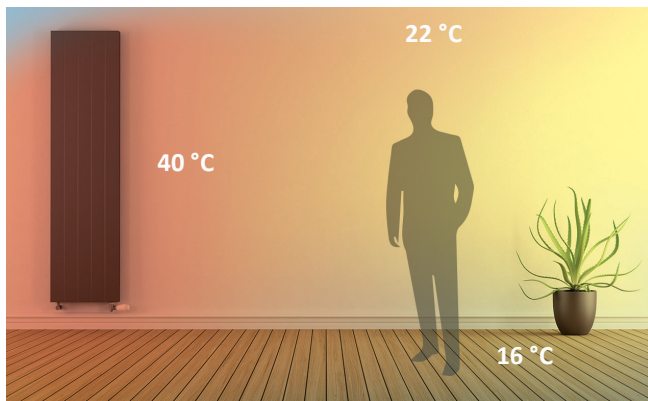


# RADIANT FLOOR SYSTEMS RESIDENTIAL/TERTIARY

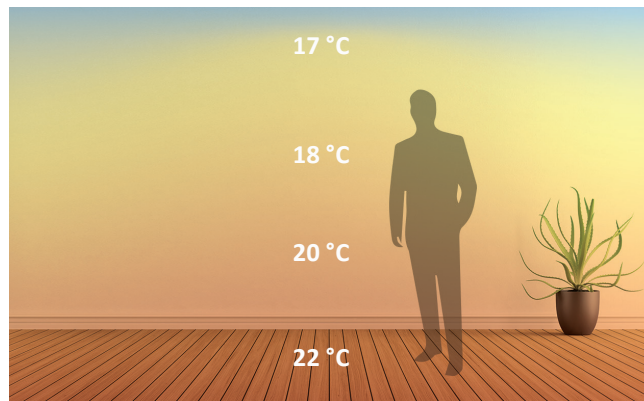
# WHY CHOOSE THE TIEMME FLOOR RADIANT SYSTEM?

## IMPROVED DIFFUSION OF HEAT

The radiators diffuse the heat by convection pushing the hot air upwards and consequently the cold air downwards. In the case of floor heating, diffusion occurs by radiation, a phenomenon that guarantees a constant temperature throughout the environment.



Radiator heating



Floor heating

## COMPATIBILITY WITH RENEWABLE ENERGY

A radiator system requires gas or diesel heating that can bring the water to a temperature between 70 and 80 °C. The floor system works at temperatures much lower, between 35 and 40 °C, and therefore offers maximum compatibility with more environmentally friendly energy sources such as pellet boilers, heat pumps and solar energy plants.

## REDUCTION OF DUST, MITES, AND MOULDS

The presence of radiators produces dust that then spread annoyingly in the environment as a result of convection. In case of floor heating this problem is greatly reduced as well as the presence of mites and mould.

## FULL FREEDOM IN THE ORGANISATION OF INTERIORS

The radiators limit the internal space making unusable the walls on which they are placed. The floor heating system allows to recover a lot of space making the walls entirely usable.

## FULL FREEDOM IN CHOOSING THE FLOOR

The radiant system is compatible with any type of flooring: from laminates to tiles, from carpet to terracotta. The only caution concerns the wood for which you will have to pay more attention in the choice of a stable and small parquet.

Tiemme radiant systems offer a comprehensive range of applications that will definitely meet all of your comfort needs in any house. Each system results from a continuous research of the best technology and materials, in order to provide clients with state of the art solutions in terms of both thermal and/or acoustic insulation and eco-sustainability. However, a system's reliability is as important as its performance. Tiemme is aware that a radiant system should not raise concerns. That is why reliability is one of its core values and entails a 10 year warranty on Tiemme systems. We are honored to introduce you to zero10 warranty.



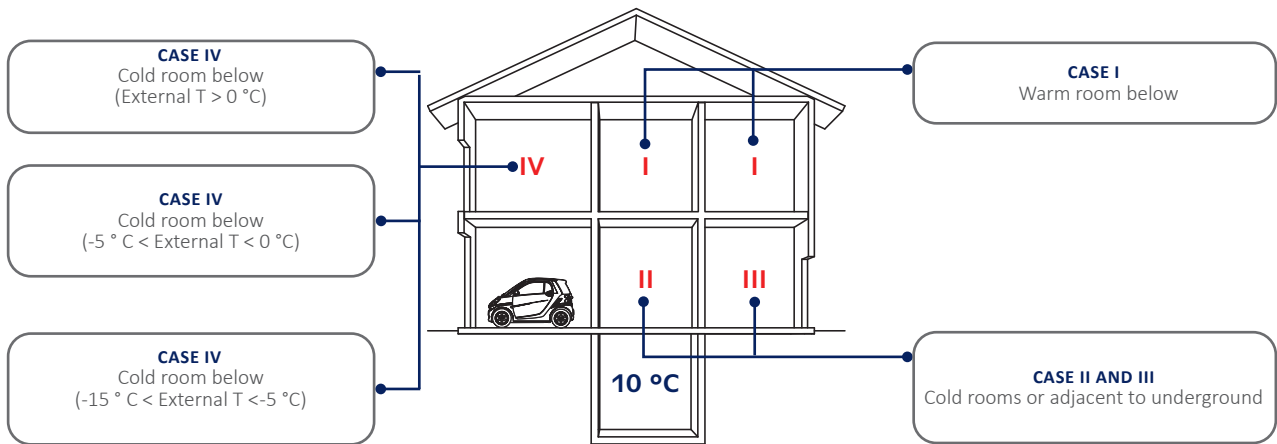
# REGULATIONS FOR RADIANT SYSTEMS

The UNI EN 1264:2021 standard is the technical regulation that defines all the elements that make up a floor, wall and ceiling system. It consists of 5 parts and is a product standard, and within it the calculation methods for the design of radiant systems are indicated. In July 2021, the update revision UNI EN 1264:2021 was published, in part 4 of the standard titled 'installation' has been integrated more than in the previous version. Insulation, joints and compliance with installation conditions are the main new features covered.

