



TIEMME, INNOVATION FOR A STEADY GROWTH

Tiemme Raccorderie is an international leader in the production and marketing of plumbing and heating components. Experience, innovative capacity, creativity and exclusive Made in Italy production, tradition and culture, attentive customer care and environmental consciousness are the key values from which Tiemme creates solutions for plumbing and heating system engineering, in a perfect mix of technical competence and top material quality. That allowed Tiemme to develop through the years an extensive catalogue of products introducing itself to the world of systems engineering as an “all-in-one supplier”, able to meet the most diverse demands of the plumbing and heating industry. Tiemme prides itself in keeping the entire production chain on national territory so as to ensure high quality, unquestionable safety and reliability of its products and systems. Each year, Tiemme also invests considerable resources in the research and development of new solutions so as to anticipate the requests of an increasingly global market. 4,000,000 metres of PE-x extruded oxygen barrier tube.





TIEMME - VIEW ON RENOVATION AND ENERGY REDEVELOPMENT

The renovation is an important opportunity to improve the energy performance of your home, to make it more efficient and therefore reduce the consumption of plant management.

An efficient renovation means replacing the heat generator and the old radiator heating system with more innovative solutions and higher performance.

Interventions of this kind are encouraged by providing tax benefits for the tax payers in the current regulatory framework. We will now consider a few interventions from a structural point of view, such as: structural consolidation, moisture infiltration inside the walls, windows replacement, floor loading capacity and its seismic adaptation.

TIEMME offers a very wide range of heating systems: underfloor and ceiling heating and cooling systems specifically developed to meet all the needs of any building under renovation.

A plant that is perfectly integrated in the environment, today more than in the past- that is our very goal.

IMPORTANT: DEROGATION ON INTERNAL MINIMUM HEIGHT IN RESIDENTIAL AREAS

The three national decrees containing the new dispositions on energy efficiency in the building sector have been published in the Official Gazette, and they update the old Legislative Decree 192/2005 and 311/2006, which, together with their Implementing Decrees, defined the national framework for energy certification of buildings.

In Attachment 1 of the Decree from June 26, 2015- Application of calculation methodologies for energy performance and definition of buildings minimum requirements - there we find the major news concerning radiant systems and it reads:

4. In existing buildings undergoing major renovations, or energy upgrades as defined in article 2, paragraph 1, letters l-vicies ter), and l-vicies quater), of the Legislative Decree, being clarified as referred to in paragraphs 1.3 and 1.4 of this Annex, in the case of installation of heating systems equipped with radiant floor or ceiling panels, and in the case of insulation intervention from the inside, the minimum heights of the rooms in the first and second subparagraph of the ministerial decree 5 July, 1975, may be waived up to 10 centimetres.

By installing a radiant system, the minimum internal height will no longer be 2.7 metres, but 2.6 metres, giving many existing buildings a chance to replace the old radiator systems with a newer radiant floor or ceiling system.



NZEB

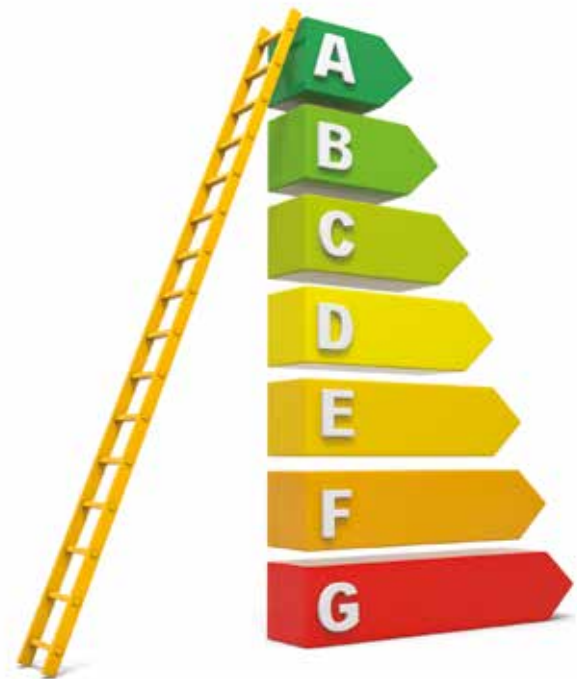
The buildings designed with high quality thermal insulation standards, in line with the European directives (which impose the execution of "nearly zero energy" construction projects by 2020) will benefit the most from our winter and summer air conditioning solutions thanks to the wall-, ceiling- or floor-radiant system (low thermal inertia).

A house that follows today's energy standards should be featuring:

- reduced energy requirements for summer and winter air conditioning;
- discontinuous and time-limited power demand.

Radiant systems with low-thickness screeds prove to be the best solution to adopt, as they are characterised by reduced thermal inertia and reduced set-up times.

