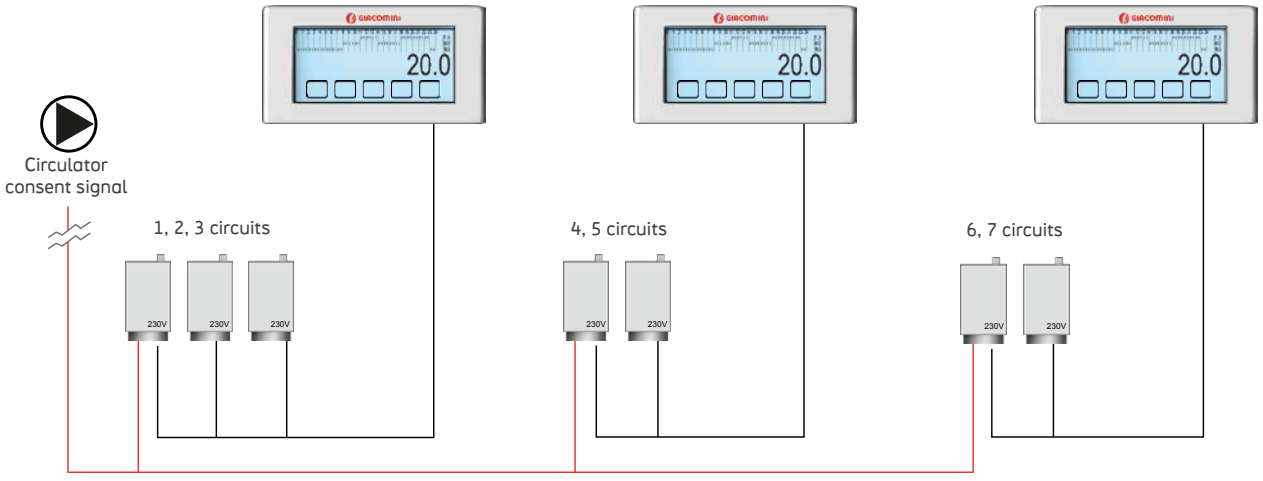
- intercepts every single circuit
- enables to control the temperature of every single ambient
- wide product range
- easy to install
- extremely quiet

The need for a state-of-the-art temperature control of single ambients is fulfilled by using electro-thermal heads – or electro-thermal actuators – installed on the distribution manifolds to intercept every single circuit. They can be fitted directly on stand alone ambient thermostats or integrated in klimabus thermoregulation systems (and are therefore controlled through the KPM30 or KPM31 thermoregulation units).

Available versions:

- usually open: they power the hydraulic circuits without voltage. These are the R478 heads (with 2-threads power wires) and R478M (with 4-threads power wires and micro-limit switch)
- usually closed: they power the hydraulic circuits when voltage in available. These are the R473 heads (with 2-threads power wires) and R473M (with 4-threads power wires, micro-limit switch).

EXAMPLE OF ELECTRO-THERMAL HEAD CONNECTION DIAGRAM



K490I AMBIENT CHRONOTHERMOSTAT

WHY K490I?

- weekly programming
- backlit LCD display
- refined aesthetics
- compatible with the most used civil series

K490I is a “stand alone” electronic digital thermostat with weekly programming to control heating and cooling systems. Available in two versions: battery-powered and electric-powered.

To be installed in concealed 3-modules boxes, it can be matched to a wide range of covers, frames and adaptors to apply plates from the most important and widespread civil series.

Connection to a GSM phone activator (K499 optional) enables to program and control the ambient temperature also remotely.

K494I / K494 AMBIENT THERMOSTAT

WHY K494I / K494?

- excellent quality-price ratio
- easy to use
- compatible with the most used civil series (for K494I concealed installation)

K494 and K494I thermostats are “stand alone” devices to control the ambient temperature of heating and cooling systems.

K494I for concealed installation in 3-modules boxes can be battery-powered (winter-only management) or powered with a 230 Vac electric network (summer/winter management). K494 for wall-mounted installation is available only in the battery-powered version.

K492D CHRONOTHERMOSTAT WITH HUMIDISTAT

STAND ALONE

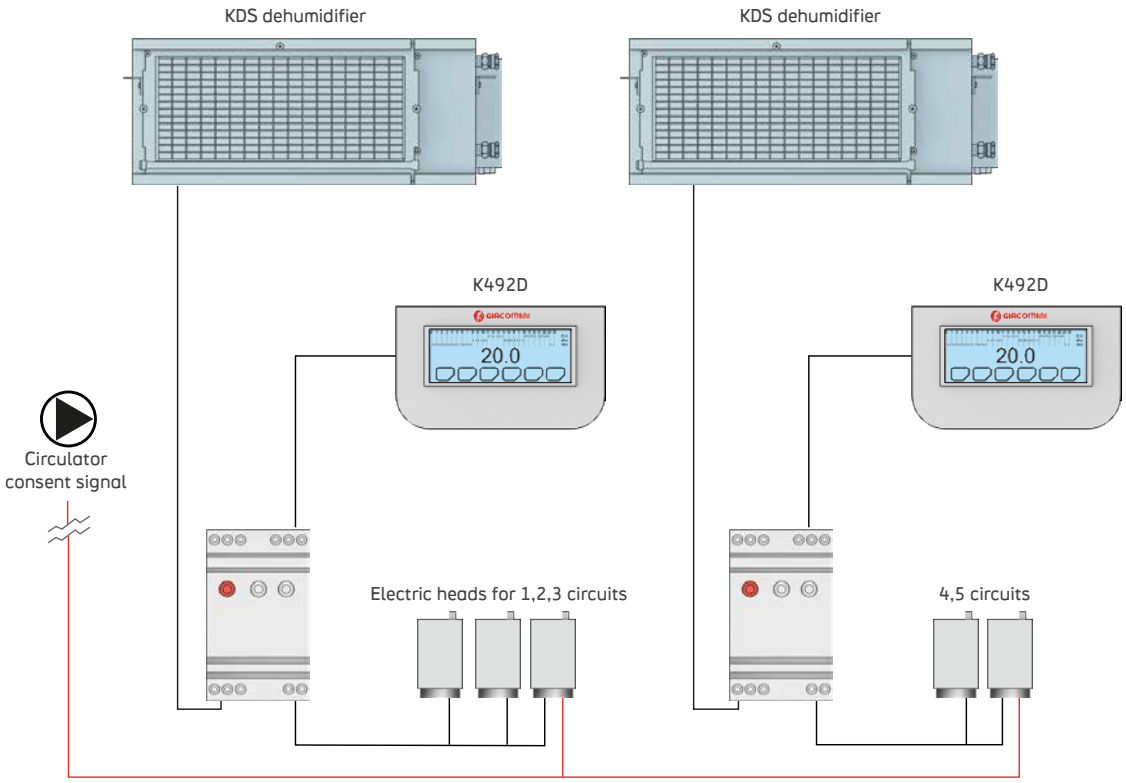
WHY K492D?

- weekly programming
- equipped with humidity sensor
- dehumidifier control (K492D)

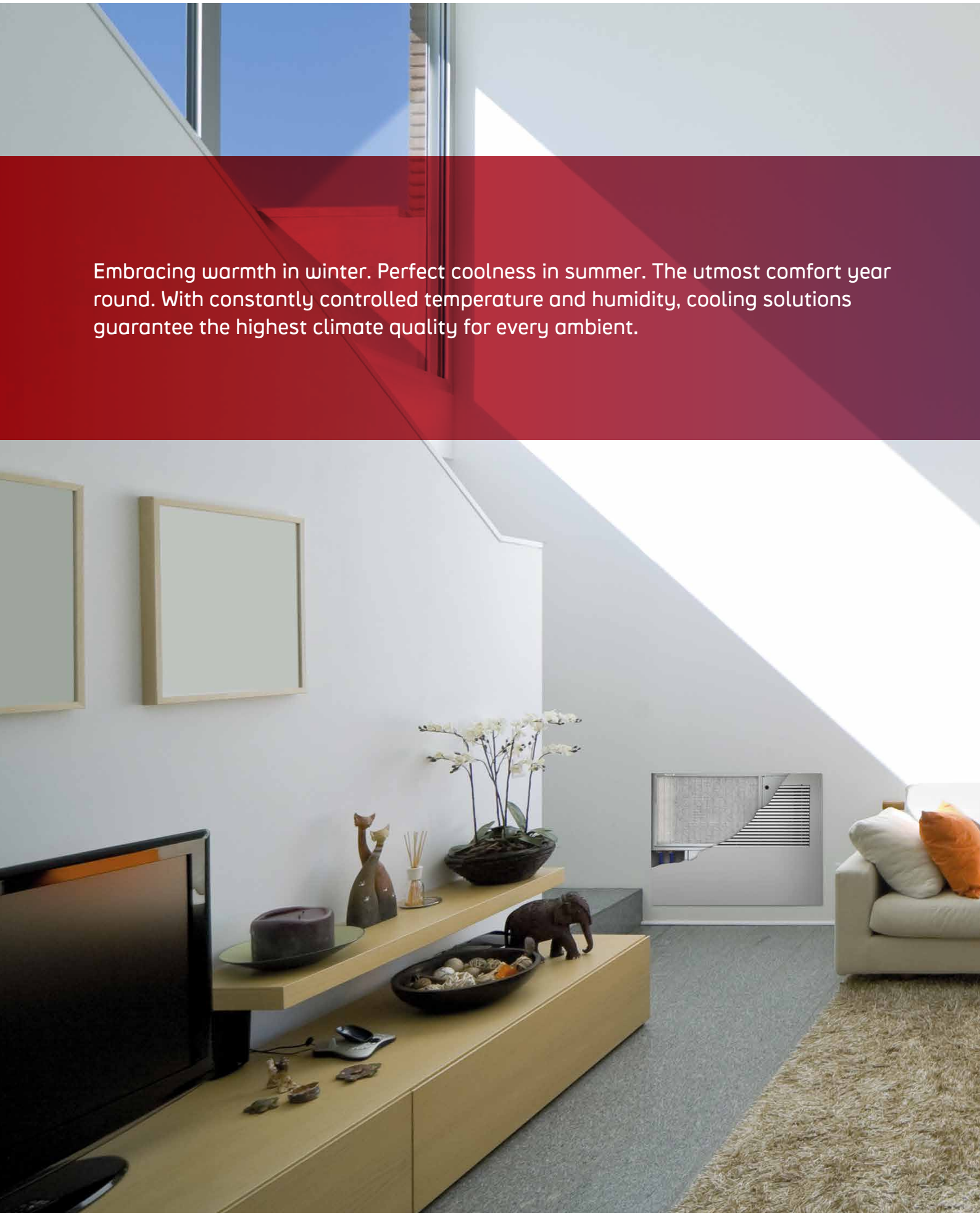
The K492 series, which includes K492D with integrated relative humidity sensor, features “stand alone” weekly chronothermostats for exposed wall installation with a large touch-screen display. All models can control the electro-thermal actuators for ambient thermoregulation.

The integrated humidity sensor makes this product particularly suitable for control of cooling systems. The special exposed module enables K492D to also control the dehumidification machines. In addition, it can be combined to the “stand-alone” versions of KPM30 or KPM31 regulation units.

CONNECTION DIAGRAM K492D WITH ELECTRIC HEADS AND DEHUMIDIFIERS



Embracing warmth in winter. Perfect coolness in summer. The utmost comfort year round. With constantly controlled temperature and humidity, cooling solutions guarantee the highest climate quality for every ambient.



RADIANT SYSTEMS

Chapter 6

Cooling and air treatment

COOLING AND AIR TREATMENT

RADIANT COMFORT YEAR ROUND

The real estate market is becoming more and more challenging and that is why modern buildings must provide high energy efficiency classes with top performing insulations to be more attractive. This type of insulation calls for control of summer temperatures, humidity and air quality of the occupied ambient.

