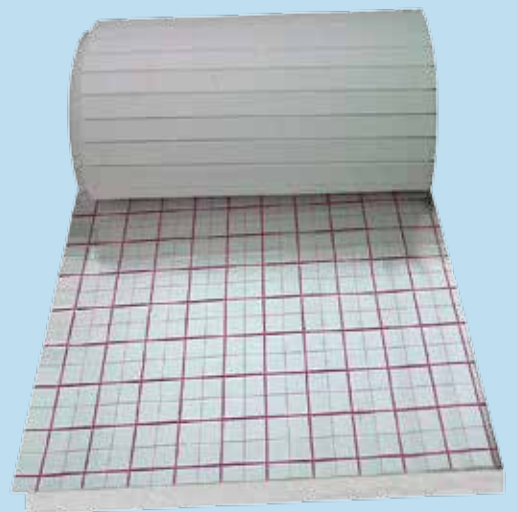
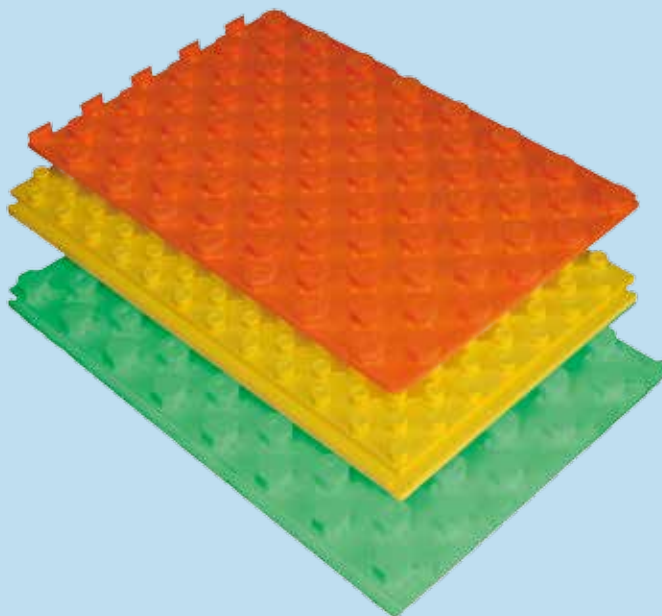
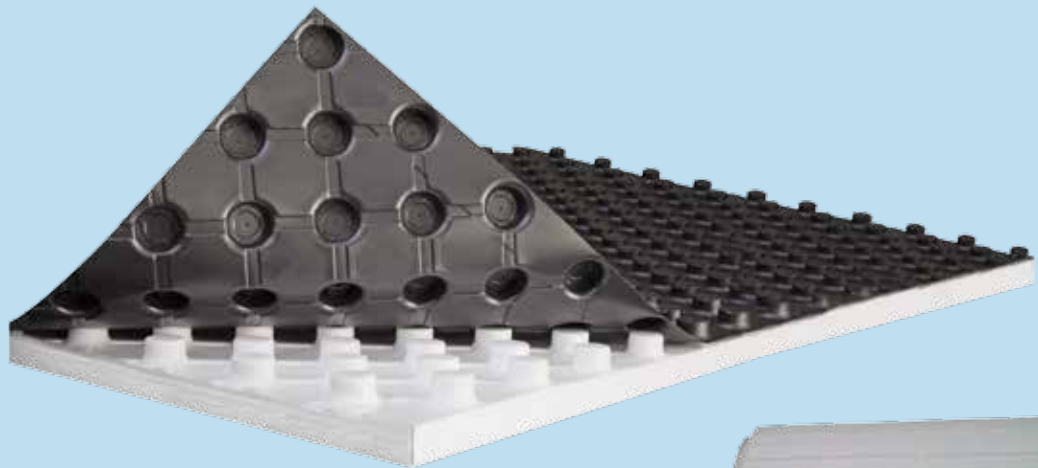