The regulatory framework is very clear and subsequently, the world of renovations and upgrading proceeds towards low-consumption and high-performance buildings, which is why TIEMME is providing a wide range of floor and ceiling heating and cooling systems especially designed to meet specific needs of new and renovated buildings. Tiemme technical department is ready to fulfil your requirements by offering the best solution according to your project.

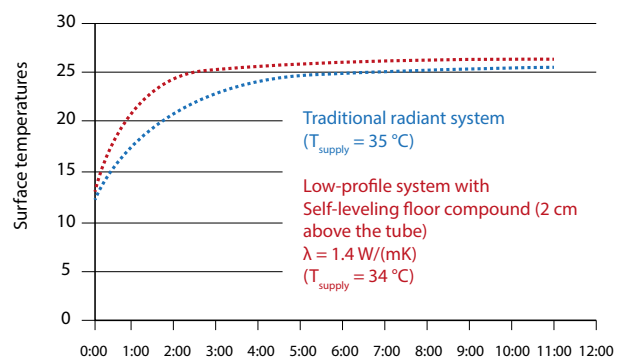


Evaluation of inertia in radiant systems

In physics, and in mechanics particularly, the inertia of a body is the property that determines the resistance to changes in the state of motion, and is qualified by the inertial mass. Applying this concept to radiant systems is complex because there are many boundary conditions that affect its performance.

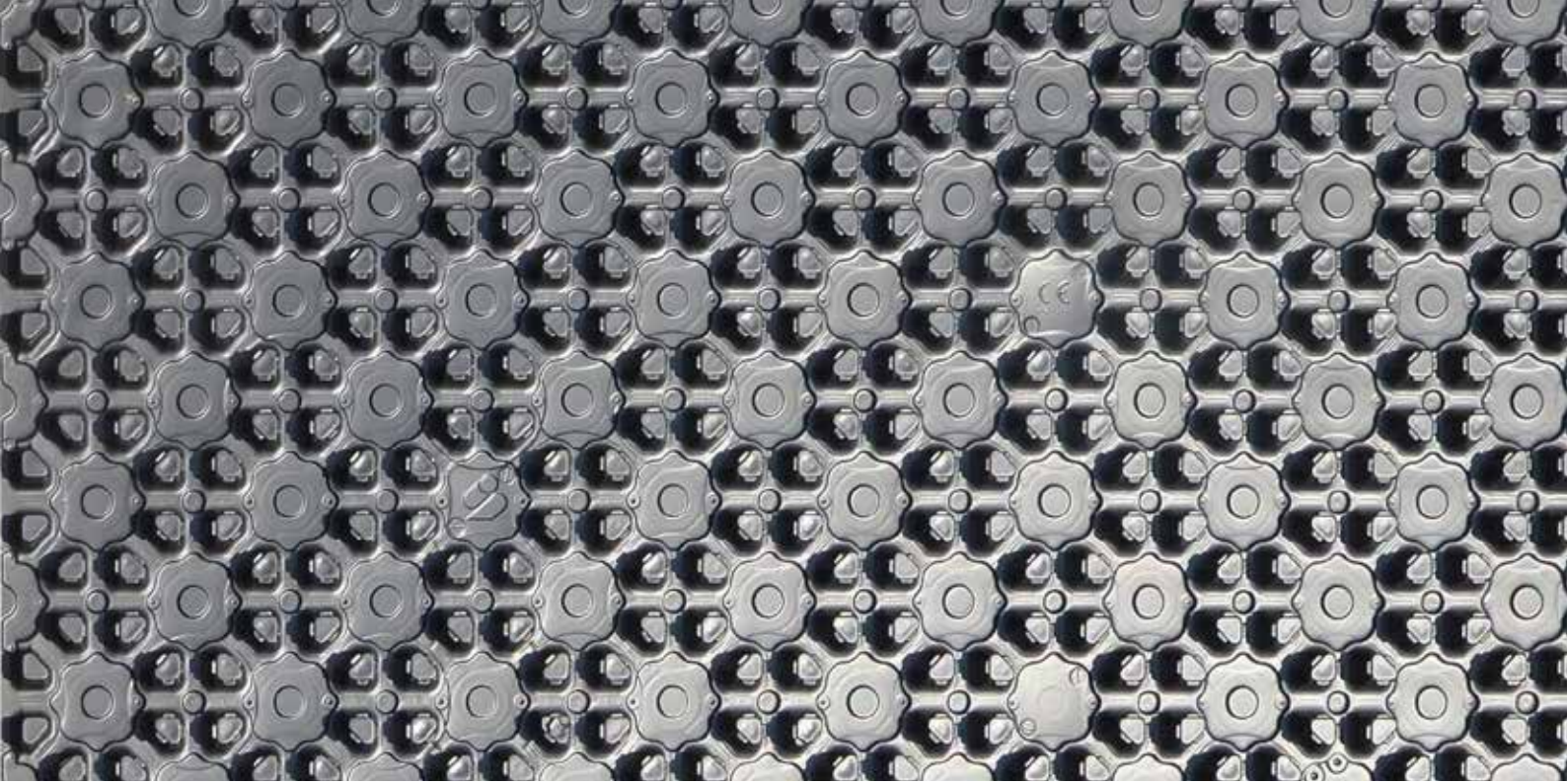
The factors that influence the inertia of the system are:

