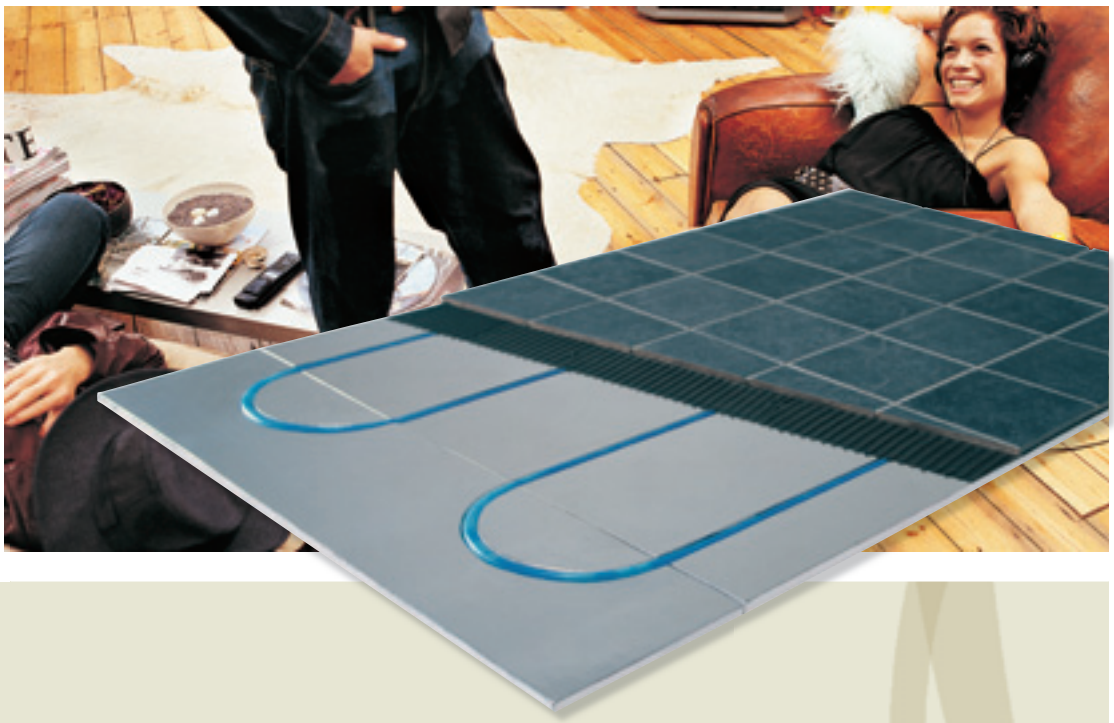
Flooré Produktion AB

From Scandinavia comes a completely different way of looking at underfloor heating. System that drastically reduces installation costs. That doesn't require the usual expensive and time-consuming process of pouring concrete. That doesn't halt work for two or more weeks for concrete to settle and dry.

We're now presenting an underfloor heating system that can literally be put down in hours, easily, so saving on labour cost whilst other vital construction work continues unhindered and on-schedule.



Our aim is to offer the customer the best underfloor heating solution considering thermal comfort, economy and flexibility.

BETTER ECONOMY – ENHANCED THERMAL COMFORT

flooré
VÄRMEGOLV

Flooréwa

Flooréwa is the name of the patented floor panel. This panel is unique since its building height has been minimised. It is the diameter of the pipe that sets the limit – the building height is 12.5 or 16.5 mm depending on which pipe size is used. Today, there are two standard panels available: Flooréwa 12 and Flooréwa 16.

Flooréwa is composed of high density expanded polystyrene (EPS) lamellas which are set together by means of a laminated aluminium foil, to produce a panel.
The distance between two lamellas forms the groove in which the pipe can be placed during the installation process. The lower side of the groove is reinforced with tape.