## INSULATING LAYERS

The standard pays particular attention to the thermal resistance of the insulating layers placed between the system and adjacent rooms or to the outside. An 'insulating layer' is considered to be that which makes up the system and is placed immediately under the pipe; in the case of several layers of insulating material, the coupling between two or more materials will acquire this definition. Table 1, concerning compliance with the thermal resistance of horizontal dispersing structures, has not been changed from the previous version, however, some important details for calculating the thermal resistance of systems used in building renovations versus new construction have been revised.

Thermal resistance that shall be considered are reported in the diagram and in the relevant table.

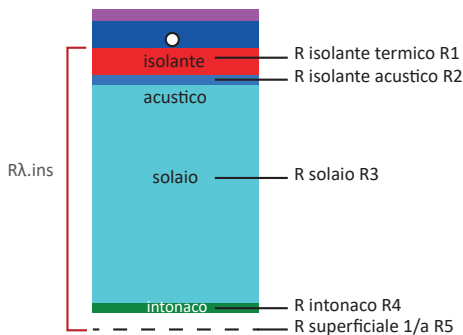


	I	II e III	IV		
	Heated room below	Non-heated room below	External temperature > 0 °C	External temperature -5 / 0 °C	External temperature -15 / -5 °C
Internal Temperature iT (°C)	20	20	20	20	20
Thermal resistance Rλ (m²K/W)	0,75	1,25	1,25	1,50	2,00

The new calculation approach makes the following distinction:

- **Radiant systems in new buildings**, the thermal resistance of the insulation Rλ.Ins must be determined considering the insulation layer(s) underneath the pipe;
- **Radiant systems in buildings subject to building renovation**, the thermal resistance of the insulation Rλ.Ins can be determined taking into account the actual thermal resistance of the building structure, including the insulation layer(s) underneath the pipe.

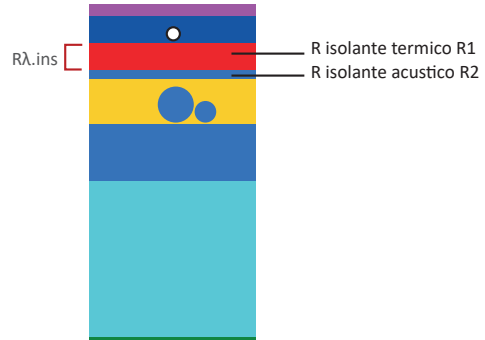
### RENOVATION



The thermal resistance is obtained by adding up all thermal resistance of the layers UNDER THE PIPE.

$$R\lambda.Ins = R1 + R2 + R3 + R4 + R5 = m^2K/W$$

### NEW BUILDING

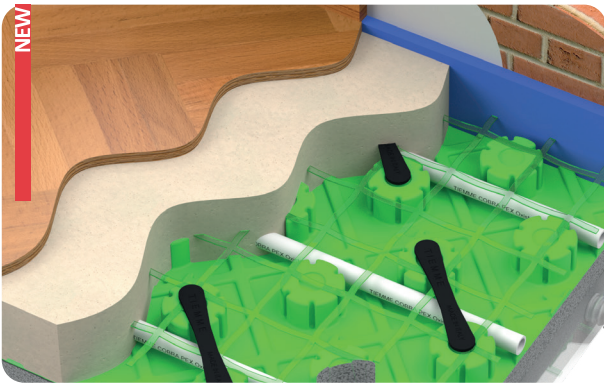


The thermal resistance is obtained by adding up all thermal resistance of the INSULATING ELEMENTS ONLY present UNDER THE PIPE.