- Inertial temperature
- Temperature of the environment to be air-conditioned
- System placement (underfloor or outside)



A prompt and precise methodology for inertia evaluation is the execution of dynamic simulations to the finished elements on plant sections. An example of the obtainable results is shown in Figure 2 - the surface temperatures of two radiating systems as a function of time. For the low-profile system (shown in red in the figure), the time it takes to reach the desired surface temperature is less than 30 minutes. For the traditional system consisting of an insulator and a concrete screed it takes a longer time to reach the desired surface temperature.

This will have to be considered in the planning of the system regulation to ensure that the desired temperature is reached within 24 hours. The concept of thermal inertia is also important when the system is switched off: a low inertia system will take less time to cool off compared to a traditional system. The radiant systems with low profile screeds, and therefore low thermal inertia, allow an extremely effective room regulation and in perfect harmony with the new low-consumption building.



TIEMME SLIM

Renovation offers the ideal opportunity to improve the overall energy performance of your home by gaining in efficiency and reducing consumption. Under current legislation, these measures are encouraged by offering advantages to the taxpayer.

The Tiemme range includes underfloor heating and cooling systems developed ad hoc to meet the specific requirements of buildings undergoing renovation.

When the space available is extremely limited, the Tiemme Slim system is the perfect solution.

The panel available in the version with adhesive, to be applied straight onto the existing floor, or in white 0.05 cm EPS insulation, makes it possible to create very efficient low radiant systems. The unique shape of the panel allows the pipe to be laid orthogonally or diagonally at 45°, while coupling of the panels is guaranteed by overlapping of the lateral cleats.

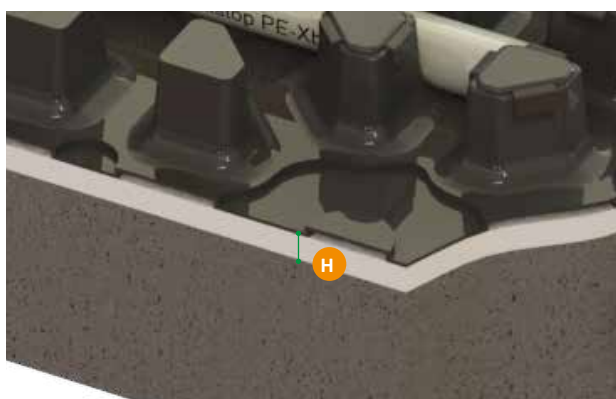
TIEMME SLIM / HOW IS IT MADE?

Tiemme Slim is the innovative Tiemme system created to meet the demand for radiant systems with low thermal inertia and lower thicknesses. Designed to meet system requirements when renovating, thanks to reduced thickness and the possibility of bonding to the existing flooring, it is possible to create systems without having to resort to demolition, to improve the energy performance of existing buildings by working with a low temperature radiant system. It can be combined with 16x2mm and 17x2mm diameter pipes and guarantees excellent flow rates both when operating in winter and in summer, with low drops in pressure and, as a result, optimisation of the circulation pump. The cleat, which is optimised to guarantee perfect contact between the pipes and the screed, increases the yield of the system and even allows for diagonal installation at 45° without having to use clips. The pre-moulded sheet in thermoformed PS is extremely resistant to foot traffic thus optimising installation on site. Available in versions without self-adhesive insulation or with 5mm of white EPS 200 insulation, it can be adapted to meet diverse application needs.

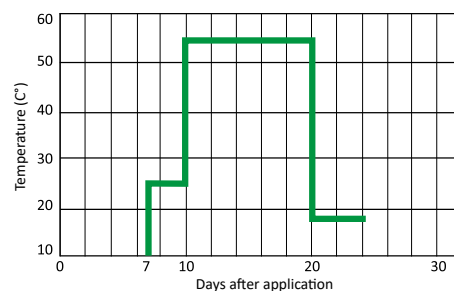


- 1 Covering
- 2 Lowered screed
- 3 Self-adhesive Tiemme Slim
- 4 Pipe
- 5 Flush system
- 6 Tiemme Slim 24,1 mm

Codes	Dimensions [mm]
	H
450 0641	19
450 0642	23,6



Heat Cycle



- No net
- Joints every 20 ml

TIEMME SLIM / PANEL

4519

Thermoformed panel with no heat insulation with raised cleats to block the pipe. Orthogonal installation pitch of 50 mm and multiples, diagonal installation pitch of 43/70 mm and multiples. Specific for renovations.