In modern conditioning systems summer cooling has thus become a must also for residential units. While in winter the temperature must be increased through the heating system – humidity does not require any specific control as it generally features an adequate level - in summer both temperature (cooling) and humidity (dehumidification) must be decreased to avoid discomfort, possibly by preventing excessive sudden changes of temperature between the outside and the inside, and guaranteeing the required protection against moisture[1].

Radiant floor systems, combined to machines specifically designed for air dehumidification, represent a winning installation option to enjoy adequate thermo-hygrometric **comfort** and significant **energy saving** during the entire yearly cycle of ambient use.

NOTE

[1] According to the EN ISO 7730 rule, relative humidity should not exceed 60÷65 % to guarantee a comfort sensation while maintaining the ambient air healthy. In summer, a difference of 7-8 °C between the internal and external temperature is generally recommended by health authorities.

AIR TREATMENT MACHINES: OPERATIONAL PRINCIPLES

Giacomini's machines exploit their integrated compression refrigerating cycle: however, the benefits of the resulting treated air goes way beyond mere dehumidification.

Available are:

- **isothermal dehumidifiers**
- **dehumidifiers with sensible cooling integration**
- **machines for controlled mechanical ventilation**.

According to the operational principle, which will be described further on, the benefits offered by this type of machines are clear:

- they work with water at 15-18 °C, the same temperature required for cooling floors, and they enable the refrigerating groups to work with water temperatures higher than the usual 7 °C required for hydronic conditioning systems, thus offering great benefits in terms of energy efficiency (EER - Energy Efficiency Ratio)
- they feature a high latent power/air capacity ratio: a value up to 2,5 W for every m^3/h which minimizes the quantity of air required to cover latent loads and offers greater quietness, total absence of air drafts and minimum energy consumption.

Basic dehumidifiers simply reduce the humidity level of the ambient and they are known as "**isothermal dehumidifiers**", shown in a schematic version in fig. 6.1.

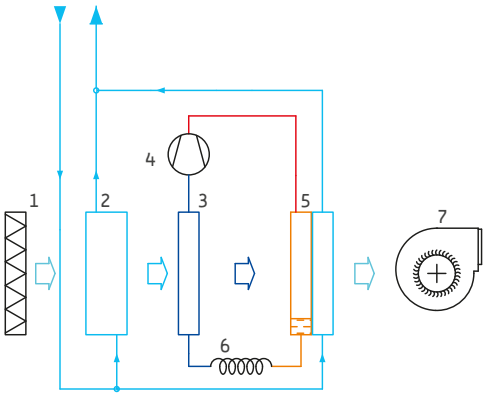
This type of machine intakes and filters the ambient humid air (1), generally at a 26-27 °C temperature, then it cools it by means of an hydronic coil (2) supplied by water at about 15-18 °C.

This cooling process brings the humid air the closest possible to condensation by exploiting the water already available to supply the radiant floor circuit, but without burdening the refrigerating circuit electric compressor with extra work.

The cooled air is then ready to flow through the refrigerating circuit evaporation coil (3): during this phase it releases condensation humidity. This provides air with a humidity content lower than the ambient and suitable for circulation in the ambient itself.

Before being released, the air flows through the condensation coil (5, left side): the air temperature is exploited to condensate the refrigerating fluid so as to repeat the cycle. However, the air is now warmer as it has absorbed heat from the condensation fluid; that is why it is advisable to make it flow through a second post-cooling hydronic coil (5, right side) which brings the temperature back to a level not exceeding the value it featured when entering the machine. The air is then finally released in the ambient.

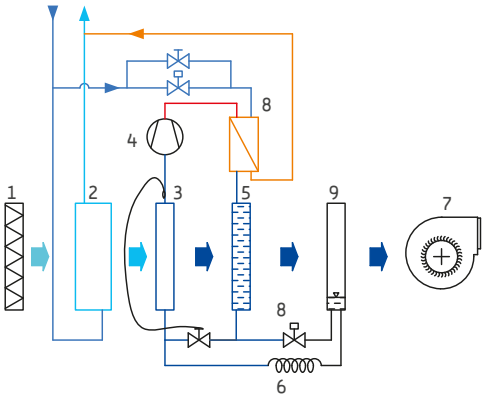
By slightly varying the machine pattern, it is possible to obtain a **dehumidifier with sensible cooling integration** able to cover two functions: work as isothermal dehumidifier or as a machine able to integrate the ambient sensible cooling by releasing air cooler than the incoming flow.



Schematic representation of an isothermal dehumidifier

fig. 6.1

The diagram of fig. 6.2 differs from the isothermal dehumidifier as it shows a double condenser in the refrigerating circuit: next to the one interacting with air (3) there is a second condenser (4) which disperses all the condensation heat. When this happens, the dehumidifier works on an integration regime, the air condenser (3) is blocked and the machine releases cool dry air in the ambient.



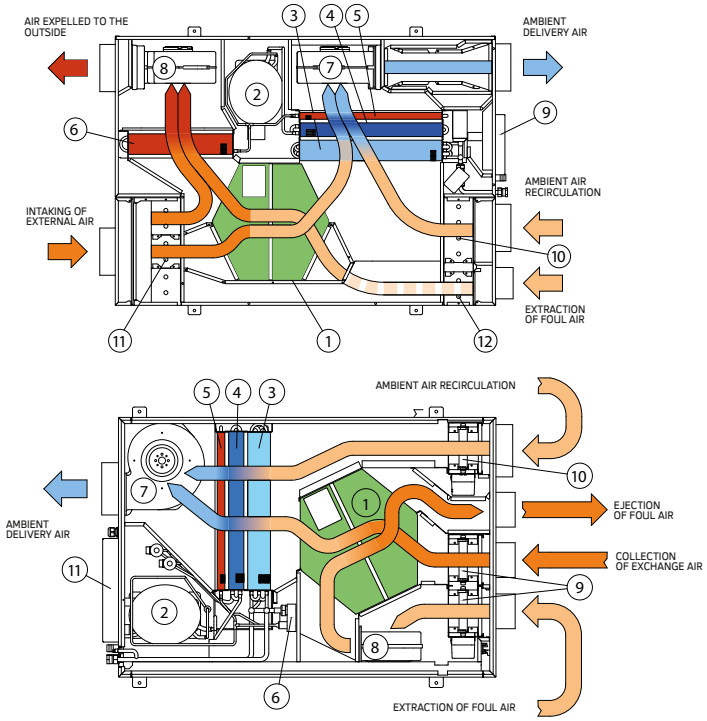
Schematic representation of a sensible integration dehumidifier

fig. 6.2

Controlled mechanic ventilation machines (VMC), in addition to offering dehumidification and integration of sensible thermal power, enable to change the ambient air by recovering high efficiency heat. They are the most complete machines for ambient air treatment and, as expected, they can be used year round.

The refrigerating circuit of these machines is the same type used for sensible integration dehumidifiers: there are two condensers, one for post-heating and one for dissipation.

The two VMC machines differ not only for their internal pattern, but also for their different dissipative condensers: a water-condenser for KDVRW and an air-condenser for KDVRA.



1 Air/air recuperator
2 Refrigerating compressor
3 Water-coil
4 Refrigerating evaporator
5 Post-heating condenser
6 Dissipative condenser
7 Delivery fan
8 Ejection fan
9 Electrical panel
10-11-12 Shutters

Schematic representation of KDVRA (air-powered above) and KDVRW (water-powered below)

fig. 6.3

As shown by fig. 6.3, in both machines the external air (exchange), is pre-cooled in an air/air recuperator (1), before being sent to the treatment coils, by exchanging the foul air which is removed from the ambient to be conditioned. When exiting the recuperator, it is mixed with

the recirculation air and undergoes the first sensible cooling cycle inside the water-fed finned coil (3), a second cooling and dehumidification cycle in the refrigerating evaporator (4), then a post-heating cycle in the condenser (5) and finally the delivery fan releases it in the ambient to be conditioned.

The dampers (10, 11, 12) adjust the recirculation and external air flows to achieve the desired flow of ambient air in addition to the foul air to be ejected after recovery, which has been moved by the ejection fan (8).

The dissipative condenser of KDVRA (6) is cooled by the extraction air flow and, when required, by the additional external air flow.

AIR TREATMENT MACHINES: THE RANGE

Giacomini has designed a complete range of dehumidification solutions for radiant systems which includes extremely sturdy machines for **concealed wall** (**KDP** series) or **concealed false-ceiling** installation (KDS series) and providing for, as discussed for operational principles, both humidity reduction only or also integration of sensible thermal power.

These machines enable to reach ideal levels of air humidity (50-60%) in an ambient by using the same refrigerated water (15- 18 °C) of the radiant panel system.

The false-ceiling concealed duct-type VMC (**KDV** series) represents the range top item: in addition to dehumidification and integration of sensible cooling it can also provide air exchange and free-cooling thanks to its high-efficiency air-air heat recuperator.

COMPARISON TABLE OF THE VARIOUS MODELS

	KDPY024	KDPRY024	KDSY026	KDSRY026	KDSRY350	KDSRY500	KDVRWY300	KDVRAY300
installation	wall-mounted concealed	wall-mounted concealed	false-ceiling concealed	false-ceiling concealed	false-ceiling concealed	false-ceiling concealed	false-ceiling concealed	false-ceiling concealed
dehumidification	x	x	x	x	x	x	x	x
cooling integration	-	x	-	x	x	x	x	x
ambient air recirculation	-	-	-	-	-	-	x	x
free cooling	-	-	-	-	-	-	-	x
ACCESSORIES								
outer casing	x	x	-	-	-	-	-	-
front panel	x	x	-	-	-	-	-	-
4-outlets delivery plenum	-	-	x	x	-	-	-	-
6-outlets delivery plenum	-	-	-	-	x	-	-	-

KDP AND **KDS** DEHUMIDIFICATION AND INTEGRATION UNITS

WHY KDP / KDS?

- to be combined to radiant cooling systems
- compact and quiet monoblock machines
- wide range of solutions (concealed wall or false-ceiling installation) for ambient integration
- also available with sensible power integration

KDP and KDS machines are monoblock units for concealed wall (KDP) or false-ceiling (KDS) installation. The latter is a duct-type machine representing the perfect solution for air treatment of multiple ambients.

They mainly include a removable filtering section, a refrigerating unit (with pre- and post-treatment coil), a finned exchanger and a centrifugal fan. The machine structure is made by galvanized sheet panels lined with sound-absorbing material. The KDP wall model includes a metal outer casing and white lacquered front panel. In addition to dehumidification, specific models may feature integration of sensible power for the ambient to be conditioned: in this case the out-flowing air is colder than the incoming.

TECHNICAL DATA

	KDPY024	KDPRY024		KDSY026	KDSRY026		KDSRY350	KDSRY500
		dehumidification	integration		dehumidification	integration		
latent power [W] air at 26 °C-65 % supply water at 15 °C	700	700		740	740		1.110	1.740
sensible power [W] air at 26 °C-65 % water supply at 15 °C	-	-	900	-	-	950	1.390	2.070
required water flow [l/h]	220	220	290	240	240	320	350	500
water circuit losses of pressure [mm in H_2O]	600	1.200		1.100	1.100	1.100	1.200	1.600
air flow [m^3/h]	200	200	300	250	200	300	350	500
available max. head [Pa]	-	-		45	68	60	40	60
absorbed electric power [W] 230 V - 50 Hz single-phase power	410	410	430	410	440	460	528	750

KDV CONTROLLED DEHUMIDIFICATION, INTEGRATION AND MECHANIC VENTILATION UNIT

WHY KDV?