## The floor heating system with radiant panels

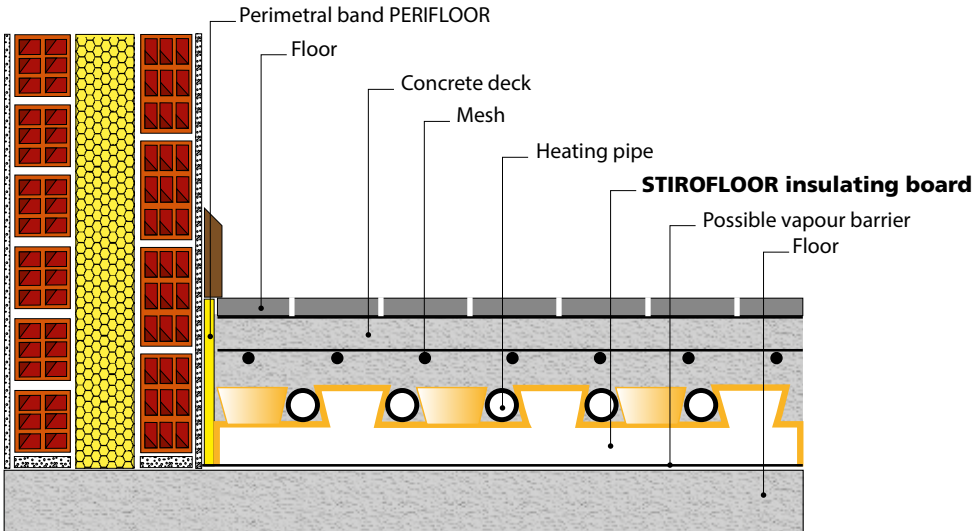


# The floor heating system with radiant panels

The floor heating with radiant panels is the system with the highest energetic efficiency widely spread in all European countries, which allows to design and build buildings in high Energy Class (Gold Class, Class A Plus etc.).

**The principle of operation** of the system with radiating panels is based on the circulation of hot water at low temperature, typically between 30 °C and 40 °C, in a closed circuit, which is spread by covering a very high radiating surface.

## AN EXAMPLE OF STRATIGRAPHY OF THE RADIANT PANEL

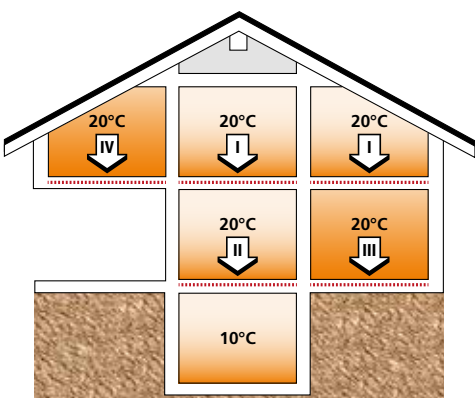


The European **Norm** governing the design and installation of heating floor is **EN 1264** (waterbased surface embedded heating and cooling system), which applies to all residential buildings, offices and other buildings the use of which corresponds or it is similar to that of residential buildings (eg. hotels, nursing houses, colleges, convents, barracks, etc.). This Norm covers the main definitions and their symbols, related to the installations with underfloor heating, fed with hot water, used in residential or similar. It does not apply to heating systems with wooden floor, while it can be used in the case where other heating means are used instead of water.

## The Norm EN 1264 is structured into 5 parts:

- EN 1264-1: 2011 Definitions and symbols
- EN 1264-2: 2008, A1:2012 Floor heating: prove methods for the determination of the thermal output using calculation test methods
- EN 1264-3: 2009: Dimensioning of both heating and cooling system - effective thickness
- EN 1264-4: 2009 Installation
- EN 1264-5: 2008 Heating and cooling surfaces embedded in floors, ceilings and walls - Determination of the thermal output

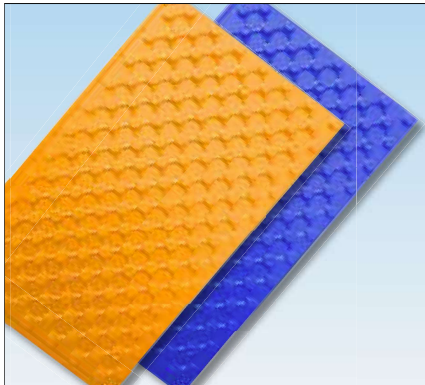
The NORM EN 1264-4, at paragraph 4.1.2.2.1 table1, recommends what should be the minimum values of thermal resistance ( $R_D$ ) of the insulating panels used in the underfloor heating systems, distinguishing five different cases, based on the conditions existing under the heated rooms. These minimum values of thermal resistance ( $R_D$ ) translate in EFFECTIVE THICKNESSES reported in the following tables for the various types of insulating boards used.