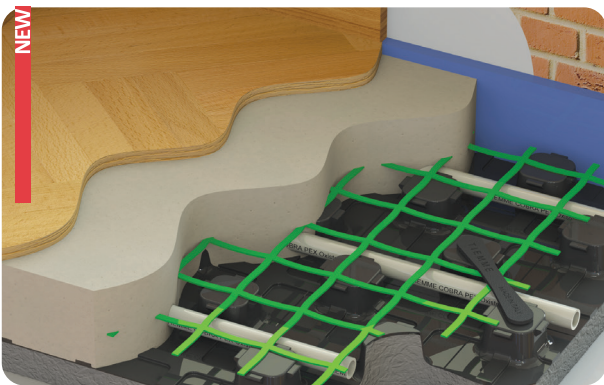
$$R\lambda.Ins = R1 + R2 = m^2K/W$$

# TIEMME SOLUTIONS

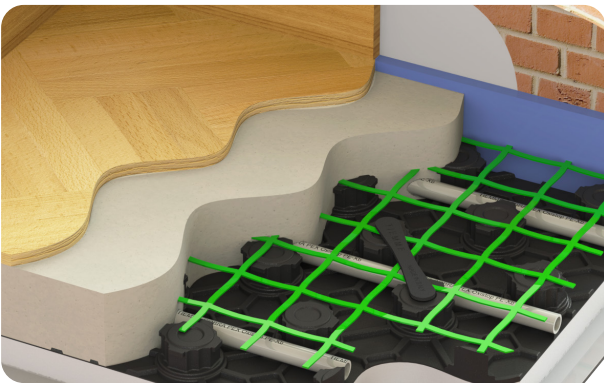
NEW CLASSIC GRAPHITE



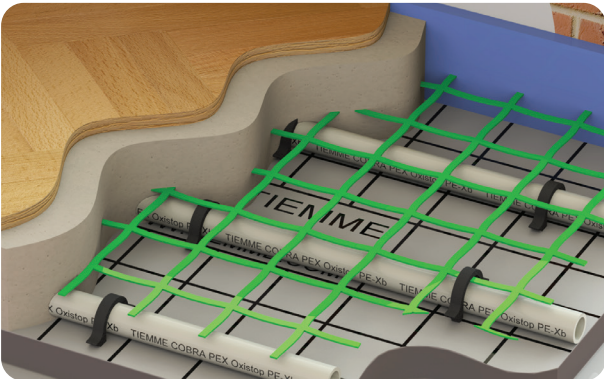
TECHNO GRAPHITE CAM



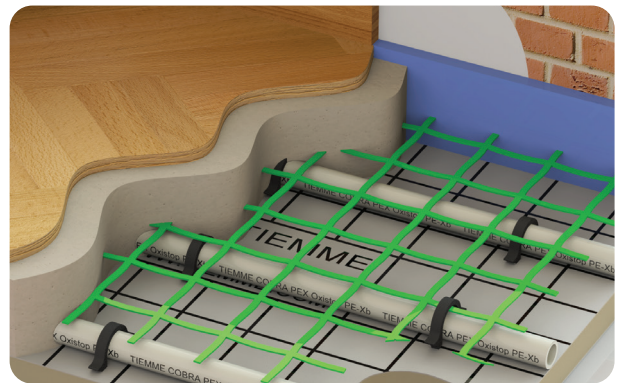
BASIC



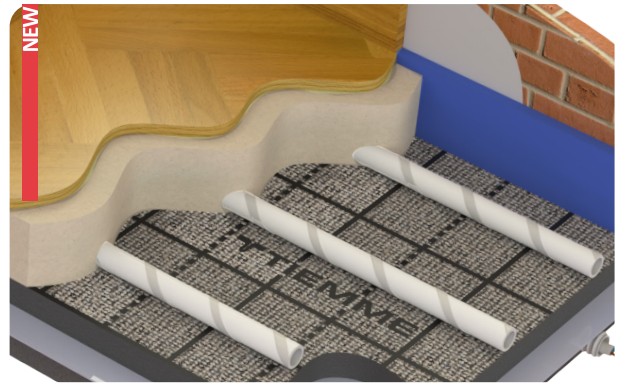
CLIP GRAPHITE



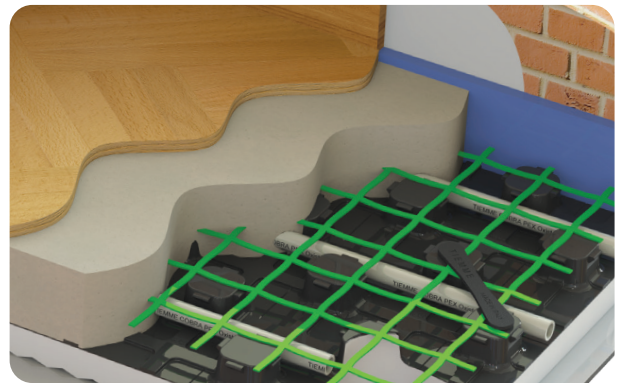
CLIP SUPER



VELK

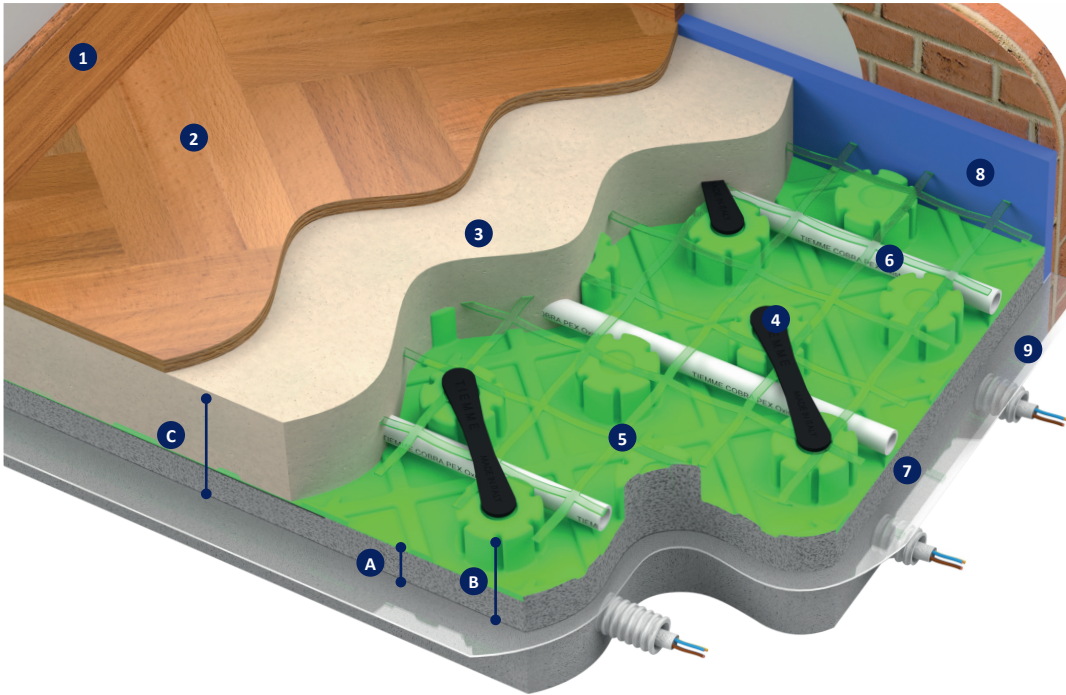


SILENTO



## NEW CLASSIC GRAPHITE

Ideal solution for residential and commercial heating and cooling systems. The panel with ashlar is the result of the coupling between a base in expanded polystyrene with graphite additives, obtained with the best moulding techniques, and a sheet of polystyrene with thickness 0.16 mm. The result is a panel that is easy to use and available in different thicknesses ranging from 10 to 60 mm, all certified and equipped with excellent compressive strength. The coupling between the panels is guaranteed by a special coupling system with perimeter joints. 50 mm and multiple pipe distances. Meets the new thermal resistance requirements of UNI EN 1264:2021



- |                     |                     |
|---------------------|---------------------|
| 1. Skirting         | -                   |
| 2. Coating          | -                   |
| 3. Screed           | -                   |
| 4. Mesh fixing clip | <b>art. 4527</b>    |
| 5. Fiberglass mesh  | <b>art. 4532</b>    |
| 6. Pipe             | <b>art. 0200B</b>   |
| 7. Insulation panel | <b>art. 4524GRF</b> |
| 8. Perimeter strip  | <b>art. 4507</b>    |
| 9. PE sheet         | <b>art. 4503</b>    |

Code	Dimensions (mm)		
	A	B	C
450 0479	10	34	60 ÷ 70
450 0721	23	47	73 ÷ 83
450 0722	38	62	88 ÷ 98
450 0725	45	69	95 ÷ 105
450 0726	60	84	110 ÷ 120