- range top machine
- dehumidification, sensible power integration and evolved treatment of primary air
- high efficiency heat recuperator
- compact and highly quiet mono-block machine
- low electric absorption

KDV machines are monoblock units for dehumidification, integration and treatment of primary air. They are designed for false-ceiling duct-type installation.

They feature a high-efficiency air-air heat recuperator (higher than 86%) and include a removable filtering section, two centrifugal fans, five motorized dampers (for delivery, recirculation, extraction, external collection, ejection), refrigerating circuit, exchange coils. Based on the model, they can be equipped with a water or air dissipative condenser.

The air released in an ambient may include two flows: exchange air or recirculation of ambient air, with variable percentages based on the type of treatment desired for the released air. The air flows can be adjusted using the control panel: 80÷160 m^3/h for exchange air; 260÷300 m^3/h for the total released air. No calibration is required based on the aeraulic network topology.

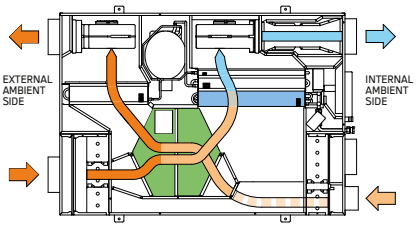
MACHINE MAIN FUNCTIONS

- summer and winter air exchange with high efficiency heat recuperation
- summer dehumidification with temperature control of air released in ambient
- works with water at the same temperature required for the radiant floor, 15-18 °C in summer, 35-40 °C in winter
- extraction of foul air
- ambient air recirculation
- free-cooling management (KDVRAY300 only)
- temperature of air released in ambient adjustable from the control panel
- possibility to define activation time frames
- when machine is off, separation of ambient from the outside by closing the dampers.

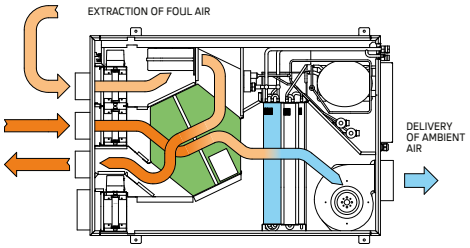
OPERATIONAL DIAGRAM

EXCHANGE ONLY The exchange air exchanges heat with the extraction air through the recuperator (1) before flowing through the treatment section and being released in the ambient. The delivery air temperature is adjusted by the water-fed coil.

KDVRAY300

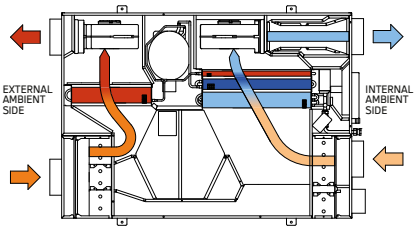


KDVRWY300

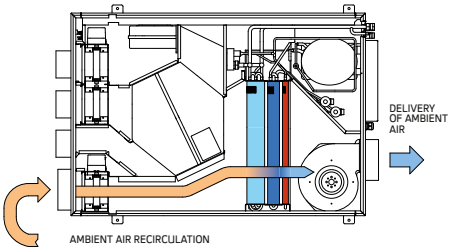


RECIRCULATION ONLY Only the ambient air is treated by being collected and released after dehumidification, cooling or heating according to the operational conditions. For KDVRA units, an external air flow is put into circulation to cool the dissipative condenser in summer. The water-fed coil adjusts the delivery air temperature.

KDVRAY300

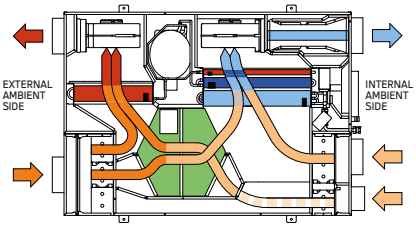


KDVRWY300

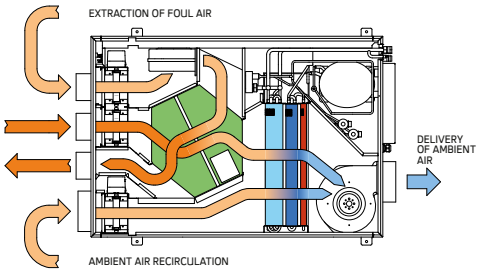


EXCHANGE + RECIRCULATION The exchange air exchanges heat with the extraction air by means of the recuperator before mixing with a recirculation air flow, it passes through the treatment section to be then released in the ambient. The water-fed coil adjusts the delivery air temperature.

KDVRAY300

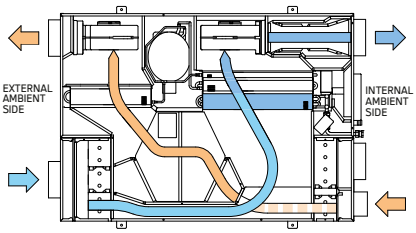


KDVRWY300

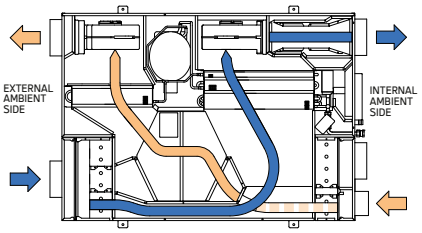


FREE COOLING (KDVRAY300 only) It enables to exploit the free flows of external air when the latter is within the limits set through the control panel. The free-cooling function intakes the preset external air flows while extracting an equal flow of ambient air.

SUMMER



WINTER



TECHNICAL DATA

	KDVRWY300	KDVRAY300
total latent power [W] - external air at 35 °C-50 %	1.083	
usable latent power [W] - referred to recirculation, air at 26 °C-55 %	625	
usable sensible refrigerating power [W] - referred to recirculation, air at 26 °C-55 %	1.050	
usable thermal power* [W] - supply water at 45 ° and 60 °C	2.200 - 3.500	
required water flow [l/h]	400	300
water circuit loss of pressure [mm in H_2O]	800	1.000
delivery fan flow [m^3/h]	80-300	
delivery fan usable head [Pa]	120	
ejection fan flow [m^3/h]	80-160	80-300
ejection fan usable head [Pa]	100	
heat recuperator efficiency - winter: external -5 °C, internal 20 °C	95 %	
heat recuperator efficiency - summer: external 35 °C, internal 26 °C	93 %	
sound pressure level, in free field - distance 1 m [dB(A)]	39	
weight [kg]	71	85
absorbed electric power [W] - single-phase power 230 V - 50 Hz	560	600

* referred to recirculation of 300 m^3/h of ambient air at 20 °C


A passion for excellence. The utmost care for every single detail.
Top quality even for the smallest part.
Only the best for every single component or accessory.

Chapter 7

Accessories and other components

K369A WALL EDGING STRIP

CHARACTERISTICS

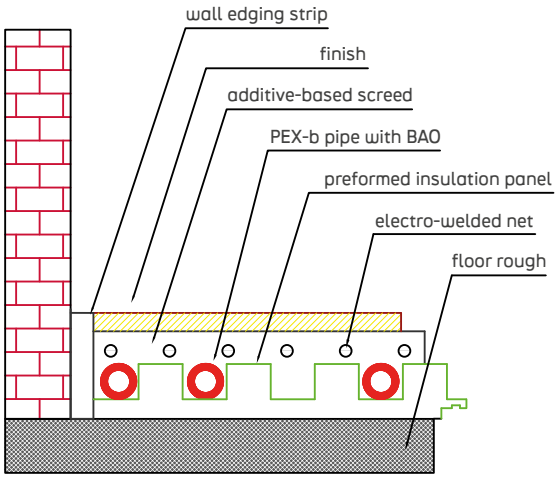
K369A is a polyethylene edging strip for installation along walls to absorb possible minimum settling movements of the radiant floor.

The 8 mm thick strip is supplied as 50 m rolls with two specific heights: 150 mm and 250 mm. The latter version is particularly recommended for industrial installations where screeds generally present greater dimensions.

The strip has an adhesive side for an easy and rapid installation on wall.

For installation complying with the UNI EN 1264-4:2009 rule, reference is made to the corresponding section of Chapter 8.

SCREED SECTION



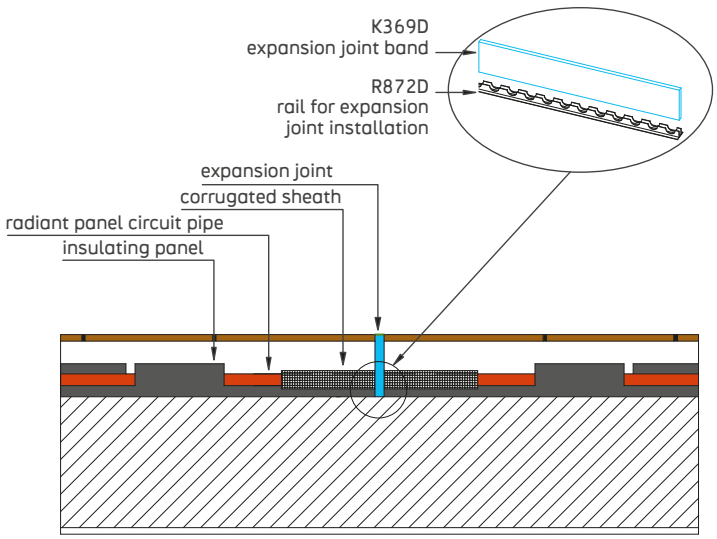
EXPANSION JOINT BAND: **K369D** BAND AND **R872D** RAIL

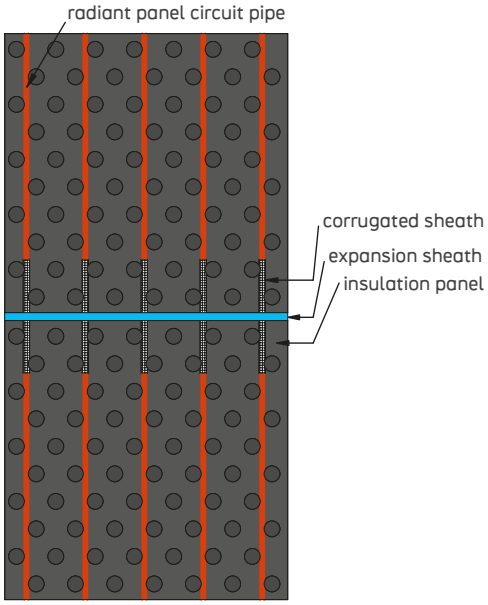
CHARACTERISTICS

K369D is a polyethylene band used as expansion band to prevent screed movements, caused by thermal expansion or shrinking effects, from damaging the lithoid surface finish. It is provided as 50 m rolls, 8 mm thick and 150 mm high for installation on site.

For installation complying with the UNI EN 1264-4:2009 rule reference is made to the corresponding section of Chapter 8.

The R872D plastic rail is used to position K369D strips which work as expansion joints. It is provided as 2 m rods. The rail has an adhesive strip at the base for correct installation on the support surface of the radiant screed; the central part is elastic so as to be adapted according to the expansion joint thickness.





R146I HYDRAULIC SEPARATOR

WHY R146I?

- no interference between circulators
- enhanced system efficiency
- insulation kit included

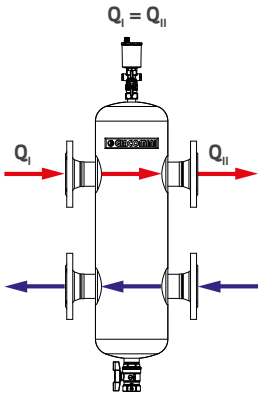
CHARACTERISTICS

Generally the thermal plant cannot satisfy the hydraulic requirements of thermal systems; that is why one or more secondary circulators, properly dimensioned according to need (temperature, head and flow) of the various systems, become essential. The operational conditions of the interacting pumps, which can create anomalous flows and circuit heads, can be then verified.

