



TIEMME SLIM - LOW BLACK - DRY
LOW THERMAL INERTIA SYSTEMS
FOR HIGH PERFORMANCE BUILDINGS

TIEMME VIEW ON RENOVATION AND ENERGY REDEVELOPMENT

Renovation is an ideal situation to improve the energy performance of your house, resulting in higher efficiency and savings in terms of system management costs.

Efficient renovation entails the replacement of the heat generator and the old heating system with radiators, with more innovative and high performance solutions.

In compliance to new regulations in force, tax benefits are granted to the taxpayer for this type of interventions. From a structural perspective, the following interventions should be considered: structural strengthening, moisture content of masonry walls, replacement of windows and doors, reduction of surcharges on slabs, and seismic upgrading.

The wide range of TIEMME radiant solutions includes floor or ceiling heating and cooling systems tailored upon any specific needs of the buildings undergoing renovation.

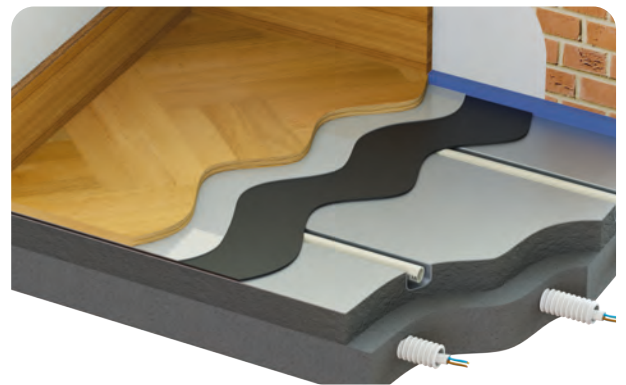
Our main goal is to create a system that is perfectly integrated in the environment, now more than ever.

THIN SYSTEMS - TIEMME SOLUTIONS

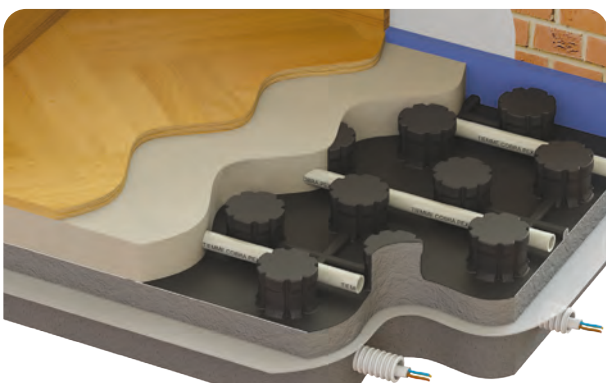
TIEMME SLIM



DRY



LOW BLACK



NZEB BUILDINGS

For buildings designed with high quality standards in terms of thermal insulation, in compliance with European directives requiring by 2020 the construction of “almost zero energy” buildings, a (low thermal inertia) radiant wall, ceiling or floor system, is the ideal solution for a winter and summer climate control. A house complying with current energy standards is characterized by:

- reduced energy supply needs for winter and summer climate control;
- occasional and limited need for power.

Radiant systems with thin screeds are the best possible solution, due to their low thermal inertia and reduced time needed for a full implementation.



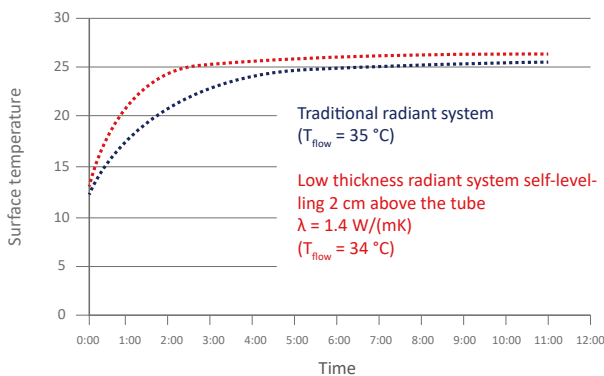
Regulatory provisions are very clear and, as a consequence, the world of renovation and redevelopment tends to create low-consumption and high-performance buildings. For this reason, TIEMME provides a wide range of heating and cooling floor and ceiling systems that meet the specific needs of new buildings and renovation interventions. Tiemme technical team is ready to accommodate any request, suggesting the right system according to project specifications.

ASSESSING INERTIA IN RADIANT SYSTEMS

In physics and mechanics, inertia is an object's amount of resistance to a change in motion, which is quantified by its inertial mass.