### TECHNICAL CHARACTERISTICS

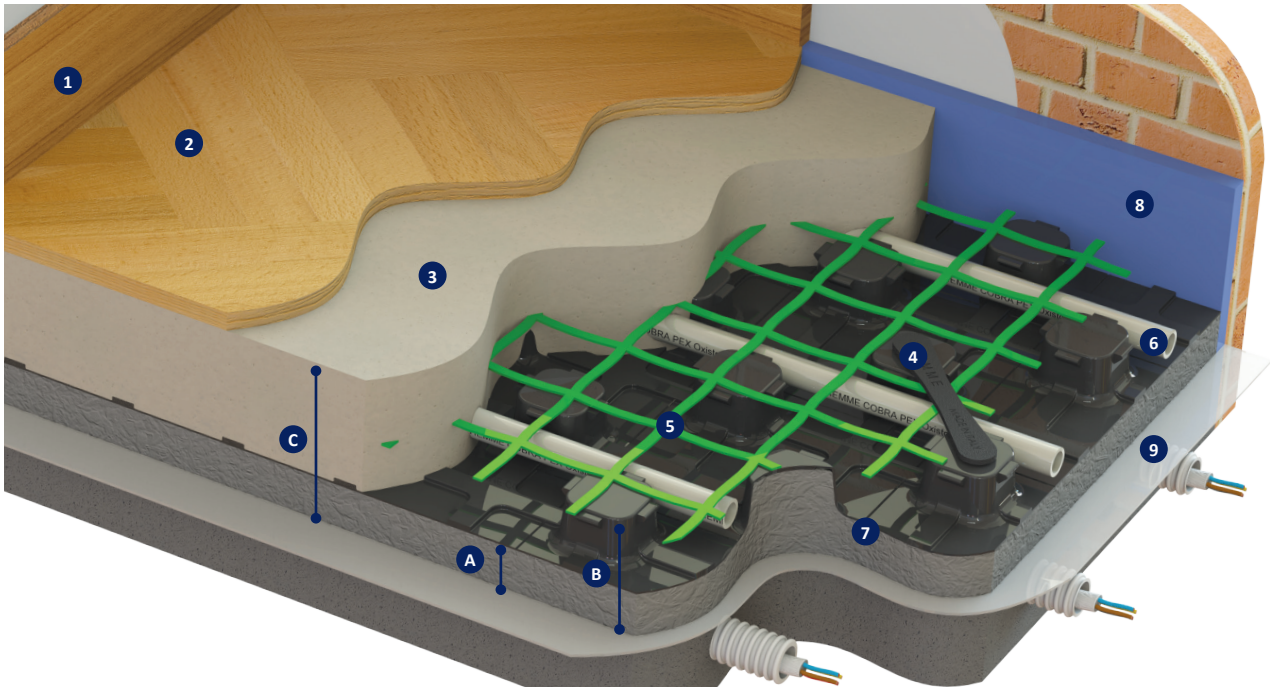
	Codes				
	450 0479	450 0721	450 0722	450 0725	450 0726
Thermal resistance EN 13163 (m <sup>2</sup> k/W)	0,33	0,75	1,25	1,50	2,00
Compression resistance to 10% UNI EN 826 (kPa)	250	150			
Insulation thickness (mm)	10	23	38	45	60
Total thickness (mm)	34	47	62	69	84
Cover film (µm)	160				
Minimum pipe distance (mm)	50				
Thermal conductivity UNI EN 12667 (W/mk)	0,030				
Water absorption UNI EN 12087 (%)	7	4			
Reaction to fire EN 13501-1 (Euroclass)	E				
Total panel size (mm)	1220 x 820	1425 x 825			
Useful panel size (mm)	1220 x 820	1400 x 800			
Useful panel area(m <sup>2</sup> )	0,96	1,12			
Panels per package (n)	22	14	10	8	7
Panel area per package (m <sup>2</sup> )	21,12	15,68	11,20	8,96	7,84

# TECHNO GRAPHITE CAM

Ideal solution for residential and commercial heating and cooling systems. The thermoformed panel with ashlars allows to obtain low thickness and is therefore also suitable for renovations.

Maximum protection from thermal bridges. 50 mm and multiple pipe distances. The coupling between the panels is guaranteed by the overlap of side ashlars.

Meets the new thermal resistance requirements of UNI EN 1264:2021



- 1. Skirting -
- 2. Coating -
- 3. Screed -
- 4. Mesh fixing clip **art. 4527**
- 5. Fiberglass mesh **art. 4532**
- 6. Pipe **art. 0200B**
- 7. Insulation panel **art. 4528PANGRF**
- 8. Perimeter strip **art. 4507**
- 9. PE sheet **art. 4503**

Code	Dimensions (mm)		
	A	B	C
450 0729	10	32	60 ÷ 70
450 0730	23	45	73 ÷ 85
450 0731	38	60	88 ÷ 98
450 0732	45	67	95 ÷ 105
450 0733	60	82	110 ÷ 120