Facts

EPS:
Density 40 kg/m^3
Aluminium foil thickness 100µm
Pipe spacing standard 192 alt 120 mm
Pipe spacing customised 200 mm

BUILDING HEIGHT:
Standard 12 and 16 mm
(can be customised)

Size

FLOOREWA16 – spacing 200 mm

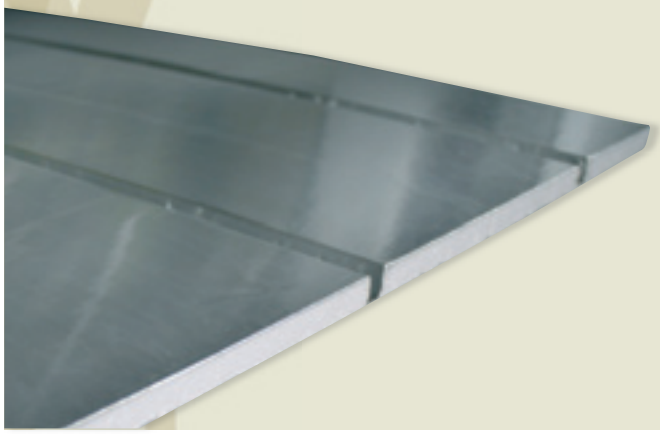
Straight panel	1175 x 600 mm
U-turn panel	1200 x 200 mm

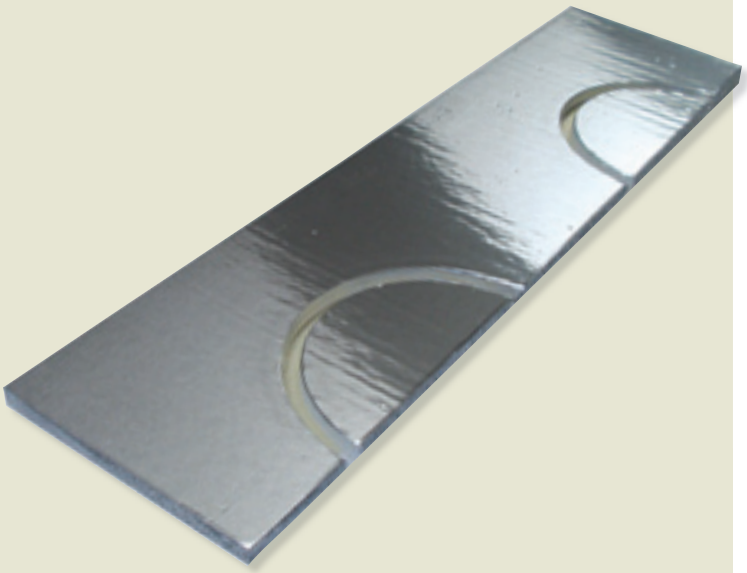
FLOOREWA12 – spacing 192 mm

Straight panel	1175 x 768 mm
U-turn panel	768 x 192 mm

FLOOREWA12 – spacing 120 mm

Straight panel	1175 x 720 mm
U-turn panel	1200 x 192 mm





EASY – the insulating panel

The Flooré EASY panel is made of high density expanded polystyrene (EPS) with pre-cut grooves and is laminated with aluminium foil. A difference, in comparison to the Flooréwa panel, is that each EASY panel is equipped with straight and U-turn grooves. Furthermore, EASY has thermal insulation underneath the pipe groove.

The installation of EASY is as simple and beneficial as Flooréwa and is the natural selection if additional thermal insulation is required in the floor construction. EASY is manufactured for use of 12– or 16 mm pipes.
Both alternatives have two panel thicknesses as standard, please see below.

Facts

EPS:
Density 40 kg/m^3
Aluminium foil thickness 100 µm
Pipe spacing standard 200 mm
(can be customised)

BUILDING HEIGHT:
18 – 50mm depending on pipe diameter and degree of thermal insulation.