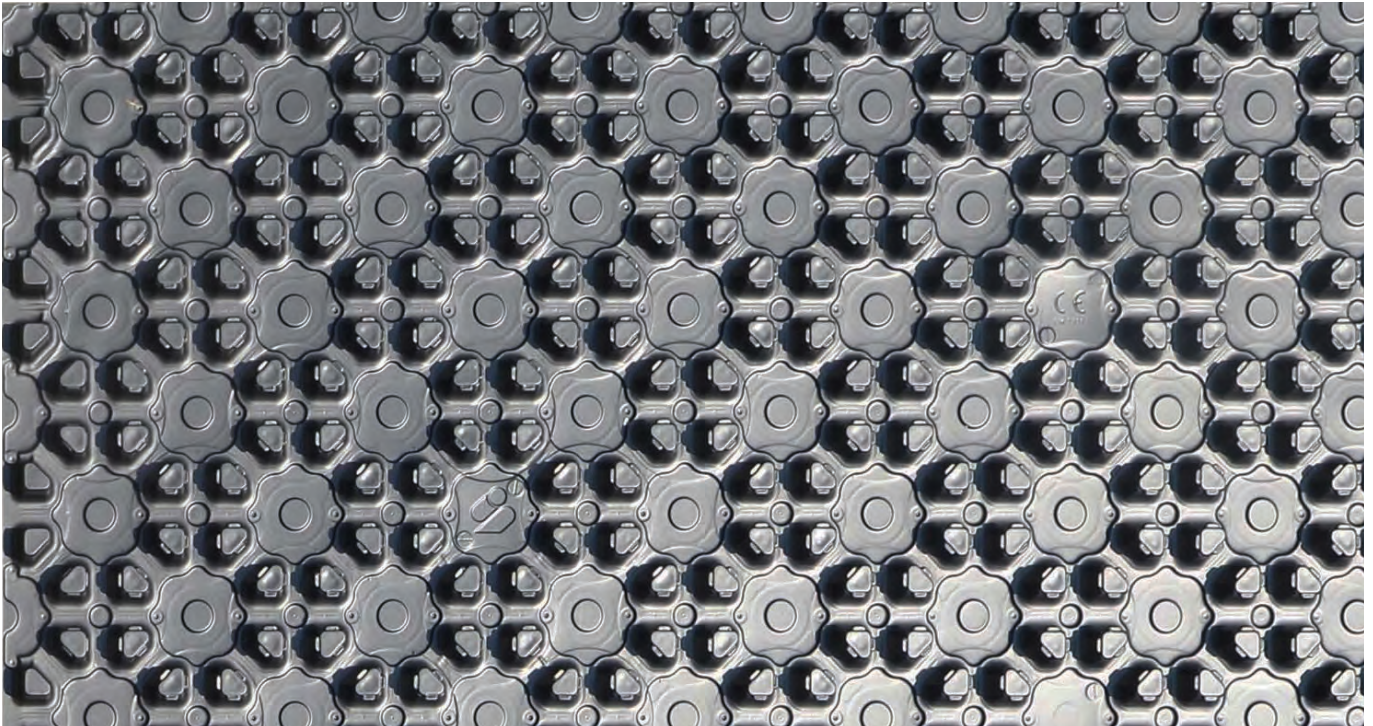
It is difficult to apply this concept to radiant systems, as there are many concurrent conditions impacting on their performance. Factors affecting a system's inertia include:

- Inertial temperature
- Room temperature in the environment requiring climate control
- The system's position (interstorey or in contact with the outside)



A quick and precise method to assess inertia is by making dynamic simulations of finished elements on system sections. The picture above shows an example of the outcomes, with the surface temperature to time of two radiant systems. It takes less than 30 minutes to the thin system (in red) to achieve the desired surface temperature. A traditional system consisting of an insulator and concrete screed needs a higher range of time to achieve the superficial temperature. It is worth to consider this aspect when designing the system control, to guarantee the achievement of desired temperature within 24 hours. Thermal inertia is also important when shutting down the system: a low inertia system needs less time to cool down compared to a traditional system. Radiant systems with thin screeds and, as a consequence, low thermal inertia enable to control the environment in a very effective way and are compatible with new low-consumption buildings.

TIEMME SLIM



When the space available is extremely limited, the TIEMME SLIM system is the perfect solution.

TIEMME SLIM is the new Tiemme system designed to meet the demand for low thermal inertia and thin radiant systems. Designed to satisfy system requirements in renovation processes, it is thin and can be bonded on the existing floor, thus enabling to create a system without any need for demolitions.

It supports 16x2mm and 17x2mm diameter pipes, with an excellent flow rate in both winter and summer, with a low pressure drop, thus optimizing the pump. The optimized ashlar guarantees perfect contact between the pipes and the screed, increasing system performance and enabling diagonal 45° laying without fastening clips. The molded thermoformed-polystyrene foil shows high resistance to impact, thus optimizing laying on the construction site. Available in a version with insulator.

TIEMME SLIM_EXTRA BENEFITS

- Low thermal inertia (in combination with lowered screeds).
- Reduced thickness: 24 mm certified system.
- High resistance to wearing.
- Quick and easy installation, thanks to the preformed relief (ashlars) and interlocking grooves on the perimeter of the panel (by overlapping lateral ashlars).
- Pipe can be laid diagonally: guaranteeing maximum flexibility of the system as it can also be laid in rooms with irregular floorplans.
- Panel with self-adhesive bottom (in the version with no insulating layer): no unwanted movement and demolition works.
- Can be combined with \varnothing 16x2 mm and \varnothing 17x2 mm pipe: guaranteeing excellent flow rates with low pressure drops.

Tiemme radiant technology and Knauf expertise with screeds create:



the innovative TIEMME SLIM system, certified for Qk concentrated vertical loads by Elletipi S.r.l. laboratory, with NE 499 and NE 425 Knauf 5 mm mortars.