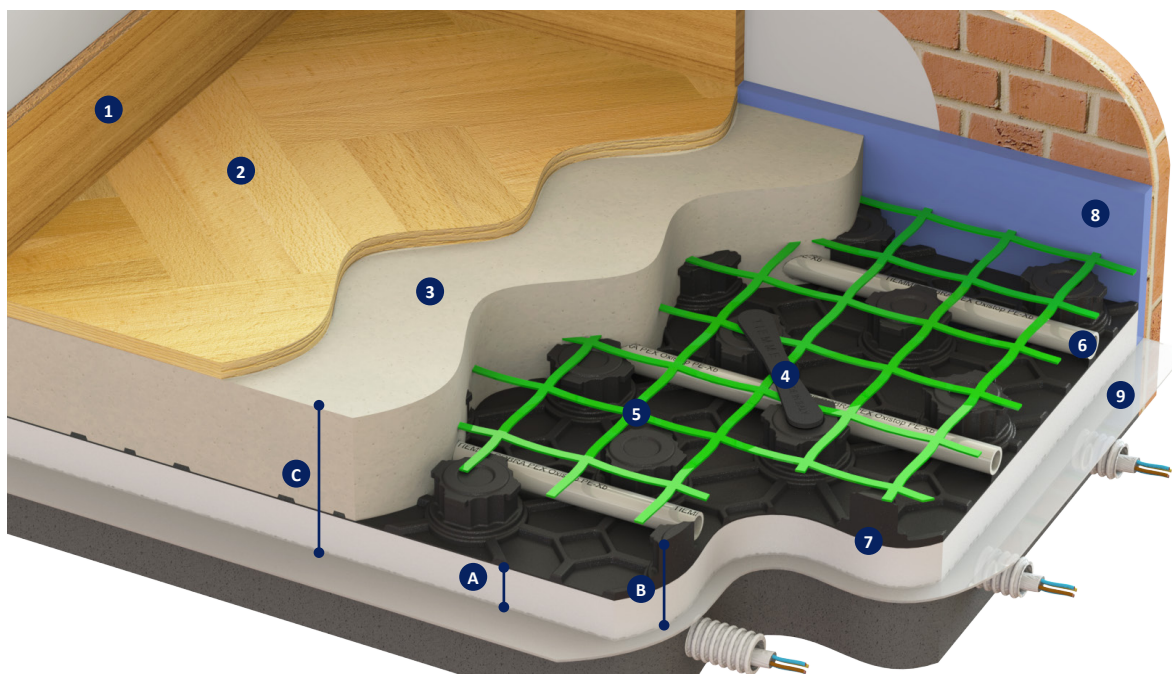
## TECHNICAL CHARACTERISTICS

	Codes				
	450 0729	450 0730	450 0731	450 0732	450 0733
Thermal resistance EN 13163 (m <sup>2</sup> k/W)	0,33	0,75	1,25	1,50	2,00
Compression resistance to 10% UNI EN 826 (kPa)	200	150			
Insulation thickness (mm)	10	23	38	45	60
Total thickness (mm)	32	45	60	67	82
Rigid cover sheet (mm)	0,6				
Minimum pipe distance (mm)	50				
Thermal conductivity UNI EN 12667 (W/mk)	0,030				
Water absorption UNI EN 12087 (%)	6,5	4,0			
Reaction to fire EN 13501-1 (Euroclass)	E				
Total panel size (mm)	1450 X 850				
Useful panel size (mm)	1400 X 800				
Useful panel area(m <sup>2</sup> )	1,12				
Panels per package (n)	18	11	8	7	5
Panel area per package (m <sup>2</sup> )	20,16	12,32	8,96	7,84	5,60

## BASIC

Ideal solution for residential and commercial heating and cooling systems. The thermoformed panel with ashlars allows to obtain low thickness and is therefore also suitable for renovations.

Maximum protection from thermal bridges. 50 mm and multiple pipe distances. The coupling between the panels is guaranteed by the overlap of side ashlars.



- |                     |              |
|---------------------|--------------|
| 1. Skirting         | -            |
| 2. Coating          | -            |
| 3. Screed           | -            |
| 4. Mesh fixing clip | art. 4527    |
| 5. Fiberglass mesh  | art. 4532    |
| 6. Pipe             | art. 0200B   |
| 7. Insulation panel | art. 4501PAN |
| 8. Perimeter strip  | art. 4507    |
| 9. PE sheet         | art. 4503    |

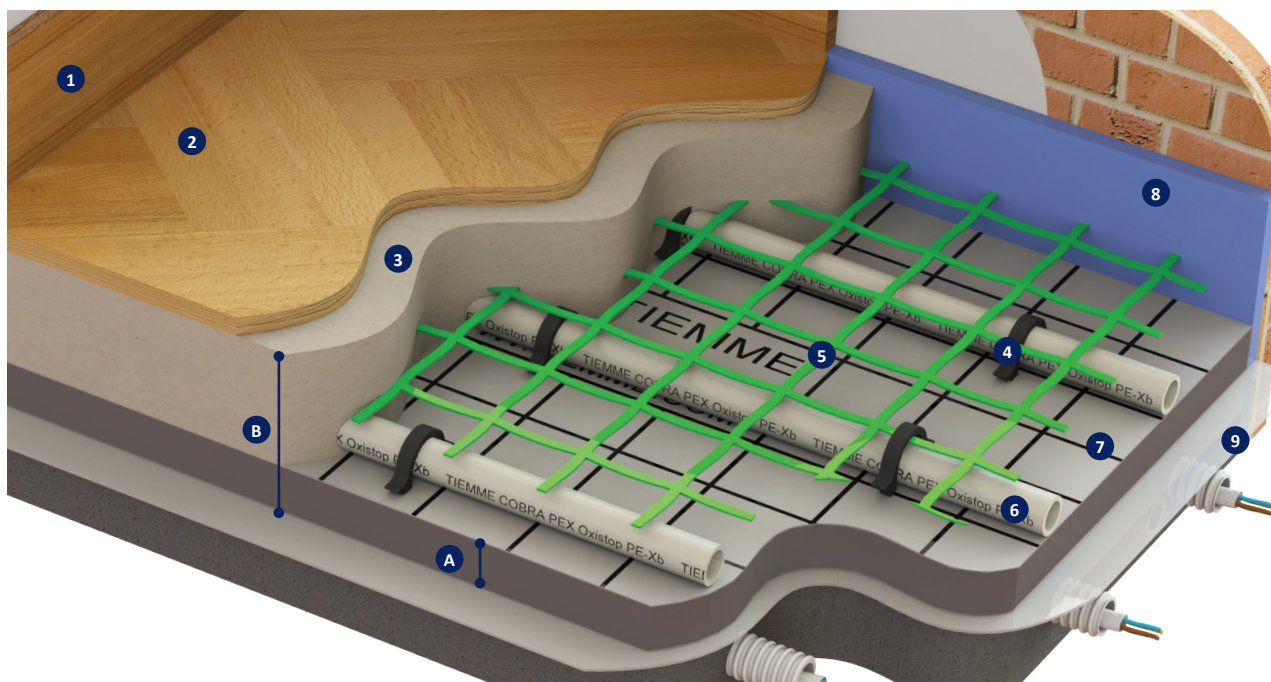
Code	Dimensions (mm)		
	A	B	C
450 0570	10	32	60 ÷ 70
450 0531	20	42	70 ÷ 80
450 0532	30	52	80 ÷ 90
450 0687	40	62	90 ÷ 100