## Minimum values of thermal resistance $R_D$ according to the Norm EN 1264-4

Thermal Resistance $R_D$	Heated room below or adjacent	Unheated or intermittent heated room below, adjacent or directly on the ground	External air temperature below or adjacent		
			External design temperature $T \geq 0^\circ\text{C}$	External design temperature $0^\circ\text{C} > T \geq -5^\circ\text{C}$	External design temperature $-5^\circ\text{C} > T \geq -15^\circ\text{C}$
			1,25 m <sup>2</sup> K/W	1,50 m <sup>2</sup> K/W	2,00 m <sup>2</sup> K/W

# The floor heating system with radiant panels



## STIROFLOOR

Thermoformed expanded polystyrene boards, CFC and HCFC free, with a high-impact polystyrene film (HIPS), with stubs and interlocking, according to the European Norm EN 13163, for the realization of heating systems with radiant floors.

**Useful dimensions:** 1200x700 mm

**Pitch:** 5

Technical properties	STIROFLOOR 150	STIROFLOOR 200	M.U.	Norm
EPS Class	150	200	-	EN 13163
Useful Length	1200	1200	mm	EN 822
Useful Width	700	700	mm	EN 822
Dimensional tolerance on length and width	± 0,6	± 0,6	%	EN 822
Dimensional tolerance on thickness	± 2	± 2	mm	EN 823
Diameter of heating pipe (recommended)	16÷18	16÷18	mm	-
Pitch (wheelbase of laying)	5	5	cm	-
Squareness	± 2	± 2	mm/m	EN 824
Compressive strength at 10% max deformation	≥150	≥200	kPa	EN 826
Declared thermal conductivity $\lambda_D$ at 10°C	0,034	0,033	W/mK	EN 12667

STIROFLOOR 150 - 200			
Product	m <sup>2</sup> /board	Board n./pallet	m <sup>2</sup> /pallet
Stirofloor 35	0,84	20	16,80
Stirofloor 40	0,84	16	13,44
Stirofloor 43	0,84	14	11,76
Stirofloor 50	0,84	12	10,08
Stirofloor 60	0,84	10	8,40
Stirofloor 65	0,84	9	7,56
Stirofloor 70	0,84	8	6,72

Packaging in cardboard boxes with two-sides opening and cross straps.

The boxes are put on EPS planks.



**Values of thermal resistance  $R_D$  of the insulating boards used in function of the effective thickness. (The effective thickness - "average effective thickness" was calculated according to the Norm EN 1264-3)**

STIROFLOOR 150 - 200: mm 1200x700 (stub 20 mm)				
Product	CLASS 150		CLASS 200	
	EFFECTIVE thickness (mm) Norm 1264-3	$R_D$ (m <sup>2</sup> K/W)	EFFECTIVE thickness (mm) Norm 1264-3	$R_D$ (m <sup>2</sup> K/W)
Stirofloor 35 (15+stub)	18,1	0,50	18,1	0,55
Stirofloor 40 (20+stub)	22,0	0,65	22,0	0,65
Stirofloor 43 (23,5+stub)	25,5	0,75	25,5	0,75
Stirofloor 50 (30+stub)	32,0	0,90	32,0	0,95
Stirofloor 60 (40+stub)	42,5	1,25	42,5	1,25
Stirofloor 65 (45+stub)	47,0	1,35	47,0	1,40
Stirofloor 70 (50+stub)	52,0	1,50	51,0	1,55

The values of  $R_D$  in orange cells are the minimum values established by the Norm EN 1264-4