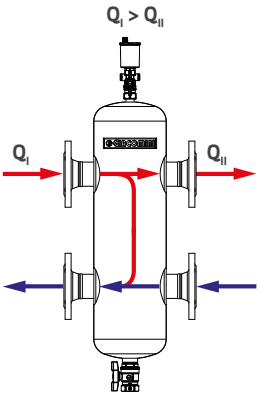
The hydraulic separator – or compensator – is a device enabling to de-couple the primary circulator flow (production) from the secondary (system): by creating a zone with reduced pressure loss, it makes the connected circuits hydraulically independent. The flow passing through the respective circuits depends exclusively on the flow characteristics of the pump, preventing reciprocal influences caused by their series coupling.

Use of an hydraulic separator enables to have a constant flow production circuit and a variable flow distribution circuit, conditions typical of modern conditioning systems.

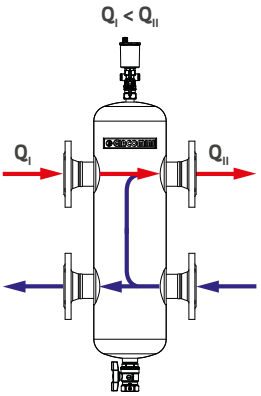
OPERATIONAL DIAGRAM



If the primary circuit flow is the same one circulating in the secondary circuit, the two fluids will not be mixed.



If the primary circuit flow is greater than the secondary, part of the flow entering the separator from the primary circuit will be by-passed by the separator to then flow back to the boiler.



If the secondary circuit flow is greater than the primary, part of the flow entering the separator from the secondary circuit will not return to the boiler, but will be by-passed by the separator and flow back inside the system.

R146M DIRT SEPARATOR

WHY R146M?

- keeps the system clean from debris and ferrous impurities
- extends the system life
- extremely easy service and cleaning of filters and magnets, no system disassembly and shut-ting-off required

CHARACTERISTICS

The R146M magnetic dirt separator is a device that separates and removes the debris inside hydraulic circuits of modern conditioning systems. The thermo-conductor fluid enters the dirt separator and slows down when colliding with a special metal mesh (element A, fig. 7.1) which filters solid impurities. Ferrous debris are held back by the attraction force generated by the permanent magnet resistant to high temperatures (element B, fig. 7.1).

The separator must be installed on the return circuit to protect the boiler from the debris found in the duct. The filter can be easily cleaned by opening the drain tap and removing the magnet inside the housing from the top.

Standard threaded dirt separators from the R146D series can be converted to magnetic dirt separators by installing a P146M kit (fig. 7.2).

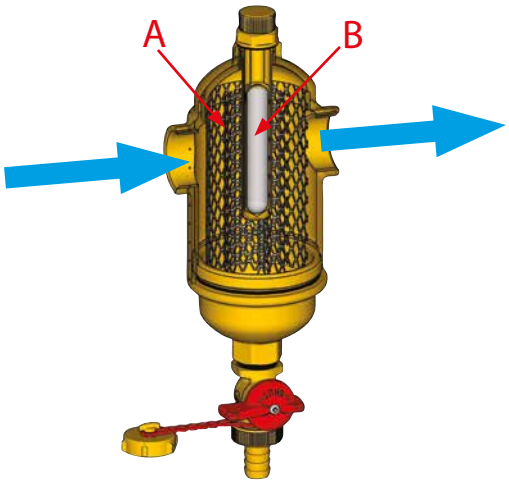


fig. 7.1

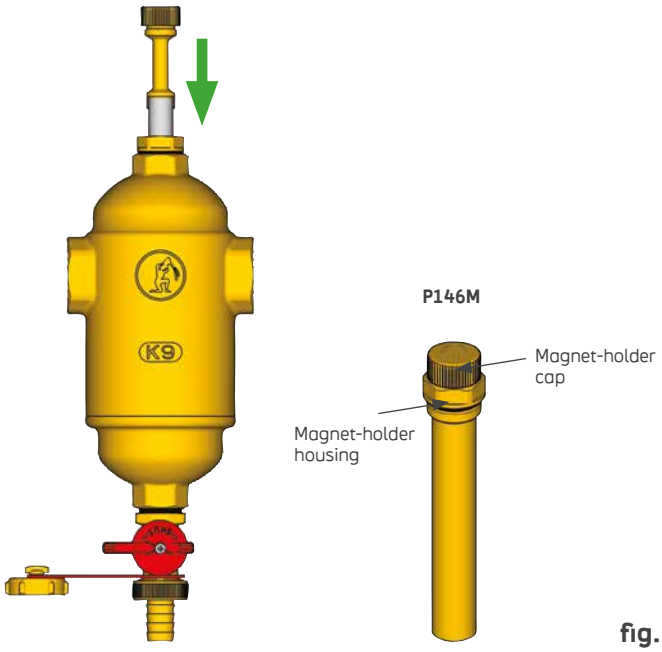


fig. 7.2

K375 PROTECTIVE ADDITIVE

The UNI EN 1264 European rule, which includes all regulations to be applied for water-fed radiant conditioning systems, provides for both anti-oxygen barrier pipes and use of chemical corrosion inhibitors for metal components – specifically ferrous parts – included in the system.

The application of both measures represents the most efficient protection against corrosion of the system metal components. In fact, oxygen may penetrate the system water also through the pump joints or automatic air vent valves and make the anti-oxygen barrier useless.

The K375 inhibitor additive for radiant systems made with synthetic pipes must be periodically integrated according to the dosage indicated by the specific technical sheet.

K376 CONCRETE FLUIDIFYING ADDITIVE

The K376 additive is a mixture of specific products to enhance concrete mixing and processing: it is used both for installation of radiant floors and preparation of concrete with high fluidity characteristics.

It does not contain components harmful for concrete, metals or plastic pipes. It must be added during mixing according to the dosage indicated by the specific technical sheet.

The main benefits of K376 are:

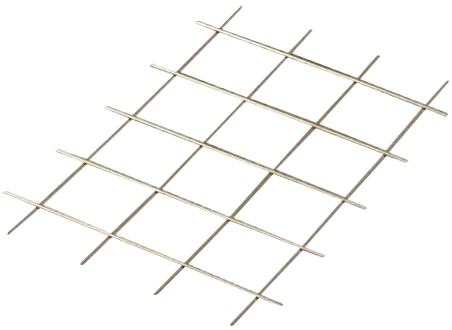
- reduced installation times
- additive-based concrete requires no vibration
- reduction of water quantities up to 25%
- reduction of aging cycles
- reduced shrinking thanks to improved water/concrete ratio
- enhanced concrete impermeability.

K393 ELECTRO-WELDED NET

The electro-welded net is the most popular reinforcement system for concrete floors, basically for its installation low cost. The electro-welded net does not increase the flexibility resistance of the screed, but limits instead the crevices in the concrete caused by hygrometric shrinking.

The K393 galvanized electro-welded net by Giacomini is made by a ø 1,6 mm thread with 50 mm square meshes.

It must be installed on the radiant system after positioning the pipes so as to fit it in the screed section at a suitable height without risking to be cut when realizing the expansion joints.



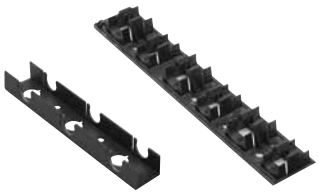
K389 AND **K389W** PIPE-FITTING RAILS

K389 and K389W rails enable to rapidly and safely install the radiant system circuits both on wide surfaces with smooth insulation panels and Klima Wall systems, thanks to the special shape of their pipe housings.

K389W pipe-fitting rails are equipped with a sturdy system to rapidly fit the single elements together and obtain the support required by the radiant circuits on the entire surface.

The rails are installed on the insulation panel using clips anchored inside the dedicated housings.

Made with plastic, they are available in various versions according to pipe diameter and positioning.



PIPE-FITTING CLIPS AND CLIP-FITTING PISTOL

R983 clips are very useful to fit plastic pipes on insulation panels when required. They are available in various versions according to use: for manual installation on panels featuring different thicknesses; for installation with special clip-fitting pistol (generally on smooth panels).

The special K809 clips are used for KLIMA DRY dry radiant systems.

R549P PIPE BEND SUPPORT

Pipe bend supports represent a professional solution to neatly install inlet and outlet pipes.

Easy to install, they prevent damaging the pipe with narrow bends for manifold fitting.

They are made with high-temperature resistance plastic.


DINING
ROOM
PANTRY
2x6 @ 16" OC
LOAD BEARING
3-2x8
3-2x6
TJI 210x11

Chapter 8

Regulatory compliance installation

REGULATORY COMPLIANCE INSTALLATION

UNI EN 1264

The UNI EN 1264 European technical rule includes all regulations which must be applied to water-fed radiant conditioning systems integrated in residential building structures, offices and other buildings which use corresponds or is similar to residential.

Below is a summary of the parts it includes:

- **UNI EN 1264-1:2011**. It defines field of application, terms and symbols used in the rule subsequent parts.
- **UNI EN 1264-2:2013**. It is the rule part specifying the conditions and methods to determine the thermal power of radiant floor systems fed with hot water, based on the difference between heating average temperature and ambient temperature. Thermal power is determined based on calculation and testing methods. The manufacturer can state the power supplied by its radiant system based on the indications provided for by the UNI EN 1264-2 rule. As for dispersed power, performance varies according to the thermal resistance of the installed insulation panel.
- **UNI EN 1264-3:2009**. It is the rule part enabling to determine the dimensions of radiant systems based on the thermal loads to be balanced. It specifies that the maximum specific power that can be provided by radiant heating surfaces derives from limits set for the surface temperature values. The floor system dimensions are set by determining: installation center distance, feeding temperature and circulating flows of the system single distribution lines. If the system also provides cooling, the UNI EN 1264-3 rule establishes how to apply the UNI EN 1264-5 contents to determine summer regime outputs.
- **UNI EN 1264-4:2009**. This rule part refers to installation of radiant systems concealed in the structure, and defines the minimum requirements of the materials used and the provisions that must be complied with for a correct realization. Reference will follow when specifying the various installation steps of the system.
- **UNI EN 1264-5:2009**. This is the rule part providing the indications to evaluate the thermal power of heating and/or cooling radiant floors and walls in addition to the thermal power of radiant cooling floors. The recalculation method described by the rule enables to obtain the outputs for the other surfaces (ceilings and walls) and for cooling applications (floors, ceilings and walls) based on calculations and test results related to the heating floor (part 2 of the rule) and applying specific coefficients of thermal exchange.

The market offers many calculation softwares to easily plan and dimension radiant floor systems based on the rule parts described above.

GiacoKlima©Tool is the courtesy calculation and budget program offered by Giacomini to its Clients.

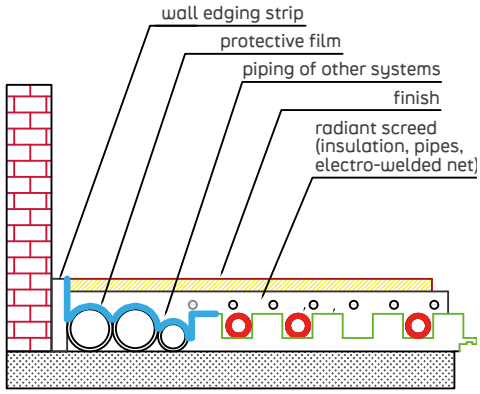
In order to guarantee a radiant floor top performance and satisfy the user, in addition to correct planning and use of top quality components, **the installer must strictly comply with the various installation steps defined by UNI EN 1264-4:2009 described further on**. It applies only to heating/cooling radiant system components and not to other elements of the floor, ceiling and wall structure.