RENOVATION WILL NO LONGER BE A PROBLEM



ADHESIVE FILM

No unwanted movements and demolitions



THERMOFORMED ASHLAR

Extremely easy to lay

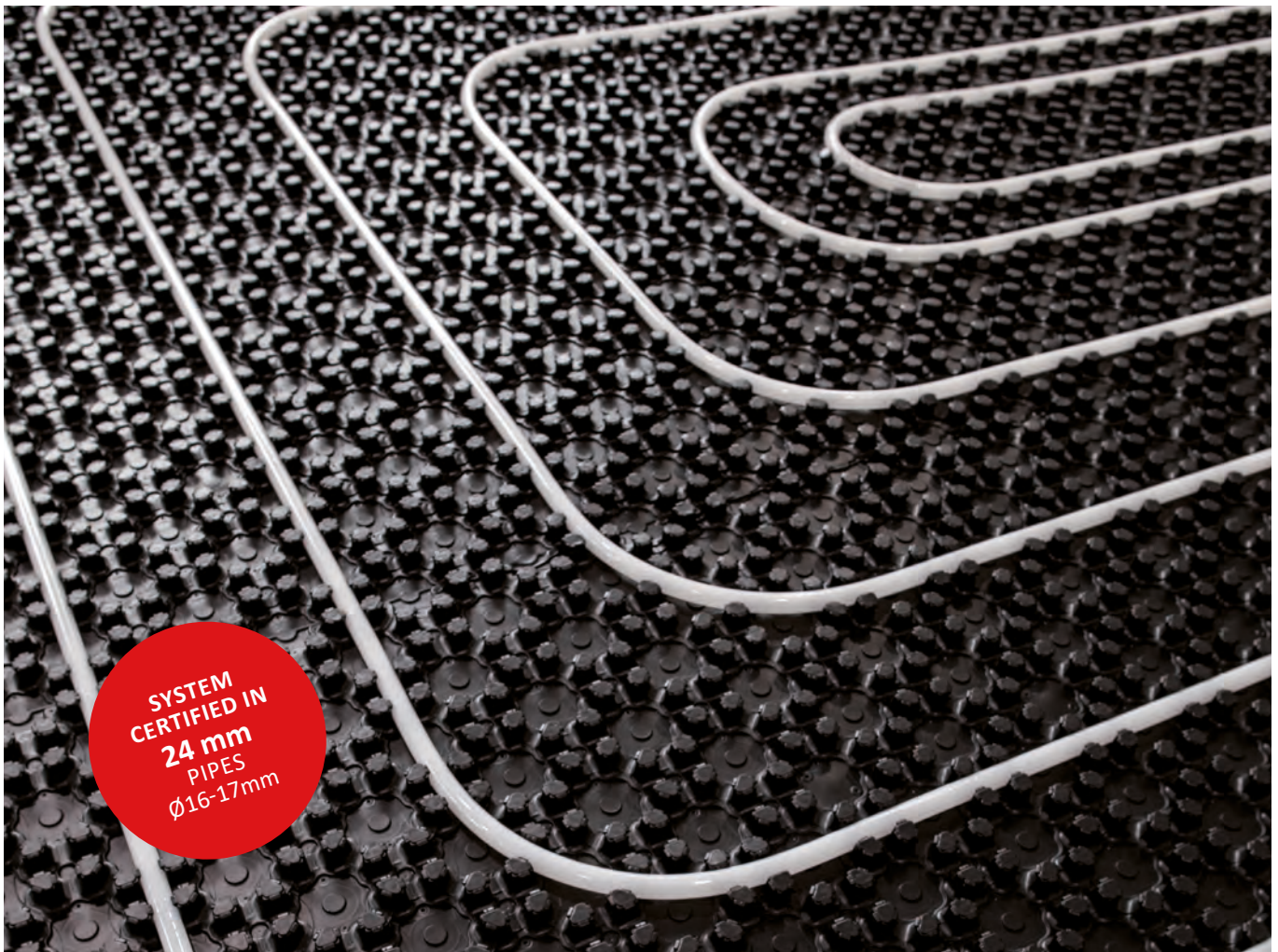


LOW THERMAL INERTIA



REDUCED THICKNESS

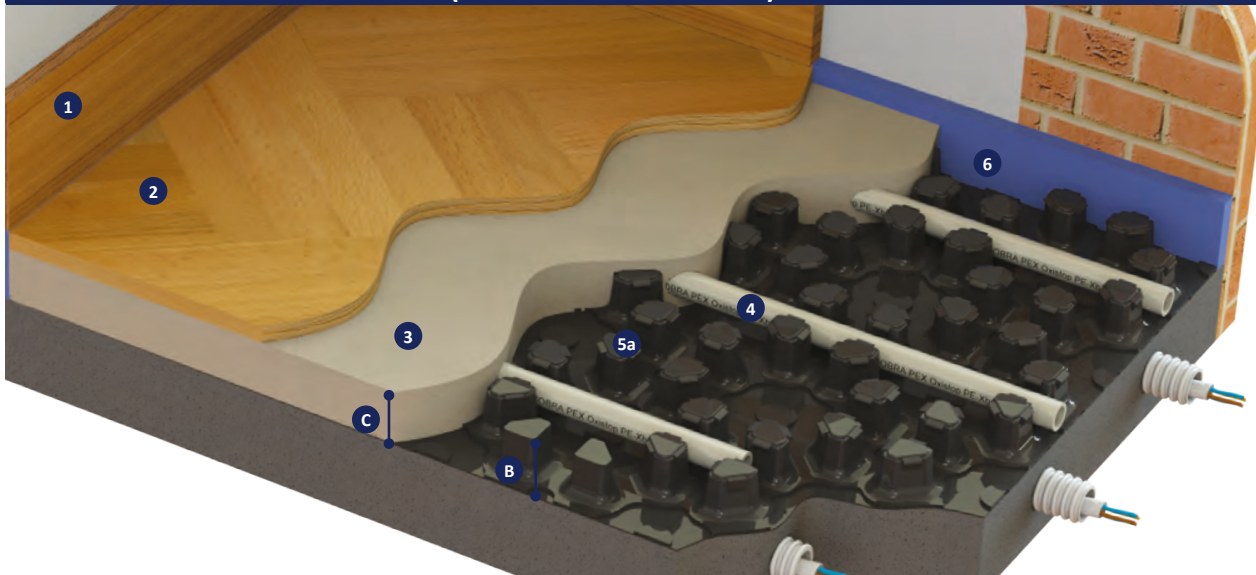
Complete in only 24 mm



SYSTEM
CERTIFIED IN
24 mm
PIPES
Ø16-17mm

TIEMME SLIM_HOW IT IS MADE?