Codes

Codes	Thickness	m ² /Packaging	Panels/Packaging
450 0641	19 mm	17,92	11
450 0642	23,6 mm	22,40	11



Technical specifications

Technical Specifications of the panel	Codes	
	450 0641	450 0642
Panel sizes [mm]	1400x800 Self-adhesive base	1400x800
Insulation thickness [mm]	-	5
Cleat thickness [mm]	18,0	18,0
Total panel thickness [mm]	19,0	23,6
Pipe thickness [mm]	16- 17	16- 17
Inter-axes [cm]	5 and multiples	5 and multiples
Thermal resistance on average effective thickness $R_{\lambda,ins}$ [m ² K/W]	-	0,25
Thermoformed PS sheet thickness [mm]	1	0,6
Declared thermal conductivity [W/mK]	-	0,034
Fire reaction classification [EN 13501-1 Euroclass]	E	E
Panels per pack [no]	16	16
m ² /pack	17,92	22,40

The Tiemme Slim radiant panel is the ideal product for building requalification interventions, combined with screeds lowered by 0.5/1 cm above the cleat, it makes it possible to create efficient systems both for heating and cooling environments.

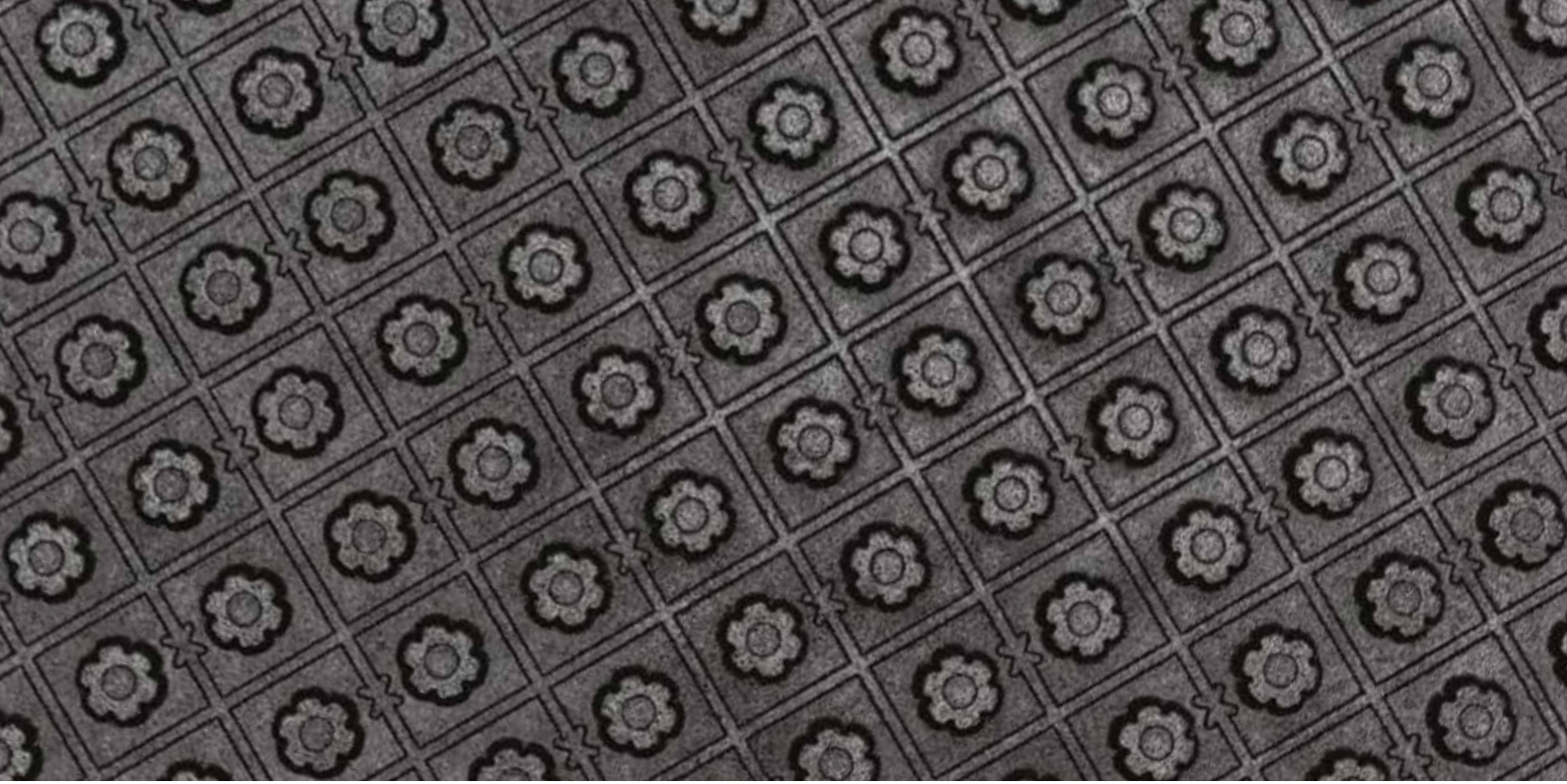
The unique shape of the Tiemme Slim thermoformed sheet allows the screed to fully surround the surface of the pipe to optimise the system's performance. The pipe hooking system makes it possible to avoid using clips to fix the pipe, thus reducing installation times. The Tiemme Slim radiant panel allows pipes to be laid horizontally, vertically or diagonally at 45°, making the system perfectly flexible as it can even be laid in environments with irregular floorplans.