PRE-EXISTING CONDITIONS FOR INSTALLATION OF RADIANT FLOORS

The rule defines the conditions required for installation of radiant floors: the building openings must be sealed by installing external doors, windows and shutters, by applying the internal door frames and by the existing plasters. In addition, all system pipes (plumbing, electric, sanitary fixtures, etc.) must already be installed and covered so as to obtain the support base required to install the insulation layer.

Two methods can be adopted to install the systems:

- installation of the systems on the unfinished slab and then smoothing with lightweight material. The insulation panel, the pipes and the electro-welded net will be respectively laid on top of this support, then the radiant screed will be installed and completed with the desired surface finish.
- the second method is frequently used when the space is insufficient for traditional installations; however, the rule of reference does not provide for it. A slab portion must be kept free along the wall edges where the system ducts and pipes will be laid in place of the insulation panel (fig. 8.1).



Screed section with other systems **fig. 8.1**

MANIFOLD INSTALLATION

The distribution manifold is the first system component installed which must be positioned so as to reduce the length of the adduction pipe to the minimum. This will prevent excessive adduction piping from making temperature control difficult in the various ambients.

It is generally installed in special cabinets or niches at an height which makes pipe connection, filling operations and air venting of the circuits easier.

It must be equipped with two delivery and return shut-off valves on the mounting columns and a calibration device for each circuit. Closing and calibration of the circuit must be independent.

The system must include safety devices which work also on power failure to prevent heating water from entering the circuits at an excessive temperature. Humidity sensors are instead required for cooling so as not to reach the dew temperature.

WALL EDGING STRIP INSTALLATION

The wall edging strip must be installed along every wall bordering the floor-heated room and every structural component inserted in the screed (pillars, steps, internal door frames, etc.).

This insulating strip must connect the support base vertically to the finished floor surface and its characteristics must be such to enable the screed to move by at least 5 mm. It must be fitted on the wall so as to prevent any movement while laying the rough concrete. The edging strip and adjoining insulation protection layer must be installed so as to prevent the fluid screed from penetrating along the perimeter under the insulation. The upper part of the edging strip extending above the floor has to be cut after completing the surface finish (before positioning skirting boards).

INSULATION PANEL INSTALLATION

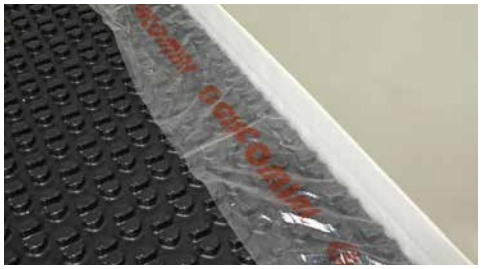
The insulation of the radiant floor system must have a minimum thermal resistance higher or equal to the value provided for by the rule (see fig.1.3, chapter 1). It must be lined on top by a protective layer made by a polyethylene sheet thick at least 0,15 mm (as all models by Giacomini) or an equivalent material.

The insulation panels must be installed flush with the edging strip, making sure not to lift the polyethylene clear film on top to guarantee an uninterrupted protection layer. The panels must then be gently placed on the ground staggering the subsequent rows.

Preformed insulation panels can be easily and quickly installed thanks to the special couplings (exceeding strips of thermoformed material or grooves) on the two orthogonal sides which neatly fit the panels one to the other: the final result is a state-of-the-art support surface for hydraulic circuits free of thermal bridges.

The diagram of fig. 8.2 shows how to rapidly install the panels. The two exceeding strips of sheet n. 1 are removed by using a cutter and it is then placed in the corner more suitable to start laying.

Sheet n. 2 is trimmed only on its longer side. The strip of the shorter side will enable to fit it to sheet n.1. This step is repeated for all sheets of the first row. Each panel of the subsequent rows will be coupled to the adjoining line, staggering the panels according to the initial measure.



SCREED JOINTS

The sudden thermal changes affecting the radiant screed may cause imperceptible movements on the screed itself. Expansion joints may be required to prevent this effect from damaging the lithoid surface finish (such as marble and ceramic) in time.

The position of the expansion joints must be established during planning as the delivery and return pipes can each cross each circuit only once. Joint position and quantity must be such to border areas not exceeding 40 m^2 and with an 8 m max length. These dimensions can be exceeded with rectangular areas if one of the dimensions is not greater than twice the other. Irregular shapes are not allowed.

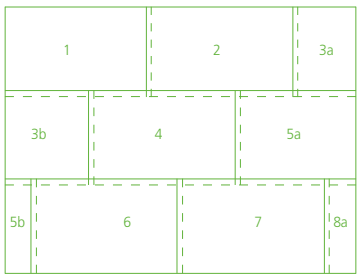


fig. 8.2

Expansion joints must be provided near every door and must be installed also at structural joints.

The two pipes of each circuit crossing the expansion joints must be protected with flexible insulating material for at least 0,3 m.

The market currently offers screeds with enhanced anti-shrinking characteristics, thanks to the constant studies carried out to improve the performance of radiant systems: they enable to realize larger surfaces between the joints, in total safety for the floor, up to preventing their application. When choosing this type of screeds, the installer must strictly follow the instructions provided for by product technical sheets.

PIPE INSTALLATION

Pipes must be protected from external damages and direct solar irradiation when handled and stocked. The pipes must be installed complying with the project pipe installation dimensions and lengths to guarantee the desired output and functionality.

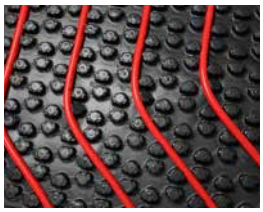
The system circuits can have a "spiral" or "coil" layout: the first is more recommended as it offers a more even distribution of the surface temperature; the latter instead causes a gradual reduction of the surface temperature from the manifold delivery point to the return point.

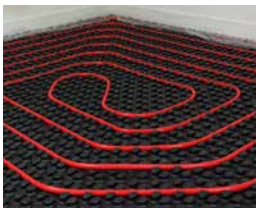
Every possible cause of damage to the pipes must be prevented (for example, installation near flues, fireplaces with low-set furnaces, etc.). The bending radius must comply with the manufacturer's specifications. Bending radius lower than the specified minimum value require pipe bend supports to prevent pipe crushing: crushing caused by too narrow bends reduces the passage section.




The pipe must be connected with anchoring systems guaranteeing a possible shift lower than 5 mm of height and 10 mm along the plane from the installation position.

R979 and R979N panels are equipped with convenient fins on the protuberance tops which ease pipe installation by holding the pipe in place without using fitting clips.






The distance between the circuit pipes is very reduced near the manifold so the heat supply is very high: it is therefore advisable to insulate delivery pipes connected to the manifold to separate them properly (about 1 m from the manifold).

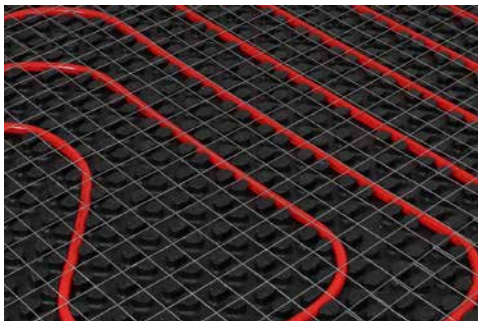
We recommend to install the special bend supports to ease installation of the manifold inlet and outlet pipes.

ELECTRO-WELDED NET INSTALLATION

Once completed the installation of the circuits, it is advisable to lay an electro-welded net with large meshes on the entire surface covered by the insulation panels. The rules do not expressly provide for its use, it is however always recommended as it enables to minimize crevices caused by drying of the screed.

The use of an electro-welded net with properly dimensioned meshes and thicknesses must be evaluated when realizing radiant floors for industrial structures, and whenever there are particularly heavy and/or concentrated loads.

Finally, it must be pointed out that when using specific fiber-reinforced premixed screeds (with amorphous stainless metal fibers) the reinforcement net is not required (**however the manufacture's technical sheet specifications must be complied with**).



FILLING AND TESTING THE SYSTEM

Before laying the concrete screed, a pressure not lower than 4 bar and not exceeding 6 bar must be applied to the system distribution lines to make sure there are no leakages.

This test can be performed with water or compressed air and the absence of leaks must be registered on a test chart indicating the test pressure. In case of freezing risks, precautionary measures must be adopted such as adding glycol to the filling water. Glycol must be removed and the pipes rinsed when the system is set on regular activation. When filling the system with water, air must be removed manually by filling the pipes according to the instructions below:

- close all panel return circuits
- feed the delivery manifolds

- activate the return manifold by opening one circuit at a time as described below:
- open the handwheel of the valve integrated in the return manifold, keeping all the other valves closed
- purge the drain tap and keep purging till there is no more water in the air
- close the valve of the full circuit and open the next one purging it as described above.

SCREED INSTALLATION

In terms of screed, the UNI EN 1264-4 rule recommends a thickness not lower than the values provided for by the regulation specifying load capacity and flexibility resistance class. With sand, concrete and additive-based screeds **the installer must comply with the product technical sheet**. This applies also for premixed screeds provided in bags ready for use .

Before laying, make sure all openings are perfectly sealed so as to prevent air from penetrating the ambient.

The screed is laid right after installing and pressurizing the system, trying not to completely cover the circuits, starting from the edges and continuing towards the center. The screed installer must avoid damaging the radiant floor components.

The screed must be laid and left aging for at least 3 days at a minimum temperature of 5 °C. Prevent the screed from drying too quickly for at least 3 days; a longer period may be necessary according to the type of material used.

The screed must be laid respecting the expansion joints where required. Any hole in the floor must be made before installing the panel.

Vertical pipes which may cross the slab must be separated from it using a proper duct.

SYSTEM COMMISSIONING

According to the provisions set forth by the UNI EN 1264-4 rule, commissioning of the system – i.e. initial heating – must be performed at least 21 days after laying the concrete screed (save for different specifications provided for by the manufacturers of specific screeds). Initially the supply temperature must be approx. 20÷25 °C for at least 3 days, then the system can be set on the project temperature which must be maintained for at least 4 additional days.

The installer must document the initial activation process.

LAYING OF SURFACE FINISH

After commissioning the system – i.e. initial activation – the surface finish can be laid.

The finish installer must make sure that the selected coating can be applied and that the materials used are compatible with radiant floors.

INSTALLATION OF THE R979S SPIDER PANEL

Spider panels require differentiated installation steps that vary compared to traditional methods according to the model.

R979SY001

The floor rough must be carefully cleaned from any dirt/dust residuals as this model includes an adhesive support. Once the protective sheet has been removed from the lower side of the net, glue the panel to the rough or existing floor, overlapping the side hooks for proper fitting (R983Y040 screw anchors may be required to ensure adherence to the existing flooring when the surface is not perfectly smooth and clean).

R979SY011

Connect the panel to the already installed smooth insulation panels by means of the pegs, laying the panels one next to the other for correct fitting (use some R983Y001 or R983Y003 clips to fit the pipe and panel to the insulator if necessary).

R979SY021

Place the panels on the floor rough or existing floor, overlapping the side hooks for proper fitting of the panels (use some R983Y041 anchoring screws to fit the pipe and panel to the insulation).