SELF ADHESIVE TIEMME SLIM (PANEL CODE 450 0641)



TIEMME SLIM WITH INSULATOR (PANEL CODE 450 0642)

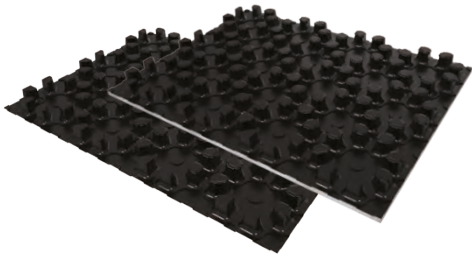


- | | |
|-----------------------------|---------------|
| 1. Skirting | - |
| 2. Coating | - |
| 3. Lowered screed | - |
| 4. Pipe | art. 0200B |
| 5. (5a) Self adhesive panel | code 450 0641 |
| (5b) Insulating panel | code 450 0642 |
| 6. Perimetral band | art. 4507 |
| 7. PE strip | art. 4503 |

Code	Size (mm)		
	A	B	C
450 0641	-	19	23,6 ÷ 38,6 (*)
450 0642	5	23,6	33,6 ÷ 43,6 (*)

(*) According to the screed used
See paragraph "Guide to the creation of the screed"
on the next page.

TIEMME SLIM_INSULATING PANEL



4519

Thermoformed panel without thermal insulation with self-adhesive surface or 5mm EPS 200 insulator, with embossed ashlars to block the pipe, even at 45°. Designed specifically for renovations.

Code	Insulating thickness (mm)	Total thickness (mm)	Unit/Box (m ²)	Unit/Box (no. panels)
450 0641	-	19	17,92/215,04	16
450 0642	5	23,6	22,40/134,40	20

TECHNICAL SPECIFICATIONS

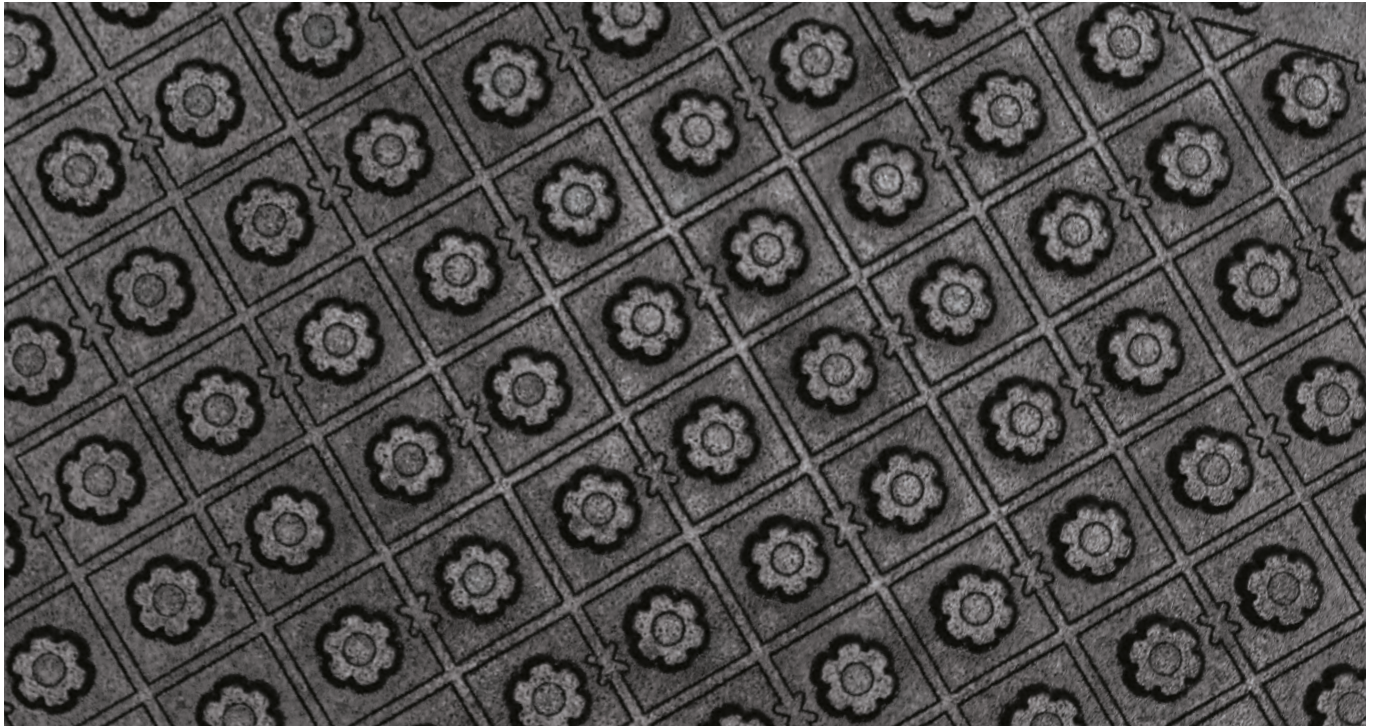
	Codes	
	450 0641	450 0642
Panel size (mm)	1400 x 800 Self-adhesive surface	1400 x 800
Insulating thickness (mm)	-	5
Ashlar thickness (mm)	18	18
Panel total thickness (mm)	19	23.6
Pipe thickness (mm)	16 - 17	16 - 17
Minimum pipe distance [mm]	50 (90° laying) - 71 (45° laying)	50 (90° laying) - 71 (45° laying)
Thermal resistance on effective average thickness $R_{\lambda,ins}$ (m ² K/W)	-	0.15
PS thermoformed foil thickness (mm)	1	0.6
Claimed thermal conductivity (W/mk)	-	0.034
Euroclass reaction to fire EN 13501-1	E	E
Panels per pack (n)	16	20
Panel surface per pack (m ²)	17.92	22.40

GUIDE TO THE CREATION OF THE SCREED

When the screed, which forms an integral part of the radiant section, fully wraps the pipes, this guarantees optimal heat transfer by conduction, thus resulting in the ideal outcome of Tiemme SLIM radiant system. A good screed should enable to level surfaces, distribute surcharges evenly, it should constitute a good base for flooring and a good container for floor heating system. Tiemme recommends to use the following KNAUF mixes with the innovative Tiemme SLIM system: NE 499 for screeds lifting up to 5/10 mm over the ashlar, NE 425 for screeds lifting up to 20 mm over the ashlar. NOTE: If you are employing a self leveling screed, follow the provider instructions.