## TECHNICAL CHARACTERISTICS

	Codes			
	450 0570	450 0531	450 0532	450 0687
Thermal resistance EN 13163 (m <sup>2</sup> k/W)	0,29	0,59	0,88	1,18
Compression resistance to 10% UNI EN 826 (kPa)	150			
Insulation thickness (mm)	10	20	30	40
Total thickness (mm)	32	42	52	62
Rigid cover sheet (mm)	0,5			
Minimum pipe distance (mm)	50			
Thermal conductivity UNI EN 12667 (W/mk)	0,034			
Water absorption UNI EN 12087 (%)	0,5			
Reaction to fire EN 13501-1 (Euroclass)	E			
Total panel size (mm)	1450 X 850			
Useful panel size (mm)	1400 X 800			
Useful panel area(m <sup>2</sup> )	1,12			
Panels per package (n)	18	12	10	8
Panel area per package (m <sup>2</sup> )	20,16	13,44	11,20	8,96

## CLIP GRAPHITE

Specific solution for residential and commercial heating and cooling systems where maximum thermal output is required. The thermo-reflective screen-printed surface of the smooth roll panel offers the possibility of installation at free distance. The coupling between the panels is guaranteed by the lateral overlap of part of the heat-reflecting surface by a double-sided adhesive strip. Maximum protection from thermal bridges.



- |                          |                          |
|--------------------------|--------------------------|
| 1. Skirting              | -                        |
| 2. Coating               | -                        |
| 3. Screed                | -                        |
| 4. Mesh-pipe fixing clip | <b>art. 4521 - 4520G</b> |
| 5. Fiberglass mesh       | <b>art. 4532</b>         |
| 6. Pipe                  | <b>art. 0200B</b>        |
| 7. Insulation panel      | <b>art. 4505GRF</b>      |
| 8. Perimeter strip       | <b>art. 4507</b>         |
| 9. PE sheet              | <b>art. 4503</b>         |

Code	Dimensions (mm)	
	A	B
450 0558	23	73 ÷ 83
450 0559	30	80 ÷ 90
450 0560	40	90 ÷ 100
450 0555	50	100 ÷ 110
450 0561	60	110 ÷ 120

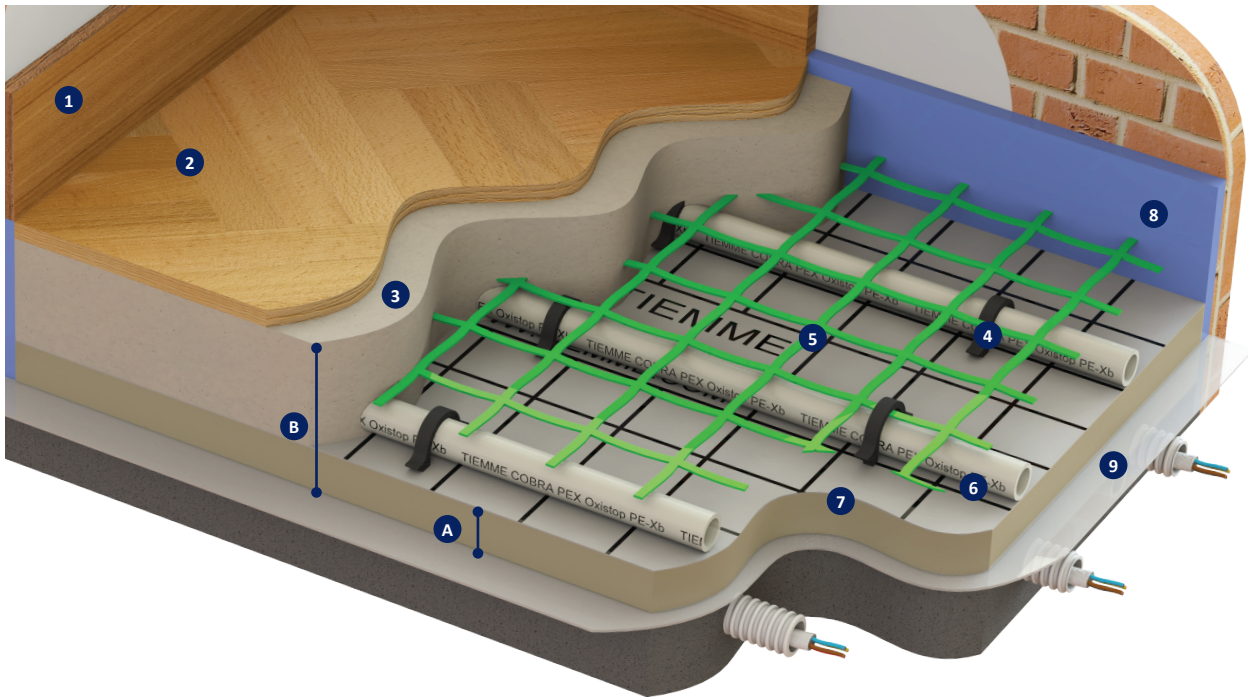
## TECHNICAL CHARACTERISTICS

	Codes				
	450 0558	450 0559	450 0560	450 0555	450 0561
Thermal resistance UNI EN 13163 (m <sup>2</sup> k/W)	0,76	1,00	1,33	1,66	2,00
Compression resistance to 10% UNI EN 826 (kPa)	150				
Insulation thickness (mm)	23	30	40	50	60
Total thickness (mm)	23	30	40	50	60
Minimum pipe distance (mm)	50				
Thermal conductivity UNI EN 12667 (W/mk)	0,030				
Water absorption UNI EN 12087 (%)	< 3,0				
Reaction to fire EN 13501-1 (Euroclass)	E				
Total roll size (mm)	12000 x 1000	10000 x 1000	10000 x 1000	10000 x 1000	8000 x 1000
Useful roll size (mm)	12000 x 1000	10000 x 1000	10000 x 1000	10000 x 1000	8000 x 1000
Useful roll area (m <sup>2</sup> )	12	10	10	10	8
Rolls per package (n)	1				
Roll area per package (m <sup>2</sup> )	12	10	10	10	8



## CLIP SUPER

Specific solution for residential and commercial heating and cooling systems where maximum thermal output is required. The thermo-reflective screen-printed surface of the smooth book panel offers the possibility of installation at free distance. The coupling between the panels is guaranteed by the lateral overlap of part of the heat-reflecting surface by a double-sided adhesive strip. Maximum protection from thermal bridges.