Specification item

450 0641 – Tiemme Slim thermoformed slab in 1mm thick PS with lower adhesive layer protected by silicone film. Shaped cleats arranged for the installation of 16mm and 17mm diameter pipes, with multiple inter-axes of 5 cm when laid at 90° and multiple inter-axes of 7.1 cm when laid at 45°; cleats with undercuts for laying pipes without the aid of fixing clips; panel has ridges to minimise contact between the piping and the insulation and maximise contact with the screed. The PS film protrudes by 5cm via a double row of cleats on two sides of the panel so that the slabs can be interlocked and coupled as required by UNI EN 1264. Waterproof film ideal for liquid screeds. Plan dimensions of 1400 x 800 mm. Euroclass fire reaction classification E (EN 13501-1, Euroclass). Thickness 18mm + 1mm.

450 0642 - Tiemme Slim thermoformed insulation panel equipped with 5mm of white EPS200 insulation with declared thermal conductivity of 0.034 W/mK (UNI EN 13163, UNI EN 12667), protected on top by a film in PS obtained by thermoforming with a thickness of 6mm (UNI EN 1264-4); Shaped cleats arranged for the installation of 16mm and 17mm diameter pipes, with multiple inter-axes of 5 cm when laid at 90° and multiple inter-axes of 7.1 cm when laid at 45°; cleats with undercuts for laying pipes without the aid of fixing clips; panel has ridges to minimise contact between the piping and the insulation and maximise contact with the screed. The PS film protrudes by 5cm via a double row of cleats on two sides of the panel so that the slabs can be interlocked and coupled as required by UNI EN 1264. Waterproof film ideal for liquid screeds. Insulation in 5mm thick white EPS with compressive strength at 10% of 200kPa (EN 826). Plan dimensions of 1400 x 800 mm. Available insulation thicknesses: 5 mm with thermal resistance pursuant to UNI-EN 1264 of 0.25 m2K/W. Euroclass fire reaction classification E (EN 13501-1, Euroclass). Total thickness 23.6mm- (18+0, 6+5) mm.



LOW BLACK SYSTEM

Low Black System is the innovative Tiemme system created to meet the demand for low thermal inertia radiant systems. The wide range of thicknesses allows the application both in new buildings, yet ensuring the thermal resistance values required by UNI EN 1264, and during renovations when the containment of the overall dimension is priority. Made of sintered expanded polystyrene with graphite and high mechanical resistance (EPS 300), it is particularly suitable for the coupling with special screeds lowered up to 1 cm above the pipe. The panel is equipped with a 170 µm HIPS thermosealed polystyrene protection layer as required by the current legislation. Coupled with 16x2 and 17x2 pipes, it is designed to deliver high flow rates and low pressure drops.

LOW BLACK SYSTEM / EXTRA BENEFITS

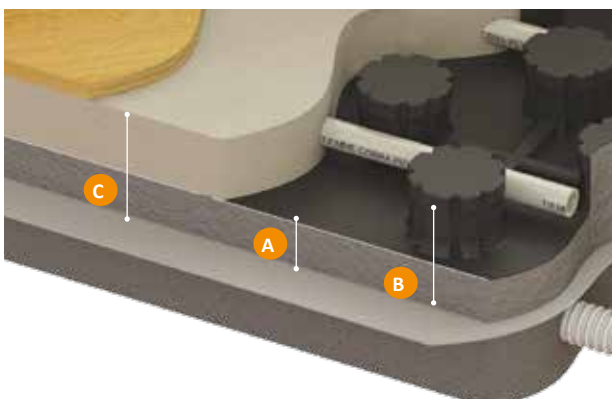
- 1 Low thermal inertia
- 2 High mechanical strength
- 3 Suitable for new constructions and renovations
- 4 Different thicknesses available
- 5 Insulation protection layers according to the UNI EN 1264 standard
- 6 Eps with graphite for high thermal insulation
- 7 Easy installation
- 8 Easy coupling of adjoining panels



LOW BLACK / WHAT DOES IT COME WITH?