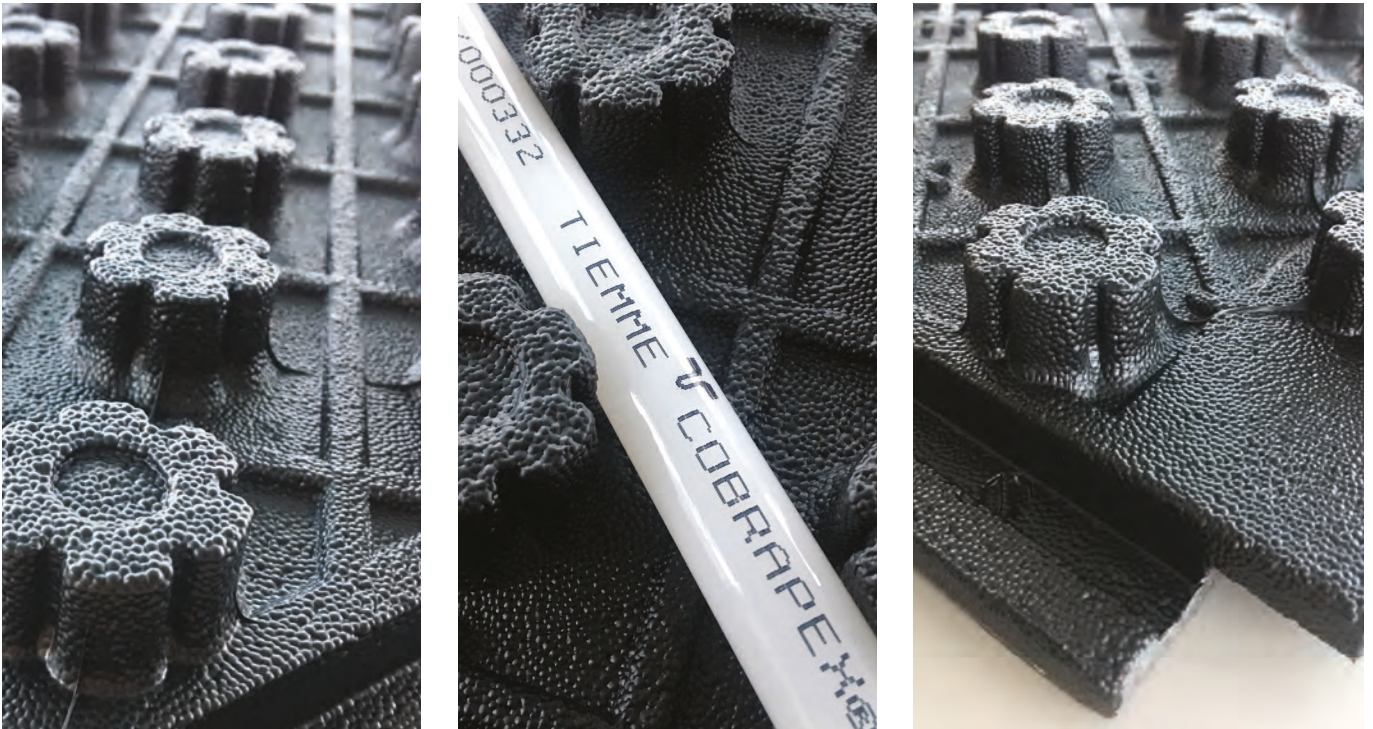
Knauf screed		Codes	
		450 0641	450 0642
NE 499 - 5/10 mm thickness $\lambda = 1,3$ W/(mk)	Panel thickness	19 mm	23.6 mm
	Panel + screed thickness	24/29 mm	33.6 mm
NE 425 - 20 mm thickness $\lambda = 1,4$ W/(mk)	Panel thickness	19 mm	23.6 mm
	Panel + screed thickness	39 mm	43.6 mm