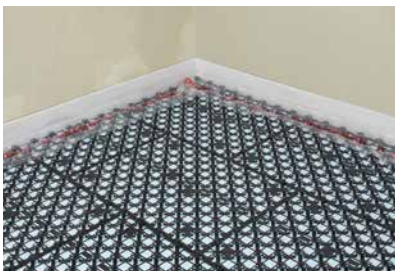
Lay the selected screed with the system already pressurized at 6 bar at least, strictly complying with the manufacturer's instructions:

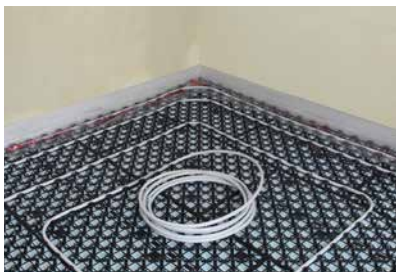
- self-leveling screed (R979SY001 and R979SY021 panels only)
- anhydrite-based screeds (for all three versions)
- classic sand-concrete screeds (for all three versions)

For all screeds described above, **strictly comply with minimum thicknesses and installation techniques specified by the manufacturer's technical datasheets**.

No electro-welded net required.

Commissioning of the system must be performed according to the instructions specified above.





RADIANT WALL INSTALLATION

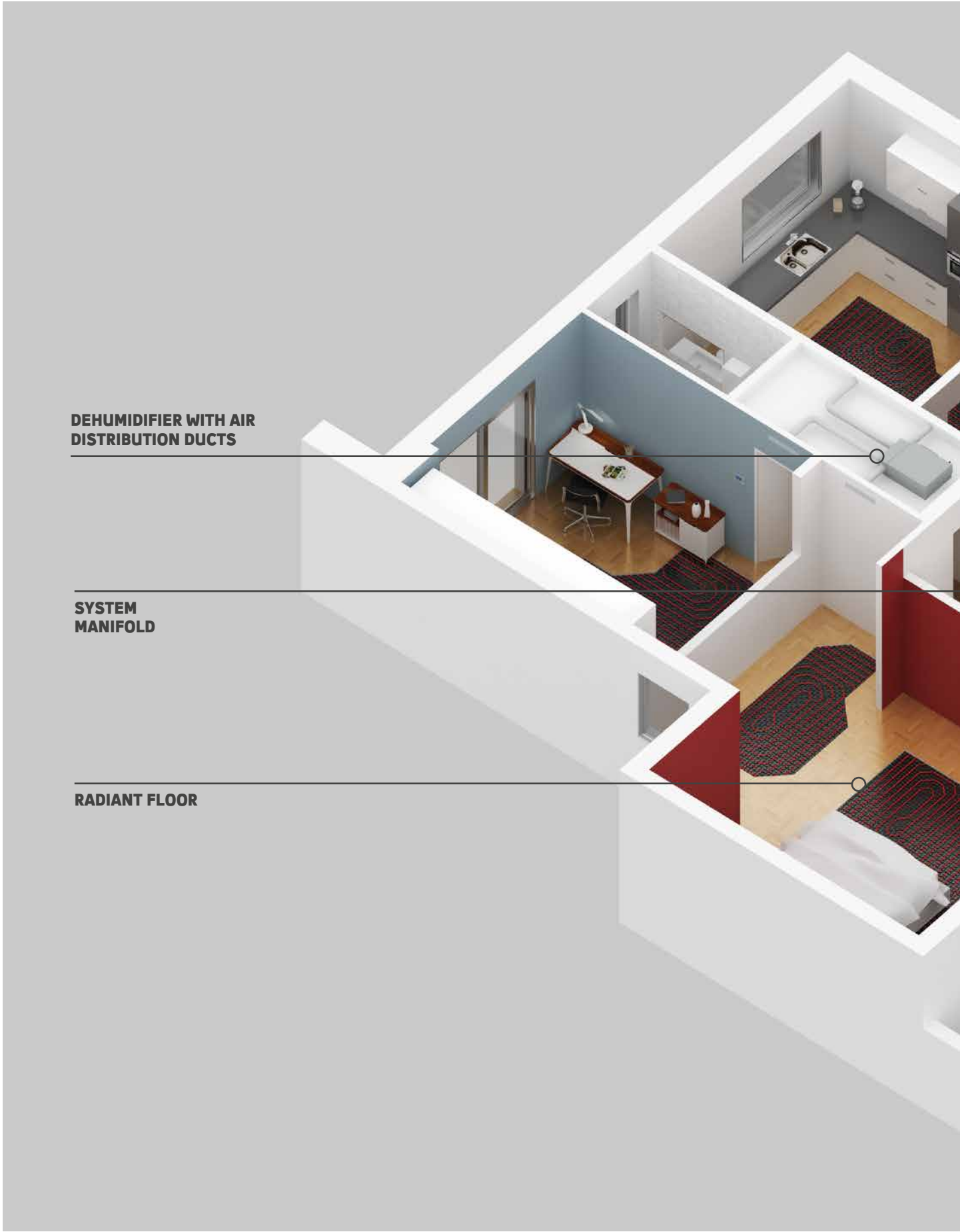
The rule provisions for radiant walls are the same set forth for radiant floors, with the following additions and/or amendments.

The walls must be able to support the radiant system.

The insulation layers required to obtain the minimum thermal resistances can be divided into two layers, based on the conditions of the adjoining ambient: for example, with an external wall, one insulation layer will be installed directly behind the radiant system while the second layer will be installed externally (external insulation).

The feeding temperature of the radiant wall and/or ceiling must not exceed a maximum value depending on the material in which the pipe is drowned (e.g. 50 °C for plaster-based plaster).

FLOOR SYSTEM IN THE HEART OF YOUR HOME




AMBIENT THERMOSTAT
WITH HUMIDITY SENSOR
CONFIGURATION
AND CONTROL DISPLAY
HEAT PUMP

NOTES

Radiant floor systems

Product codes

RADIANT FLOOR SYSTEMS

R979N

p. 23

DESCRIPTION	CODE	SIZE	❐	⊞
Preformed insulation panel for radiant floors suitable for diagonal pipe installation. Expanded polystyrene (EPS) with black thermo-formed polystyrene protection layer. Pipe pitch 50 mm.	**R979NY003**	T50-h30	11,20	-
	R979NY005	T50-h50	6,72	-
	R979NY006	T50-h63	5,60	-

R979

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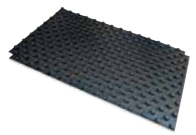


DESCRIPTION	CODE	SIZE	❐	⊞
Preformed insulation panel for radiant floors. Sintered expanded polystyrene (EPS) with black thermo-formed polystyrene protection layer.	**R979Y043**	T50-h32	13,44	-
	R979Y044	T50-h42	8,96	-
	R979Y045	T50-h52	6,72	-
	R979Y046	T50-h62	11,20	-
	R979Y047	T50-h75	8,96	-

R982Q

p. 23

DESCRIPTION	CODE	SIZE	❐	⊞
Preformed insulation panel for radiant floors. Sintered expanded polystyrene (EPS) with black thermo-formed polystyrene protection layer.	**R982QY013**	T50-h37	11,20	-
	R982QY015	T50-h50	7,84	-
		On request		
	R982QY033	T50-h37 external pack	11,20	-
	R982QY035	T50-h50 external pack	7,84	-
	R982QY016	T50-h60	11,20	-
	R982QY017	T50-h75	8,96	-

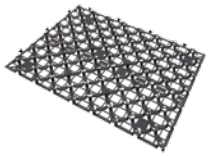
R882A

p. 25

DESCRIPTION	CODE	SIZE	❐	⊞
Smooth insulation panel rolls for radiant floors. Expanded polystyrene with surface protection layer and mesh for eased pipe installation.	**R882AY002**	h30	10	-
	R882AY003	h40	10	-

R979S

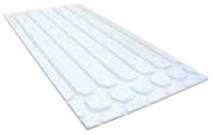
p. 29



DESCRIPTION	CODE	SIZE	❐	⊞
Preformed panel for radiant floors with low-thickness screed, high-resistance PPR. Recommended for renovation works.	**R979SY001**	T50-h22 with adhesive	13,44	-
	R979SY011	T50-h22 with pegs	7,68	-
	R979SY021	T50-h22 with 6 mm insulation	9,60	-

R883F

p. 29



DESCRIPTION	CODE	SIZE	❐	⊞
Fiber-plaster panel, for low-thickness radiant floors.	**R883FY001**	h18	57,60	-

RADIANT FLOOR SYSTEMS

R884F

p. 29

DESCRIPTION	CODE	SIZE	❐	⊞
Fiber-plaster complementary panel (header and under-manifold) for low-thickness radiant floors.	R884FY001	h18	0,72	-
	R884FY002	h18	0,72	-

R883-1

p. 33

DESCRIPTION	CODE	SIZE	❐	⊞
Expanded polystyrene insulation panel for dry-laid radiant floors. Groove fitted with 0,3 mm aluminium thermoconductor profile.	R883Y101	T150-h28	11,52	-

R884

p. 33

DESCRIPTION	CODE	SIZE	❐	⊞
Expanded polystyrene header insulation panels for laying of adduction pipes and circuit bend supports in dry-laid radiant floors.	R884Y101	T50-h28	5,76	-

K805P

DESCRIPTION	CODE	SIZE	❐	⊞
Galvanized steel sheet used as load distribution layer for dry-laid radiant floors.	K805PY003	600 x 300 x 1 mm	3,60	-
	K805PY004	600 x 600 x 1 mm	3,60	-

K805P-1

DESCRIPTION	CODE	SIZE	❐	⊞
Galvanized steel sheet used as load distribution layer for dry-laid radiant floors. Equipped with double-sided adhesive.	K805PY023	600 x 300 x 1 mm	3,60	-
	K805PY024	600 x 600 x 1 mm	3,60	-

R984

DESCRIPTION	CODE	SIZE	❐	⊞
Waterproof layer for protection against moisture for radiant floors. Mesh-patterned for eased pipe installation.	R984Y005	mesh 50 x 50 mm	135	-

K369A

p. 86

DESCRIPTION	CODE	SIZE	❐	⊞
Polyethylene wall edging strip for radiant floors. Includes one fully adhesive side and protection edge on the opposite.	K369AY021	150 x 8 mm	50	100
	K369AY022	250 x 8 mm	50	100

RADIANT FLOOR SYSTEMS

K369D

p. 87

DESCRIPTION	CODE	SIZE	❐	⊞
Polyethylene expansion joint band.	K369DY001	150 x 8 mm	50	100

R872D

p. 87

DESCRIPTION	CODE	SIZE	❐	⊞
Fitting-rail with adhesive strip for expansion joint installation.	R872DY001	-	2	100

K389W

p. 91

DESCRIPTION	CODE	SIZE	❐	⊞
Pipe-fitting rail with rapid connection system, for radiant floor or wall circuits.	K389WY001	Ø 12-22	1	100

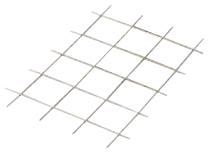
K389

p. 91

DESCRIPTION	CODE	SIZE	❐	⊞
Pipe-fitting rail for radiant floor circuits.	K389Y002	Ø 20 - pitch 50 mm	4	64
	K389Y003	Ø 25 - pitch 100 mm	4	64

K393

p. 90



DESCRIPTION	CODE	SIZE	❐	⊞
Galvanized electrowelded net. Thread diameter 1,6 mm.	K393Y001	mesh 50 x 50mm	40	-

K375

p. 90

DESCRIPTION	CODE	SIZE	❐	⊞
Protection additive for heating and/or cooling radiant systems.	K375Y001	1 liter	1	8

K376

p. 90

DESCRIPTION	CODE	SIZE	❐	⊞
Concrete fluidifying additive for radiant floor roughs.	K376Y001	10 liters	1	-