- |                          |                   |
|--------------------------|-------------------|
| 1. Skirting              | -                 |
| 2. Coating               | -                 |
| 3. Screed                | -                 |
| 4. Mesh-pipe fixing clip | art. 4521 - 4520G |
| 5. Fiberglass mesh       | art. 4532         |
| 6. Pipe                  | art. 0200B        |
| 7. Insulation panel      | art. 4505POL      |
| 8. Perimeter strip       | art. 4507         |
| 9. PE sheet              | art. 4503         |

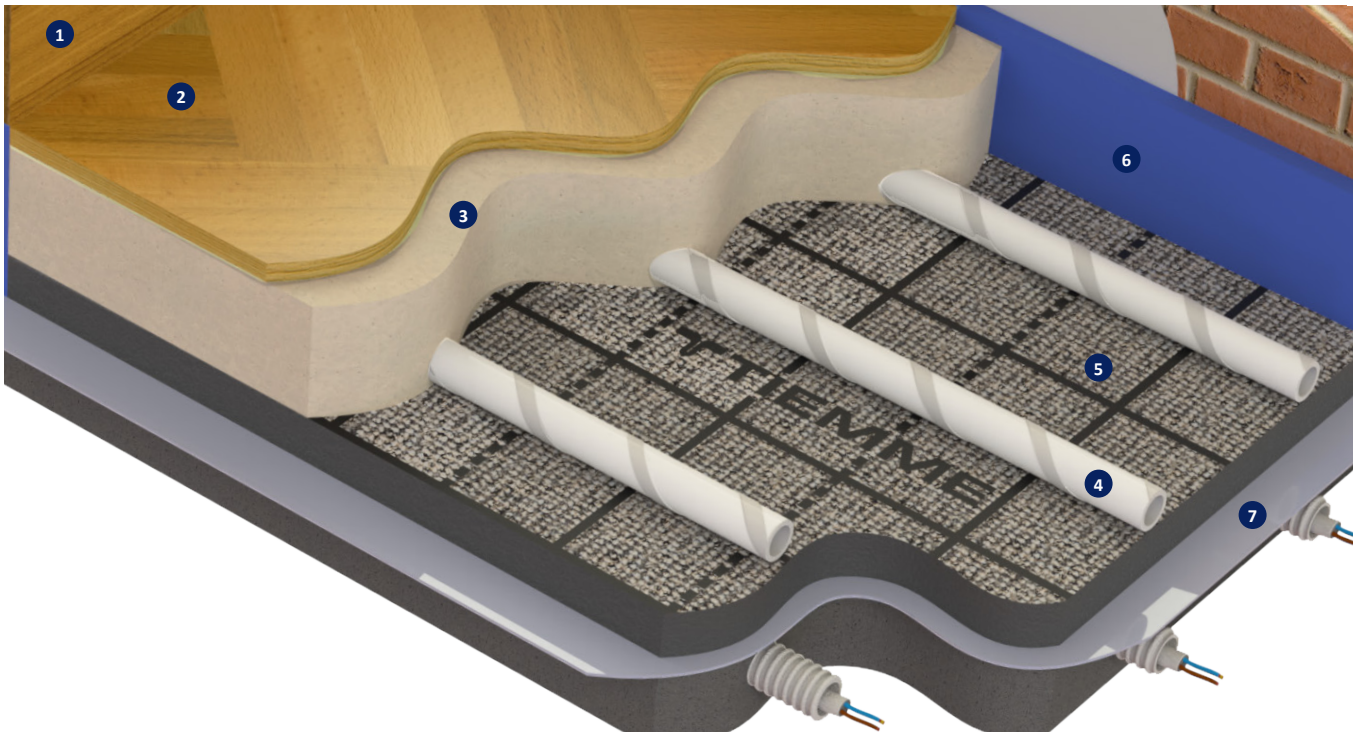
Code	Dimensions (mm)	
	A	B
450 0500	20	70 ÷ 80
450 0501	30	80 ÷ 90
450 0502	40	90 ÷ 100
450 0503	50	100 ÷ 110

### TECHNICAL CHARACTERISTICS

	Codes			
	450 0500	450 0501	450 0502	450 0503
Thermal resistance UNI EN 13163 (m <sup>2</sup> k/W)	0,85	1,30	1,70	2,15
Compression resistance to 10% UNI EN 826 (kPa)	>130			
Insulation thickness (mm)	20	30	40	50
Total thickness (mm)	20	30	40	50
Minimum pipe distance (mm)	50			
Thermal conductivity UNI EN 12667 (W/mk)	0,023			
Density (kg/m <sup>3</sup> )	30			
Water absorption UNI EN 12087 (%)	< 1,0			
Reaction to fire EN 13501-1 (Euroclass)	F			
Total panel size (mm)	1000 x (1200 + 1200)			
Useful panel size (aperto) (mm)	1000 x 2400			
Useful panel area(aperto) (m <sup>2</sup> )	2,4			
Panels per package (n)	7	5	4	4
Superficie rotoli per Packaging (m <sup>2</sup> )	16,8	12	9,6	9,6

# VELK

Quick coupling heating and cooling radiant floor system for pipe installation, characterised by its versatility, ease and speed of laying. The characteristic feature of the VELK system is the PE-RT EVOH pipe, combined with the spiral strip with anchoring function, which makes it perfectly compatible with the Tiemme flat panel (art. 4541) and velcro mat (art. 4534), without the use of tools and clips. The range of products, made up of the insulating flat panel (with insulation thicknesses in compliance with the thermal resistance requirements of UNI EN 1264:2021) and the mat, makes the system versatile and adaptable to different laying situations, from new construction to renovation.