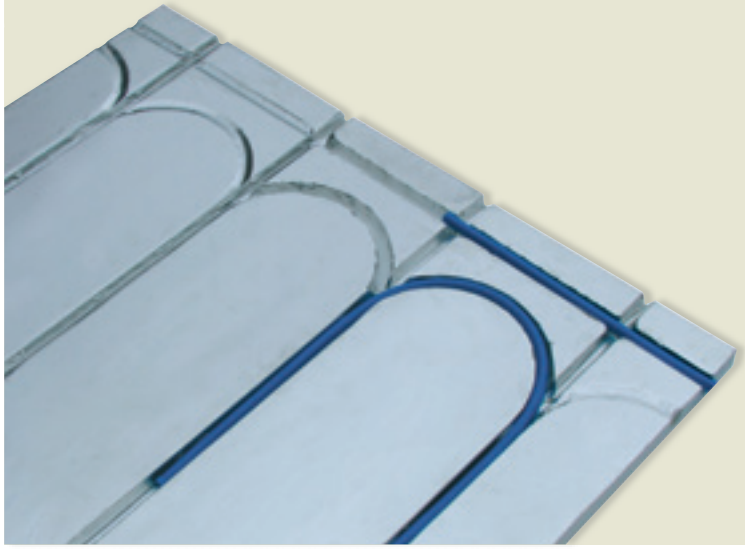
Size

EASY 12 | – 18 spacing 200 mm
1175 x 800 x 18 mm

EASY 12 | – 25 spacing 200 mm
1175 x 800 x 25 mm

EASY 16 | – 25 spacing 200 mm
1175 x 800 x 25 mm

EASY 16 | – 50 spacing 200 mm
1175 x 800 x 50 mm



Characteristics

LOW WEIGHT
Facilitates the installation and lowers the loads on the floor construction.

LOW BUILDING HEIGHT
The building height of the system is restricted by the diameter of the pipe.
The flooring material is set directly on the panels and will in this way minimise the total building height. Please refer to the section "Flooring".

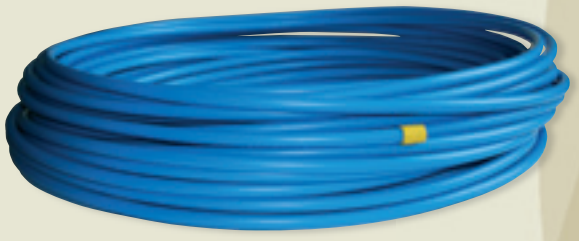
QUICK THERMAL RESPONSE
The short distance and small thermal resistance between the pipe water and floor surface gives quick thermal response and possibilities of controlling temperature changes.

EXCELLENT HEAT DISTRIBUTION
Thanks to the aluminium foil, heat is conducted from the pipe so that an even and comfortable heat is distributed across the floor surface.

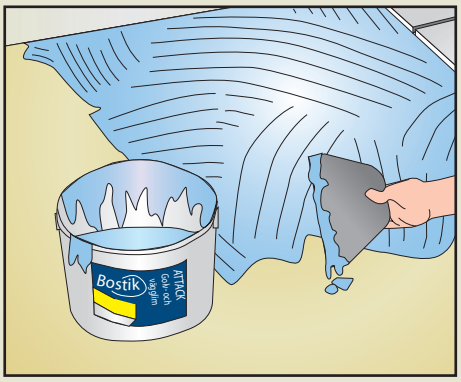
FLEXIBLE
During installation, the panels are easy to work on and adjust to the specific spaces. It reduces labour time.

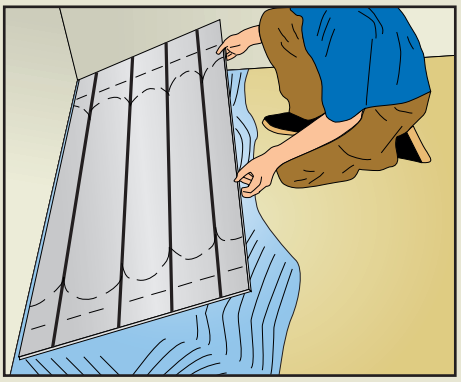
Conditions

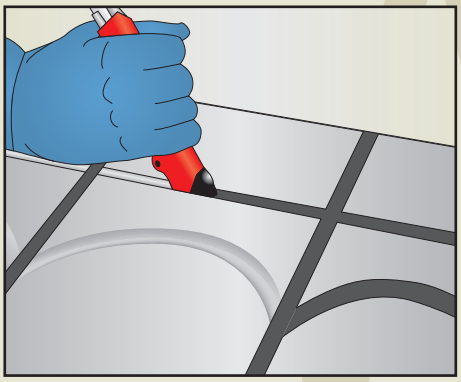
The condition for using Flooréwa is that there is a plane floor construction surface onto which the panel can be set, for example a concrete or wood chip board surface. Flooréwa cannot be mounted on top of wood beams. Normally, Flooréwa is glued onto the substrate either with solvent-free universal floor adhesives or with cementitious adhesives (adhesives used for large ceramic tiles). It does not work well to install the panels floating, in other words without mechanical or chemical bonding onto the substrate, primarily due to movements when the pipe is set into the groove.