LOW BLACK



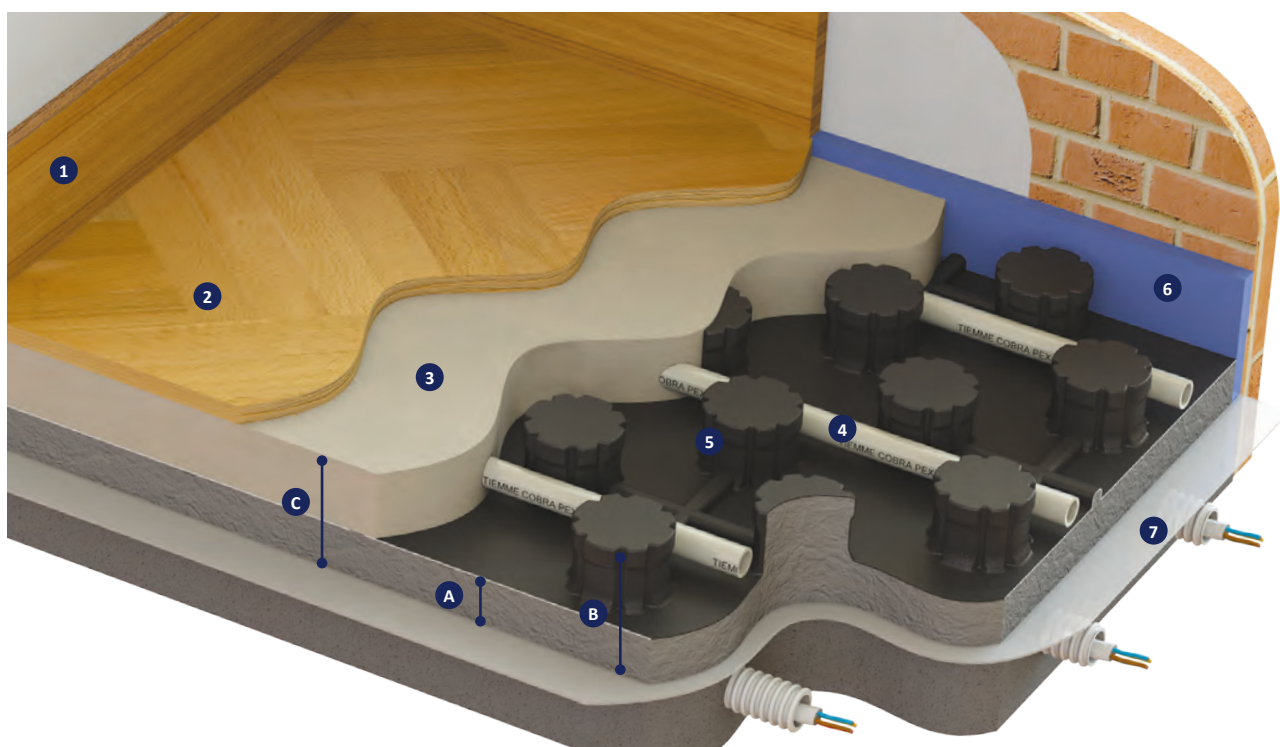
Low Black is the new Tiemme system designed to meet the demand for low-thermal-inertia radiant systems. Available in different degrees of thickness, thus enabling applications both in new buildings, with UNI EN 1264 compliant values of thermal resistance, and renovations, when reduced system size is a priority. Made in high mechanical strength (EPS 300) graphite sintered polystyrene foam, it is suitable for special lowered screeds down to 10mm over the pipes. The panel has a protective layer in HIPS 170 μ m heat-sealed polystyrene, in compliance with regulations in force. It supports \varnothing 16x2 - 17x2 pipes, guarantees a high flow and reduced load losses.

LOW BLACK_EXTRA BENEFITS



- Low thermal inertia (in combination with lowered screeds).
- Reduced system thickness.
- High mechanical strength (EPS 300).
- Panel with added graphite for a high degree of thermal insulation.
- Quick and easy installation, thanks to the preformed reliefs (ashlars) and interlocking grooves on the perimeter of the panel.
- Can be combined with \varnothing 16x2 mm and \varnothing 17x2 mm pipe: guaranteeing excellent flow rates with low pressure drops.

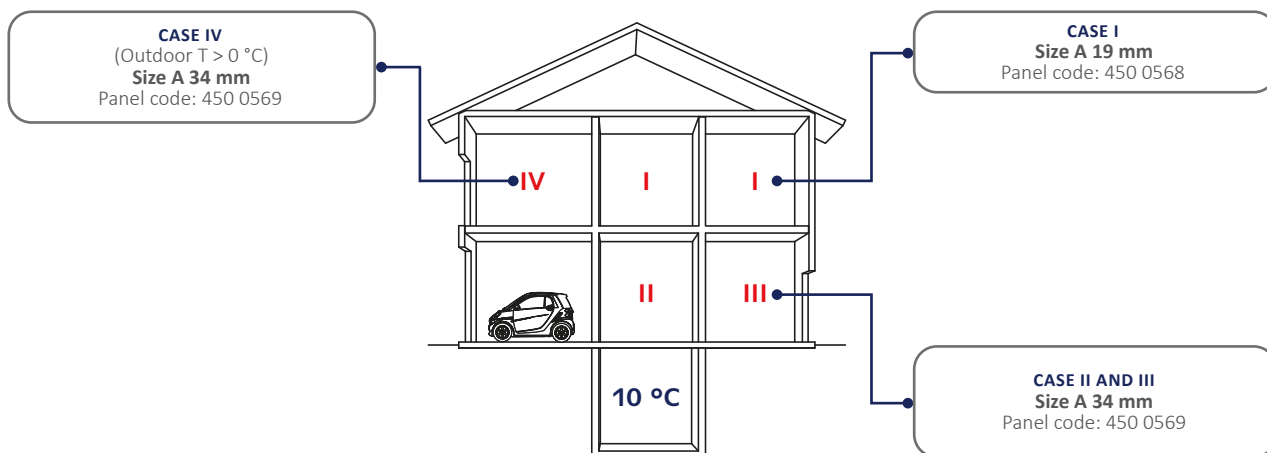
LOW BLACK_HOW IT IS MADE?



- 1. Skirting -
- 2. Coating -
- 3. Screed -
- 4. Pipe art. 0200B
- 5. Insulating panel art. 4518GRF
- 6. Perimetral band art. 4507
- 7. PE strip art. 4503

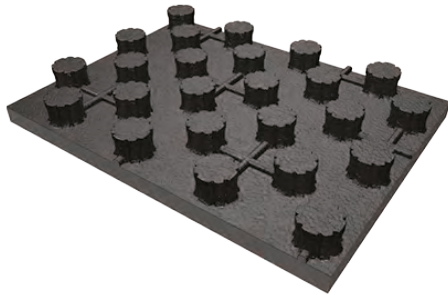
Code	Size (mm)		
	A	B	C
450 0567	15	34	44 ÷ 54
450 0568	19	38	48 ÷ 58
450 0569	34	53	63 ÷ 73

UNI EN 1264 COMPLIANT THICKNESS*



* To obtain the thermal resistance value required by the UNI EN 1264 standard, it is possible to add an insulating mat.