- 1. Skirting -
- 2. Coating -
- 3. Screed -
- 4. Pipe **art. 0211B**
- 5. Mat/Insulation panel **art. 4534 - 4541**
- 6. Perimeter strip **art. 4507**
- 7. PE sheet **art. 4503**

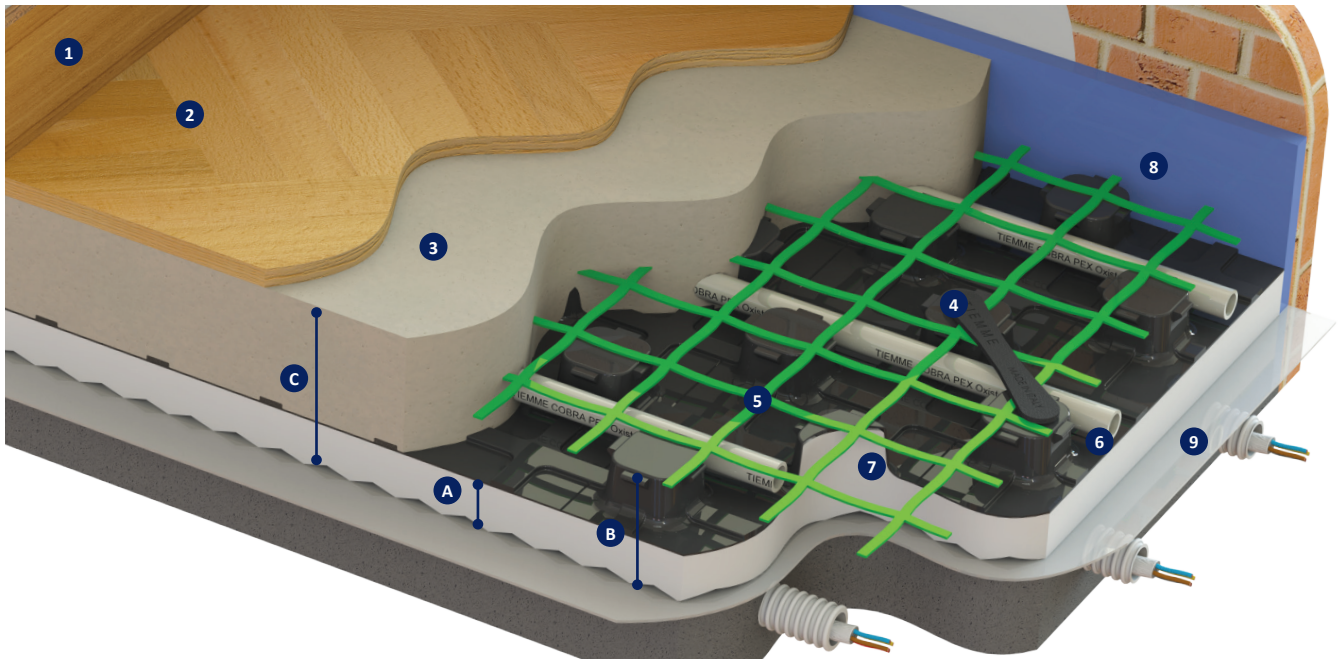
Code	Dimensions (mm)	
	A	B
450 0743	2	52 ÷ 62
450 0744	23	73 ÷ 83
450 0745	38	88 ÷ 98

## TECHNICAL CHARACTERISTICS

	Codes		
	450 0743	450 0744	450 0745
Thermal resistance UNI EN 13163 (m <sup>2</sup> k/W)	-	<b>0,77</b>	<b>1,27</b>
Compression resistance to 10% UNI EN 826 (kPa)	-	150	
Insulation thickness (mm)	2 (fondo autoadesivo)	23	38
Total thickness (mm)	2	23	38
Minimum pipe distance (mm)	50		
Thermal conductivity UNI EN 12667 (W/mk)	-	0,030	
Water absorption UNI EN 12087 (%)	-	3,0	
Reaction to fire EN 13501-1 (Euroclasse)	-	E	
Total roll size (mm)	20000 x 1050	10000 x 1000	
Useful roll size (mm)	20000 x 1000	10000 x 1000	
Useful roll area (m <sup>2</sup> )	20	10	
Roll per package (n)	1	6	4
Superficie roll per Packaging (m <sup>2</sup> )	20	60	40

# SILENTO

Silento is an innovative system whose panel has been designed to thermally insulate the floor and retain the pipe but above all to effectively reduce the noise of foot traffic. This was achieved using EPS-T, a high-performance material obtained through an advanced industrial process and further enhanced by a particular geometric shape of the bottom of the panel. Finally, to give the EPS-T additional characteristics of solidity and reliability, it has been coupled to a thermoformed able to withstand high loads both during installation and during work.



- 1. Skirting -
- 2. Coating -
- 3. Screed -
- 4. Mesh fixing clip **art. 4527**
- 5. Fiberglass mesh **art. 4532**
- 6. Pipe **art. 0200B**
- 7. Insulation panel **art. 4502SIL**
- 8. Perimeter strip **art. 4513**
- 9. PE sheet **art. 4503**

Code	Dimensions (mm)		
	A	B	C
450 0313	30	52	80 ÷ 90

## TECHNICAL CHARACTERISTICS

	Codes
	450 0313
Improvement of noise abatement (db)	28
Thermal resistance UNI EN 13163 (m <sup>2</sup> k/W)	0,75
Dynamic stiffness s' (MN/m <sup>3</sup> ) UNI EN 29052-1, screed area mass per unit 110 (kg/m <sup>2</sup> )	20
Livello di comprimibilità sotto compressione 2 mm UNI EN 12431	CP2
Insulation thickness (mm)	30
Total thickness (mm)	52
Total thickness equivalente UNI EN 1264/3 (mm)	34
Thickness of the covering thermoformed sheath (mm)	0,8
Minimum pipe distance (mm)	50
Thermal conductivity UNI EN 12667 (W/mk)	0,040
Reaction to fire EN 13501-1 (Euroclass)	E
Total panel size (mm)	1450 x 850
Useful panel size (mm)	1400 x 800
Panel area (m <sup>2</sup> )	1,12
Panels per package (n)	10
Panel area per package (m <sup>2</sup> )	11,20



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