- 1 Skirting boards
- 2 Coating
- 3 Screed
- 4 Tube
- 5 Thermally insulating panel
- 6 Perimeter strip
- 7 PE foil



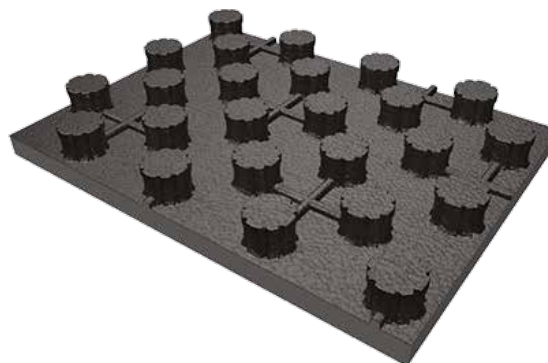
Codes	Dimensions [mm]		
	A	B	C
450 0567	12	31	41
450 0568	19	38	48
450 0569	34	53	54

	THICKNESS COMPLYING TO THE UNI EN 1264:2009 STANDARD Size mm Panel code	CASE I 19 mm 450 0568	CASE II and III 34 mm 450 0569
	CASE IV [External T ≥ 0 °C] 34 mm 450 0569	CASE IV [-5°C ≤ External T < 0 °C] - -	CASE IV [-15°C ≤ External T < -5 °C] - -

LOW BLACK / PANEL

4518GRF

Insulation for radiant floor systems, made of closed-cell expanded polystyrene added with graphite, coupled with a polystyrene laminate heat sealed HIPS 170 µm, CE marked, capable of radiating systems powered by water for heating and cooling integrated into structures according to UNI EN 1264.



Codes

Codes	Thickness	R.C. 10%	m ² /Packaging	Panels/Packaging
450 0567	12 mm	300 kPa	23,52	21
450 0568	19 mm	300 kPa	17,92	16
450 0569	34 mm	300 kPa	12,32	11

Dimensional characteristics

FEATURE	THICKNESS			CHARACTERISTIC	VALUE
Insulation thickness [mm]	12	19	34	Clevis height [mm]	19
Calculated average effective thickness sins [mm]	17	24	39	Clevis spacing [mm]	50
Total panel thickness [mm]	31	38	53	Heating tube diameter [mm]	16- 17
Pcs per package [no.]	21	16	11	Panel useful dimensions [mm]	1400 x 800
m ² per package [m ²]	23,52	17,92	12,32	Panel total dimensions [mm]	1425 x 825
Packaging type	BOX	BOX	BOX	Panel useful surface [m ²]	1,12

Technical specifications

CHARACTERISTICS	STANDARD REFERENCE	EPS TYPE	THICKNESS			CLASS
			12	19	34	
Thermal resistance on average effective thickness $R_{\lambda,ins}$ [m ² K/W]	UNI EN 1264-3:09	300	0,55	0,77	1,26	
Declared thermal conductivity	UNI EN 13163:17	300	0,031			0,031
Durability of thermal conductivity against heat, weather conditions, degradation, wear and tear	UNI EN 13163:17	300	The thermal conductivity of EPS does not change over time			
Fire resistance rating	EN ISO 11925-2:10 + EC1:11	300	EUROCLASSE- E- UNI EN 13501:11			E
Durability of reaction to fire against heat, weather conditions, degradation, wear and tear	UNI EN 13163:17	300	The fire reaction of EPS does not change over time			E
Compressive strength at 10% deformation σ_{10} [KPa]	UNI EN 826:13	300	300			CS(10)300
Long-term water absorption W_{lr} [%]	UNI EN 12087:13	300	5			WL(T)5
Dimensional tolerance thickness d_N [mm]	UNI EN 823:13	300	± 2			T(2)
Resistance to water vapour diffusion of EPS μ [num]	UNI EN 12086:13	300	100-160			Z 100-160
Resistance to water vapour diffusion of HIPS μ [num]	UNI EN 12086:13	HIPS	10.000			===

Item Specifications

Insulating panel for underfloor radiant systems according to the UNI EN 1264 standard, made of sintered expanded polystyrene with closed cells EPS 300, additivated with graphite, coupled with a protective layer in thermally welded laminated polystyrene HIPS 170 µm, CE marked. It can be combined with ultra-low screeds up to 0.8 cm above the pipe (follow manufacturer's instructions). 5 cm multiple steps for the 16x2mm and 17x2mm pipes. The panel complies with the UNI EN 13163: 2009 standard and is CE marked, complying with the requirements in the guidelines for the insulation of underfloor systems with Euro fire reaction class E, according to EN 13501-1. Plan dimensions 1400 x 800 mm. Insulation thicknesses available: 12mm with thermal resistance according to UNI-EN 1264 0.55 m²K / W, 19 mm with thermal resistance according to UNI EN 1264 of 0.77 m²K / W and 34 mm with thermal resistance according to UNI EN 1264 1, 26 m²K / W. Thermal conductivity 0.031 W / (m K) and compressive strength at 10% deformation of 300 kPa.