RADIANT FLOOR SYSTEMS

R996T

p. 52

HIGH-FLEXIBILITY PEX-b

DESCRIPTION	CODE	SIZE	❐	⊞
PEX-b cross-linked polyethylene Giacotherm pipe, with external anti-oxygen barrier. High-flexibility.	R996Y048	16 x 1,5	240	-
	R996Y065	16 x 1,5	500	-
	R996TY227	16 x 2	100	-
	R996TY219	16 x 2	240	-
	R996TY264	16 x 2	600	-
	R996TY054	17 x 2	100	-
	R996TY033	17 x 2	240	-
	R996TY052	17 x 2	600	-
	R996TY249	18 x 2	100	-
	R996TY220	18 x 2	240	-
	R996TY250	18 x 2	500	-
	R996TY221	20 x 2	100	-
	R996TY222	20 x 2	240	-
	R996TY253	20 x 2	400	-
	R996TY068	25 x 2,3	320	-

R978

p. 54

DESCRIPTION	CODE	SIZE	❐	⊞
PE-RT Type II polyethylene pipe with intermediate anti-oxygen barrier.	R978Y223	16 x 2	100	-
	R978Y226	16 x 2	240	-
	R978Y227	16 x 2	600	-
	R978Y233	17 x 2	100	-
	R978Y235	17 x 2	240	-
	R978Y237	17 x 2	600	-
	R978Y255	20 x 2	240	-
	R978Y256	20 x 2	400	-

R999

p. 55

DESCRIPTION	CODE	SIZE	❐	⊞
PEX-b/AL/PEX-b metal-plastic multilayer pipe.	R999Y122	16 x 2	100	-
	R999Y123	16 x 2	200	-
	R999Y124	16 x 2	500	-
	R999Y142	20 x 2	100	-
	R999Y143	20 x 2	200	-

R986-1

p. 54

DESCRIPTION	CODE	SIZE	❐	⊞
Polybutylene-1 homopolymer (PB-H) pipe with intermediate anti-oxygen barrier.	R986SY100	12 x 1,5	100	-
	R986SY120	16 x 1,5	100	-

R983

p. 91

DESCRIPTION	CODE	SIZE	❐	⊞
Radiant floor pipe-fitting clips.	R983Y001	for h37 or taller panels	100	1.000
	R983Y003	for h30 panels	100	1.000
	R983Y500	for R863 pistol	300	-
		For Eco panels		
	R983LY003	for R863LY003 pistol	1	-

RADIANT FLOOR SYSTEMS

R983N

DESCRIPTION	CODE	SIZE	❐	⊞
Plastic fitting plug for insulation-free preformed sheet.	**R983Y040**	M6 x 25 mm	100	1.000

R983S

DESCRIPTION	CODE	SIZE	❐	⊞
Fitting plug for radiant floor pipes.	**R983Y041**	M6 x 60 mm	100	1.000

K809

p. 91

DESCRIPTION	CODE	SIZE	❐	⊞
Fitting clips for dry-laid radiant floor pipes.	**K809Y001**	50 x 26 mm	1	100

R863

p. 91

DESCRIPTION	CODE	SIZE	❐	⊞
Clip-fitting pistol.	**R863Y500**	for R983Y500	1	-
	R863LY003	for R983LY003 clips	1	-

R865

DESCRIPTION	CODE	SIZE	❐	⊞
Universal unroller for plastic pipes.	**R865Y001**	-	1	-

R549P

p. 91

DESCRIPTION	CODE	SIZE	❐	⊞
Pipe bend support.	**R549PY003**	Ø 16-18	1	50
	R549PY004	Ø 20	1	50
	R549PY007	Ø 25	1	50

R179

p. 45

DESCRIPTION	CODE	SIZE	❐	⊞
Plastic pipe adaptor.	**R179X055**	18 x (12 x 1,5)	25	250
	R179X077	18 x (16 x 1,5)	25	250
	R179X105	22 x (25 x 2,3)	25	250

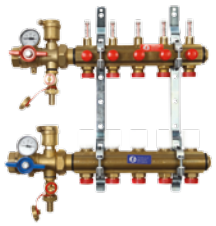
R179AM

p. 45

DESCRIPTION	CODE	SIZE	❐	⊞
Adaptor for plastic or multilayer pipes.	**R179MX024**	18 x (16 x 2)	25	250
	R179MX034	18 x (17 x 2)	25	250
	R179MX025	18 x (18 x 2)	25	250
	R179MX026	18 x (20 x 2)	25	250

R553FK

p. 42



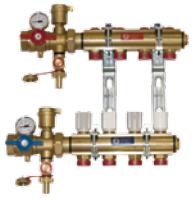
R269T MULTIFUNCTION VALVES INCLUDED

Preassembled manifold and multi-fuction valve kit for conditioning systems, flow meters (0,5÷5 l/min) included.

DESCRIPTION	CODE	SIZE	❐	⊞
		For R500-2 cabinets, 85÷130 mm depth		
	R553FK102	1"x 18 /2	1	-
	R553FK103	1"x 18 /3	1	-
	R553FK104	1"x 18 /4	1	-
	R553FK105	1"x 18 /5	1	-
	R553FK106	1"x 18 /6	1	-
	R553FK107	1"x 18 /7	1	-
	R553FK108	1"x 18 /8	1	-
	R553FK109	1"x 18 /9	1	-
	R553FK110	1"x 18 /10	1	-
	R553FK111	1"x 18 /11	1	-
	R553FK112	1"x 18 /12	1	-
		For R500 cabinets, 110 mm depth		
	R553FK022	1"x 18 /2 *	1	-
	R553FK023	1"x 18 /3 *	1	-
	R553FK024	1"x 18 /4 *	1	-
	R553FK025	1"x 18 /5 *	1	-
	R553FK026	1"x 18 /6 *	1	-
	R553FK027	1"x 18 /7 *	1	-
	R553FK028	1"x 18 /8 *	1	-
	R553FK029	1"x 18 /9 *	1	-
	R553FK030	1"x 18 /10 *	1	-
	R553FK031	1"x 18 /11 *	1	-
	R553FK032	1"x 18 /12 *	1	-

R553DK

p. 42



R269T MULTIFUNCTION VALVES INCLUDED

Preassembled manifold and multi-fuction valve kit for conditioning systems.
Brass-made with adaptor connections for copper, plastic or multilayer pipe.

DESCRIPTION	CODE	SIZE	❐	⊞
		For R500-2 cabinets, 85÷130 mm depth		
	R553DK102	1"x 18 /2	1	-
	R553DK103	1"x 18 /3	1	-
	R553DK104	1"x 18 /4	1	-
	R553DK105	1"x 18 /5	1	-
	R553DK106	1"x 18 /6	1	-
	R553DK107	1"x 18 /7	1	-
	R553DK108	1"x 18 /8	1	-
	R553DK109	1"x 18 /9	1	-
	R553DK110	1"x 18 /10	1	-
	R553DK111	1"x 18 /11	1	-
	R553DK112	1"x 18 /12	1	-
		For R500 cabinets, 110 mm depth		
	R553DK022	1"x 18 /2 *	1	-
	R553DK023	1"x 18 /3 *	1	-
	R553DK024	1"x 18 /4 *	1	-
	R553DK025	1"x 18 /5 *	1	-
	R553DK026	1"x 18 /6 *	1	-
	R553DK027	1"x 18 /7 *	1	-
	R553DK028	1"x 18 /8 *	1	-
	R553DK029	1"x 18 /9 *	1	-
	R553DK030	1"x 18 /10 *	1	-
	R553DK031	1"x 18 /11 *	1	-
	R553DK032	1"x 18 /12 *	1	-

R553FP

p. 42

R269T MULTIFUNCTION VALVES INCLUDED

DESCRIPTION	CODE	SIZE	❐	⊞
Modular technopolymer preassembled manifold kit with flow meter and multi-function valves.	R553FP002	DN32 x 3/4"E /2	1	-
	R553FP003	DN32 x 3/4"E /3	1	-
	R553FP004	DN32 x 3/4"E /4	1	-
	R553FP005	DN32 x 3/4"E /5	1	-
	R553FP006	DN32 x 3/4"E /6	1	-
	R553FP007	DN32 x 3/4"E /7	1	-
	R553FP008	DN32 x 3/4"E /8	1	-
	R553FP009	DN32 x 3/4"E /9	1	-
	R553FP010	DN32 x 3/4"E /10	1	-
	R553FP011	DN32 x 3/4"E /11	1	-
	R553FP012	DN32 x 3/4"E /12	1	-

R557R-2

p. 41

DESCRIPTION	CODE	SIZE	❐	⊞
Brass preassembled manifold for heating systems with fix-point regulation. Self-modulating circulator included and complying with ErP 2009/125/CE. For use with: - R557W insulation; - high-temperature or metering outlets.	R557RY024	1" x 18 /4	1	-
	R557RY025	1" x 18 /5	1	-
	R557RY026	1" x 18 /6	1	-
	R557RY027	1" x 18 /7	1	-
	R557RY028	1" x 18 /8	1	-
	R557RY029	1" x 18 /9	1	-
	R557RY030	1" x 18 /10	1	-
	R557RY031	1" x 18 /11	1	-
	R557RY032	1" x 18 /12	1	-
		Accessories		
	R553AY002	1" kit for n.2 zones	1	-
	R553AY003	1" kit for n.3 zones	1	-
	GE550Y100	1" metering kit	1	-
	R588RY010	1"	1	-

R557R-1

DESCRIPTION	CODE	SIZE	❐	⊞
Fix-point mixing group equipped with self-modulating circulator complying with ErP 2009/125/CE.	R557RY042	1"	1	-

R559N

p. 40

Preassembled manifold for heating and cooling systems with mixing valve electronic regulation. Electronic temperature control with K281X012 motor (sold separately) controlled by Giacomini klimabus Thermoreulation. Equipped with self-modulating circulator complying with ErP 2009/125/CE. For use with:
- R559W insulation;
- high-temperature or metering outlets.

CODE	SIZE	❐	▦
R559NY004	1" x 18 /4	1	-
R559NY005	1" x 18 /5	1	-
R559NY006	1" x 18 /6	1	-
R559NY007	1" x 18 /7	1	-
R559NY008	1" x 18 /8	1	-
R559NY009	1" x 18 /9	1	-
R559NY010	1" x 18 /10	1	-
R559NY011	1" x 18 /11	1	-
R559NY012	1" x 18 /12	1	-
	Accessories		
R553AY002	1" kit for n.2 zones	1	-
R553AY003	1" kit for n.3 zones	1	-
GE550Y100	1" metering kit	1	-
R588RY010	1"	1	-

R53VM

p. 44

Rapid-fitting modular return manifold with interception valve and manual handwheel, designed for electro-thermal control.

CODE	SIZE	❐	▦
R53VMY006	DN32 x 18	1	20

R53MM

p. 44

Rapid-fitting modular return manifold with flow meter and front balancing lockshield valve with mechanic memory.

CODE	SIZE	❐	▦
R53MMY006	DN32 x 18	1	20

R53VT

p. 44

Pair of rapid-fitting modular terminal return manifolds with interception valves and manual handwheel, designed for electro-thermal control.

CODE	SIZE	❐	▦
R53VTY006	1" x 18 x DN32	1	20
R53VTY007	1 1/4" x 18 x DN32	1	20

R53MT

p. 44

Pair of rapid-fitting modular terminal delivery manifolds with flow meters and front balancing lockshield valves with mechanic memory.

CODE	SIZE	❐	▦
R53MTY006	1" x 18 x DN32	1	20
R53MTY007	1 1/4" x 18 x DN32	1	20

R473M

p. 71

Electro-thermal head normally closed with micro limiting switch.