LOW BLACK_INSULATING PANEL



4518GRF

Insulating panel for radiant floor systems, made in closed-cell sintered foam polystyrene, with a graphite additive and a HIPS 170 μm protective heat-sealed foiled polystyrene layer, EC certified and suitable for radiant systems supplied with water for integrated cooling and heating systems in buildings complying with UNI EN 1264 standard.

Code	Insulating thickness (mm)	CS 10% (kPa)	Unit/Box (m ²)	Unit/Box (no. panels)
450 0567	15	300	23,52/94,08	21
450 0568	19	300	17,92/71,68	16
450 0569	34	300	12,32/49,28	11

TECHNICAL SPECIFICATIONS

	Codes		
	450 0567	450 0568	450 0569
Thermal resistance EN 13163 (m ² k/W)	0,65	0,77	1,26
10% compressive resistance UNI EN 826 (kPa)	300		
Insulating thickness (mm)	15	19	34
Total thickness (mm)	34	38	53
Total equivalent thickness UNI EN 1264/3 (mm)	20	24	39
Coating film (μm)	170		
Minimum pipe distance [mm]	50		
Heat conductivity UNI EN 12667 (W/mK)	0,031		
Water absorption UNI EN 12087 (%)	5		
Euroclass reaction to fire EN 13501-1	E		
Panel total size (mm)	1425 x 825		
Usable panel size (mm)	1400 x 800		
Usable panel surface (m ²)	1,12		
Panels per pack (n)	21	16	11
Panel surface per pack (m ²)	23,52	17,92	12,32

DRY



Dry is the new Tiemme dry system designed to meet the demand for low-thermal-inertia dry radiant systems. Available in different degrees of thickness, thus enabling applications both in new buildings, with UNI EN 1264 compliant values of thermal resistance, and renovations, when reduced system size is a priority. Quick laying, no downtime for letting the screed dry. High thermal conductivity, due to the 0.15 mm aluminum foil pre-assembled with the EPS panel. Available with 150 mm and 100 mm distance, for maximum performance both in winter and summer. Made in high mechanical strength (EPS 300) graphite sintered polystyrene foam, it is suitable for $\varnothing 16 \times 2$ mm pipes and guarantees a high flow rate and reduced pressure drop. Ceramic floor can be bonded directly onto the panel, by protecting them with the aluminum foil primer. When using wood, we recommend to lay a floating floor or bond with a specific lowered concrete mortar.

DRY_EXTRA BENEFITS

- Panel with added graphite for a high degree of thermal insulation.
- Reduced system thickness.
- High conductivity thanks to coupling with an aluminium foil layer.
- Low thermal inertia.
- Extremely quick to put into full operation (less than 1 hour).
- High mechanical strength EPS 300.
- Suitable for new builds and renovations.
- Quick laying: no screed drying times.
- Suitable for radiant heating and cooling systems.
- Can be combined with $\varnothing 16 \times 2$ mm pipe: guaranteeing excellent flow rates with low pressure drops.

Radiant technology developed by



and our expertise on the field create the innovative system **DRY**, suitable for both cooling and heating systems.

IDEAL FOR NEW HIGH-EFFICIENCY BUILDINGS AND RENOVATIONS



REDUCED TIME

The system is fully operational in less than one hour



QUICK LAYING

No downtime for the screed to dry



LOW THERMAL INERTIA



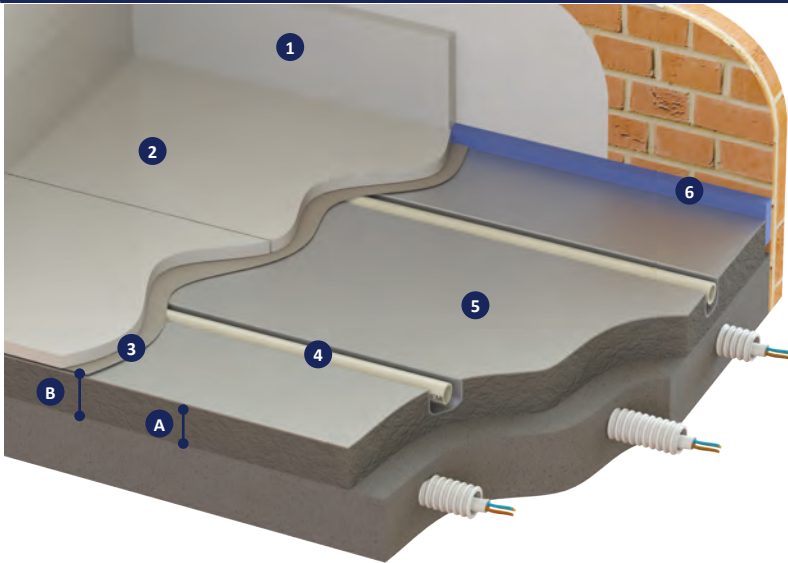
REDUCED THICKNESS



**EXTREMELY
RAPID!
FULLY OPERATIONAL
IN LESS
THAN 1h**

DRY - HOW IT IS MADE?