DRY SYSTEM

Dry System is the innovative dry system created by TIEMME to meet the demand for low thermal inertia radiant systems. The wide range of thicknesses allows the application both in new buildings, yet ensuring the thermal resistance values required by UNI EN 1264, and during renovations when the containment of the overall dimension is priority. Very fast laying, no need for screed drying time. High heat conductivity thanks to the 0.15mm aluminum foil pre-coupled to the EPS panel. Available with 150mm and 100mm step for the best performance in both winter and summer. Made of sintered expanded polystyrene with graphite with high mechanical resistance (EPS 300), it can be coupled with 16x2mm pipes, it is designed to deliver high flow rates and low pressure drops.

DRY SYSTEM / EXTRA BENEFITS

Tiemme DRY SYSTEM allows the application of different ceramic or wooden floors. Since no screed is needed the set-up times are extremely fast, allowing intermittent time programming. The presence of a 0.15 mm aluminium foil favours the uniform propagation of heat providing high yields. The strengths of DRY SYSTEM are briefly described below:

- 1 EPS with graphite for high thermal insulation
- 2 High conductivity thanks to the coupling with a 1050 aluminium foil thickness 0,15 mm
- 3 Low thermal inertia
- 4 High resistance to mechanical stress EPS 300
- 5 Suitable for new constructions and renovations
- 6 Quick installation: no screed drying tim
- 7 Suitable for radiant heating and cooling systems
- 8 Extremely low operating times (less than 1 hour)



**IDEAL FOR BUILDING
RENOVATIONS AND NEW
BUILDINGS**

**LOW THERMAL INERTIA AND LOW
WEIGHT**

Classification AAA

Classification AA

Classification A

Classification B

Classification C

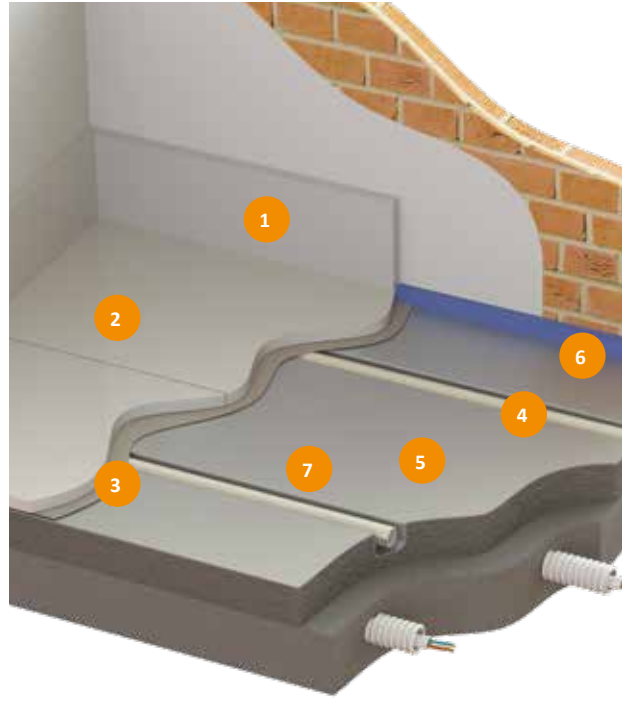
Classifications D

DRY / WHAT IS IT?

Dry System is the innovative dry system created by TIEMME to meet the demand for low thermal inertia radiant dry systems. The wide range of thicknesses allows the application both in new buildings yet ensuring the thermal resistance values required by UNI EN 1264, and during renovations where the containment of the overall dimension is priority. Very fast laying, no need for screed drying time. High heat conductivity thanks to the 0.15 mm aluminium foil pre-coupled to the EPS panel. Available with 150mm and 100mm step for the best performance in both winter and summer. Made of sintered expanded polystyrene with graphite with high mechanical resistance (EPS 300), it can be coupled with 16x2mm pipes, it is designed to deliver high flow rates and low pressure drops. The ceramic floorings can be glued directly to the panel after being protected by means of a special aluminium foil primer. Floating or glued laying in combination with a special cement lowered level is recommended for wood flooring.



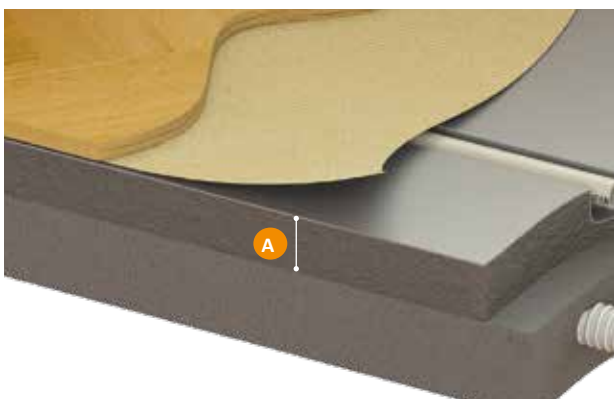
- 1 Skirting boards
- 2 Parquet
- 3 TNT
- 4 Tube
- 5 Thermally insulating panel
- 6 Perimeter strip