CODE	POWER	❐	▦
R473MX021	230 V	1	25
R473MX022	24 V	1	25
R473VX021	230 V	1	25

RADIANT FLOOR SYSTEMS

R478M

p. 71

DESCRIPTION	CODE	POWER	❐	▦
Electro-thermal head normally open with micro limiting switch.	R478MX021	230 V	1	25
	R478MX022	24 V	1	25
	R478VX021	230 V	1	25

R473

p. 71

DESCRIPTION	CODE	POWER	❐	▦
Electro-thermal head normally closed.	R473X121	230 V	1	25
	R473X122	24 V	1	25
	R473VX121	230 V	1	25

R478

p. 71

DESCRIPTION	CODE	POWER	❐	▦
Electro-thermal head normally open.	R478X121	230 V	1	25
	R478X122	24 V	1	25
	R478VX121	230 V	1	25

R500-2

p. 45

DESCRIPTION	CODE	SIZE	❐	▦
Electro-galvanized metal cabinet for concealed installation with adjustable depth and height.	R500Y221	400 x 650÷740 x 85÷130 mm	1	-
	R500Y222	600 x 650÷740 x 85÷130 mm	1	-
	R500Y223	800 x 650÷740 x 85÷130 mm	1	-
	R500Y224	1000 x 650÷740 x 85÷130 mm	1	-
	R500Y225	1200 x 650÷740 x 85÷130 mm	1	-

R557I

DESCRIPTION	CODE	SIZE	❐	▦
Electro-galvanized metal cabinet for concealed installation with varnished door and frame.		Complete cabinet		
	R557RY075	850 x 605 x 110 mm	1	-
	R557RY076	1000 x 605 x 110 mm	1	-
	R557RY077	1200 x 605 x 110 mm	1	-
		Frame + door		
	R557Y061	805 x 605 mm	1	-
	R557Y062	1000 x 605 mm	1	-
	R557Y063	1200 x 605 mm	1	-

K490I

p. 72

DESCRIPTION	CODE	POWER	❐	▦
Weekly ambient chronothermostat for concealed installation inside 3-modules civil box. Battery or electric powered.	K490IY001	230 V	1	-
	K490IY002	2 AAA 1,5 V batteries	1	-

K492

p. 73

DESCRIPTION	CODE	POWER	❐	▦
Weekly ambient chronothermostat for exposed wall installation with large touch-screen.	K492AY001	2 AA 1,5V batteries	1	-
	K492DY001	AA batteries + 230V	1	-
	K492PY001	AA batteries + 230V	1	-

RADIANT FLOOR SYSTEMS

K494

p. 72

DESCRIPTION	CODE	POWER	❐	⊞
Ambient thermostat for exposed wall installation. Display not backlit. Battery powered.	**K494AY001**	2 AAA 1,5 V batteries	1	-

K494I

p. 72

DESCRIPTION	CODE	POWER	❐	⊞
Electronic ambient thermostat for concealed wall installation. 230 V / 50 Hz power or battery powered.	**K494IY001**	230 V	1	-
	K494IY002	230 V	1	-
	K494IY011	3 AAA 1,5 V batteries	1	-
	K494IY012	3 AAA 1,5 V batteries	1	-

K499

DESCRIPTION	CODE	POWER	❐	⊞
Control module to be combined with all ambient chronothermostats of the K490I and K492 series. GSM remote control (K499Y001) or on-site centralized control (K499Y010).	**K499Y001**	10-22 Vcc or ac, 12 VA	1	-
	K499Y010	12-24 Vcc or ac, 5 VA	1	-

K373

p. 70

DESCRIPTION	CODE	POWER	❐	⊞
Safety thermostat with immersion probe. R227-1 housing included for delivery probe.	**K373Y012**	230 V	1	10

KPM30

p. 64

DESCRIPTION	CODE	POWER	❐	⊞
Regulation module for heating and/or cooling systems. With integrated display panel for system monitoring, configuration and control. 24 Vac power.	**KPM30Y001**	24 V	1	-
	KPM30Y002	24 V	1	-
	KPM30Y003	24 V	1	-
	KPM30Y004	24 V	1	-
	KPM30Y005	24 V	1	-

KPM31

p. 64

DESCRIPTION	CODE	POWER	❐	⊞
Regulation module for heating and/or cooling systems. No integrated display, for use with KD201 remote terminal for system monitoring, configuration and control. 24 Vac power.	**KPM31Y001**	24 V	1	-
	KPM31Y002	24 V	1	-
	KPM31Y003	24 V	1	-
	KPM31Y004	24 V	1	-
	KPM31Y005	24 V	1	-

RADIANT FLOOR SYSTEMS

KPM35

p. 65

DESCRIPTION	CODE	POWER	❐	⊞
Inlet/outlet expansion module for KPM30 or KPM31 regulation modules.	**KPM35Y001**	24 V	1	-

KPM36

p. 65

DESCRIPTION	CODE	CHARACTERISTICS	❐	⊞
Additional cards for KPM30/KPM31 regulation modules for integration with other communication protocols.	**KPM36Y001**	Modbus Card	1	-
	KPM36Y002	Konnex Card	1	-
	KPM36Y003	Ethernet Card	1	-

KD201

p. 65

DESCRIPTION	CODE	POWER	❐	⊞
Semi-graphic keypad terminal for system monitoring, configuration and control. White backlit semi-graphic LCD display. Klimabus series.	**KD201Y001**	Through KPM30/KPM31	1	-

K495B

p. 70

DESCRIPTION	CODE	POWER	❐	⊞
Ambient sensor without display and local interface (blind), with temperature/humidity sensor. Klimabus series.	**K495BY002**	24 V	1	-

K495L

p. 69

DESCRIPTION	CODE	POWER	❐	⊞
Ambient backlit thermostat with local interface for temperature/humidity control. Klimabus series.	**K495LY002**	24 V	1	-

K492B

p. 68

DESCRIPTION	CODE	POWER	❐	⊞
Ambient backlit thermostat with local interface for temperature/humidity control. Klimabus series.	**K492BY002**	230 V	1	-

K493T

p. 70

DESCRIPTION	CODE	POWER	❐	⊞
Ambient thermostat with temperature/humidity sensor. Equipped with color backlit touch-display. Klimabus series.	**K493TY002**	12 Vdc	1	-

RADIANT FLOOR SYSTEMS

K493I

p. 70

DESCRIPTION	CODE	POWER	❐	⊞
Blind temperature/humidity sensor for concealed installation on civil hole cover. Klimabus series.	**K493IY002**	12 Vdc	1	-

K463P

p. 65

DESCRIPTION	CODE	POWER	❐	⊞
Passive immersion delivery temperature probe.	**K463PY001**	-	1	-

K465P

p. 65

DESCRIPTION	CODE	POWER	❐	⊞
Passive external temperature probe.	**K465PY001**	-	1	-

KDP

p. 80

DESCRIPTION	CODE	CHARACTERISTICS	❐	⊞
Humidity control monoblock unit for wall concealed installation. For use with cooling radiant systems. Possible sensible power integration. Availability of wooden white lacquered outer casing and front panel.	**KDPY024**	dehumidification	1	-
	KDPRY024	dehumidification + integration	1	-
		Accessories		
	KDPCY024	outer casing	1	-
	KDPFY024	front panel	1	-

KDS

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DESCRIPTION	CODE	CHARACTERISTICS	❐	⊞
Humidity control monoblock unit for false-ceiling installation. For use with cooling radiant systems. Possible sensible power integration and primary air treatment.	**KDSY026**	dehumidification	1	-
	KDSRY026	dehumidification + integration	1	-
	KDSRY350	deum. + integr. + primary air	1	-
	KDSRY500	deum. + integr. + primary air	1	-
		Accessories		
	KDSPLY026	plenum for KDSY026, KDSRY026	1	-
	KDSPLY350	plenum for KDSRY350	1	-

KDV

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DESCRIPTION	CODE	CHARACTERISTICS	❐	⊞
Air treatment duct-type monoblock unit for ventilation, dehumidification and sensible power integration. False-ceiling installation. For use with cooling radiant systems. With high-efficiency counter-current air heat recuperator.	**KDVRWY300**	air condensation	1	-
	KDVRAY300	air condensation	1	-

RADIANT FLOOR SYSTEMS

R586P

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DESCRIPTION	CODE	SIZE		
		For KPM20 regulation module		
Heating and cooling mixing group with non-mixed direct flow and mixed flow through 3-ways valve with piston stopper and actuator. Includes self-modulating circulators (compliance with ErP 2009/125/CE).	**R586PY004**	1" - Kv 5 *	1	-
	R586PY005	1" - Kv 10 *	1	-
	R586PY006	1 1/4" - Kv 16 *	1	-
		For KPM30 regulation module		
	R586PY014	1" - Kv 5	1	-
	R586PY015	1" - Kv 10	1	-
	R586PY016	1 1/4" - Kv 16	1	-

R586R

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DESCRIPTION	CODE	SIZE		
Module for mixing or basic circulation for heating adn cooling system secondary control. Equipped with self-modulating circulator complying with ErP 2009/125/CE .	**R586RY001**	1" - mixer-free	1	-
	R586RY002	1" - with R296 mixer	1	-
	R586RY003	1" - with R298 mixer	1	-
	R586RY004	1" - with R462L (fix point)	1	-

R146IR

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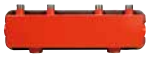

DESCRIPTION	CODE	SIZE		
Varnished steel insulated hydraulic separator for R586R.	**R146IY027**	1 1/2"	1	-

R586I

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DESCRIPTION	CODE	SIZE		
Insulated modular fitting group for R586R.	**R586IY011**	1 1/4" x 1"	1	-

K297R

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DESCRIPTION	CODE	SIZE		
Mixing group with K297 3-ways mixing valve (actuator not included), for use with R586R and R586I.	**K297RY016**	1 1/4"	1	-

K297

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DESCRIPTION	CODE	SIZE		
Motorizable 3-ways mixing valve with piston stopper.	**K297Y004**	DN20 - Kv 6,3	1	-
	K297Y005	DN25 - Kv 10	1	-
	K297Y006	DN32 - Kv 16	1	-
	K297Y007	DN40 - Kv 25	1	-
	K297Y008	DN50 - Kv 40	1	-

K274J

DESCRIPTION	CODE	POWER	❐	⊞
Actuator for K297 mixing valve. 24 V power.	**K274Y022**	24 V - 3-points floating drive	1	-
	K274Y042	24 V - 0÷10 V	1	-

K281

DESCRIPTION	CODE	POWER	❐	⊞
Actuator for R298 mixing valve, for use with Giacomini thermoregulation devices. 24 V power.		M28 x 1,5 mm connection		
	K281X002	24 V - 3-points floating drive	1	-
		M30 x 1,5 mm connection		
	K281X022	24 V - 3-points floating drive	1	-
	K281X012	24 V - 0÷10 V	1	-

K282

DESCRIPTION	CODE	POWER	❐	⊞
Actuator with automatic control for R298 mixing valve, equipped with temperature sensor and integrated electronic regulator. 24 V power.		M28 x 1,5 mm connection		
	K282X002	24 V - 3-points floating drive	1	-

K274

DESCRIPTION	CODE	POWER	❐	⊞
Actuator for R296 mixing valve, for use with Giacomini thermoregulation devices. 24 V power.	**K274Y102**	24 V - 3-points floating drive	1	-

Giacomini S.p.A. is a company with an ICIM certified Integrated Quality Management System for Environment, Health & Safety

ICIM ISO 9001 0006/7

UNI EN ISO 9001: 2008
Quality Management Systems

ICIM ISO 14001 0032A/3

UNI EN ISO 14001: 2004
Environmental Management Systems

ICIM OHSAS 18001 0064L/1

OHSAS 18001: 2007
Occupational Health & Safety
Mangement Systems

GIACOMINI
WATER E-MOTION

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Via per Alzo, 39
28017 San Maurizio d'Opaglio (NO) ITALY

Phone +39 0322 923111

giacomini.com