DRY - BONDED CERAMIC LAYING



- 1. Skirting -
- 2. Ceramic coating -
- 3. Glue -
- 4. Pipe **art. 0200B**
- 5. Insulating panel **art. 4517GRF**
- 6. Perimetral band **art. 4507**

Code	Size (mm)	
	A	B
450 0562	26	29
450 0564	26	29
450 0563	42	45
450 0565	42	45

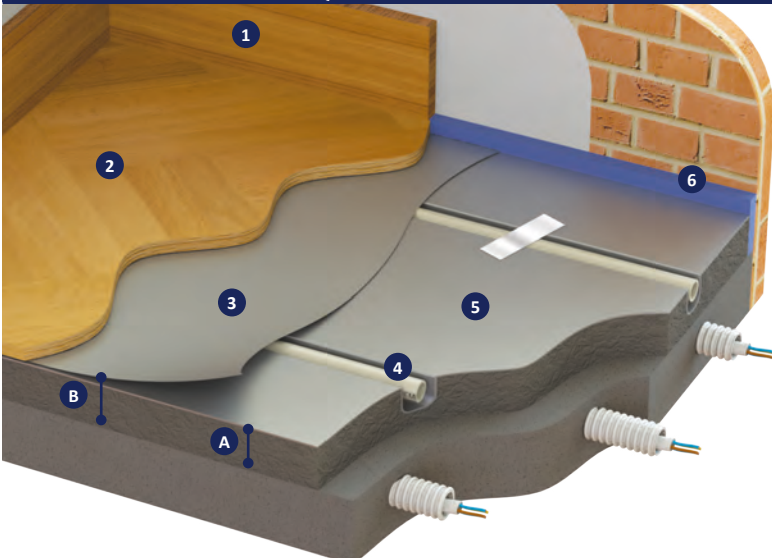
DRY - BONDED PARQUET LAYING



- 1. Skirting -
- 2. Bonded parquet coating -
- 3. Glue -
- 4. Carpet (Isolmant Isoltile AD) -
- 5. Pipe **art. 0200B**
- 6. Insulating panel **art. 4517GR**
- 7. Perimetral band **art. 4507**

Code	Size (mm)	
	A	B
450 0562	26	30
450 0564	26	30
450 0563	42	46
450 0565	42	46

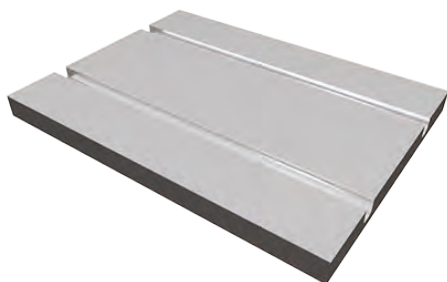
DRY - FLOATING PARQUET LAYING



- 1. Skirting -
- 2. Floating parquet coating -
- 3. Separation layer (Isolmant TOP) -
- 4. Pipe **art. 0200B**
- 5. Insulating panel **art. 4517GRF**
- 6. Perimetral band **art. 4507**

Code	Size (mm)	
	A	B
450 0562	26	28
450 0564	26	28
450 0563	42	44
450 0565	42	44

DRY_INSULATING PANEL



4517GRF

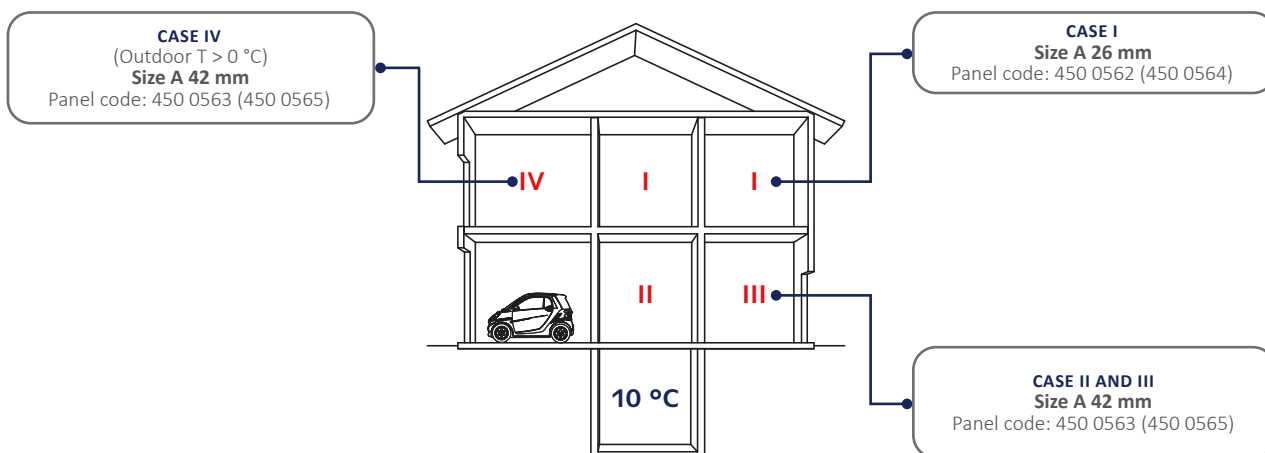
Insulating panel for radiant dry floor systems in EPS 300, with graphite, pre-bonded to 1050 aluminum alloy foil with high thermal conductivity. Low thermal inertia due to the absence of the screed, enabling short response time. Ideal for heating and cooling systems and available with 100 or 150 mm laying distance.

Code	Thickness (mm)	Spacing (mm)	CS 10% (kPa)	Unit/Box (m ²)	Unit/Box (no. panels)
450 0562	26	100	300	11,20/89,60	10
450 0563	42	100	300	6,72/53,76	6
450 0564	26	150	300	10,5/84	10
450 0565	42	150	300	6,30/50,40	6

TECHNICAL SPECIFICATIONS

	Codes			
	450 0562	450 0563	450 0564	450 0565
Insulating thickness (mm)	26	42	26	42
Total thickness (mm)	26	42	26	42
Aluminum alloy/ thickness (mm)	1050/ 0,15			
Claimed thermal conductivity (W/mk)	0,031			
Thermal resistance $R\lambda_{ins}$ (m ² k/W)	0,75	1,27	0,75	1,26
10% deflection compressive resistance (kPa)	300			
Euroclass reaction to fire	E			
Panel total size (mm)	1400 x 800		1400 x 750	
Minimum pipe distance [mm]	100		150	
Usable panel surface (m ²)	1,12		1,05	

UNI EN 1264 COMPLIANT THICKNESS*



* To obtain the thermal resistance value required by the UNI EN 1264 standard, it is possible to add an insulating mat.



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