- 1 Skirting boards
- 2 Ceramic coating
- 3 Glue
- 4 Tube
- 5 Thermally insulating panel
- 6 Perimeter strip



- 7 Adhesive tape (for pipe elbow locking)



Codes	Dimensions [mm]
	A
450 0562	26
450 0563	42
450 0564	26
450 0565	42

	THICKNESS COMPLYING TO THE UNI EN 1264:2009 STANDARD Dim. A mm Cod. pannello	CASE I 26 mm 450 0562 (450 0564)	CASE II and III 42 mm 450 0563 (450 0565)
	CASE IV [external T ≥ 0 °C]	CASE IV [-5°C ≤ external T < 0 °C]	CASE IV [-15°C ≤ external T < -5 °C]
-	-	-	-

DRY / PANEL

4517GRF

Insulating panel for dry floor radiant systems in EPS 300, with graphite additive, pre-coupled to a 1050 aluminium foil with high thermal conductivity. Low thermal inertia due to the absence of screed allowing a fast regulation. Suitable for heating and cooling systems and available at 100 or 150 installation steps.

Codes

Code	Thickness	Interasse	R.C. 10%	m ² /Packaging	Panels/Packaging
450 0562	26 mm	100 mm	300 kPa	11,20	10
450 0563	42 mm	100 mm	300 kPa	6,72	6
450 0564	26 mm	150 mm	300 kPa	10,5	10
450 0565	42 mm	150 mm	300 kPa	6	6,30



Technical specifications

FEATURES	450 0562	450 0563	450 0564	450 0565
EPS compression strength class	EPS 300			
Aluminium alloy	1050			
EPS λD declared thermal conductivity	0,031 W/mk			
Thermal resistance Rλ,ins	0,75 m ² K/W	1,27 m ² K/W	0,75 m ² K/W	1,26 m ² K/W
Compressive strength at 10% deformation σ10	300 kPa			
Reaction to fire class	Euroclasse E			

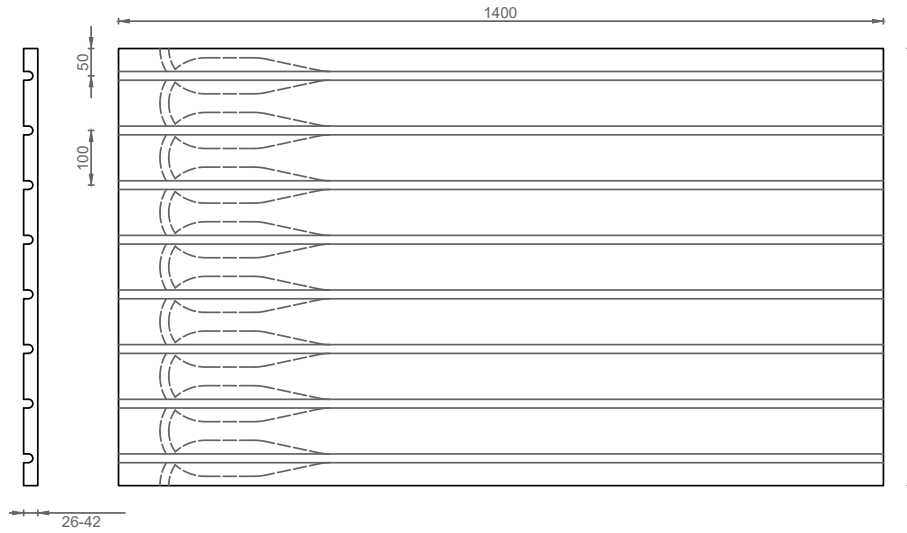
Item Specifications

Insulation for dry radiant floor systems in compliance with the UNI EN 1264 standard, made of closed-cell expanded polystyrene EPS 300, and added graphite, pre-coupled with a layer of aluminium alloy 1050, high thermal conductivity of 0.15 mm thickness. The absence of screed allows regulation short timings. The panel complies with the UNI EN 13163: 2009 standard and is CE marked, complying with the requirements in the guidelines for the insulation of underfloor systems with Euro fire reaction class E, according to EN 13501-1. Plan dimensions 1400 x 800 mm as for the 100 mm step and 1400 x 750 as for the 150 mm step. Insulation thicknesses available: 26mm with thermal resistance according to UNI-EN 1264 0.75 m²K / W, 42 mm with thermal resistance according to UNI EN 1264 of 1,27 m²K / W. Thermal conductivity 0.031 W / (m K) and compressive strength at 10% deformation of 300 kPa.

DRY / PANEL

Dimensional characteristics

FEATURE	450 0562	450 0563
Length	1400 mm	
Width	800 mm	
Thickness	26 mm	42 mm
Step	100 mm	
Useful area	1,12	



FEATURE	450 0564	450 0565
Length	1400 mm	
Width	750 mm	
Thickness	26 mm	42 mm
Step	150 mm	
Useful area	1,05 m ²	