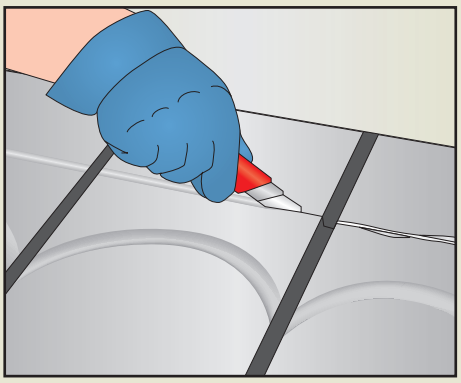


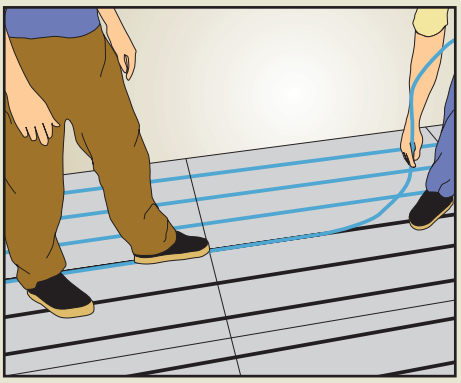
Simply EASY to install

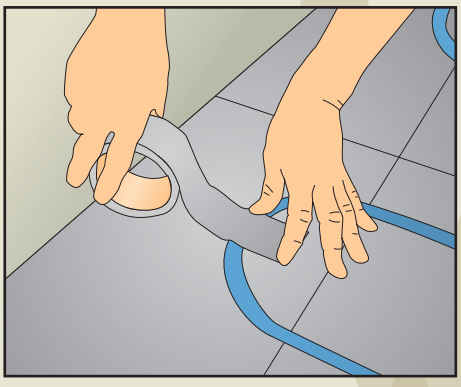


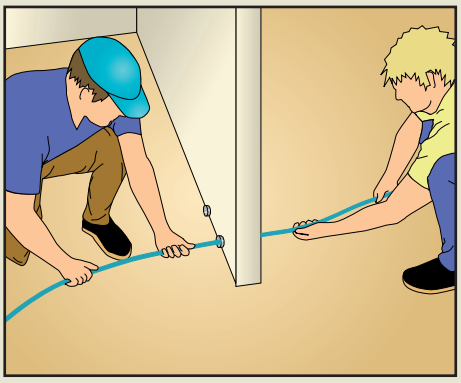


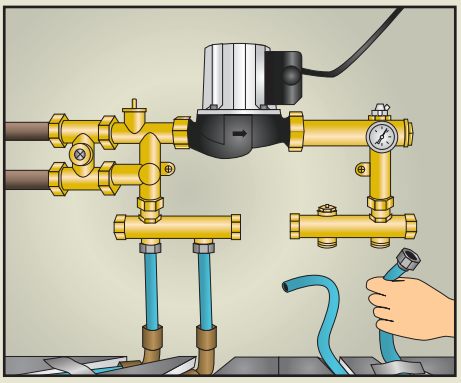


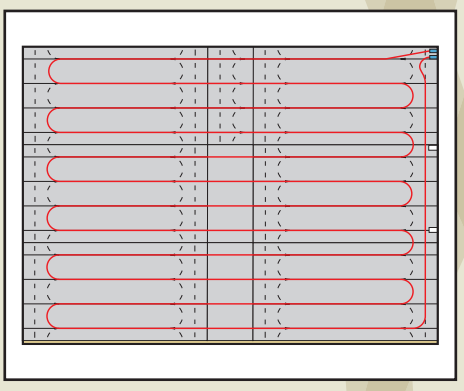












Surface-mounted underfloor heating

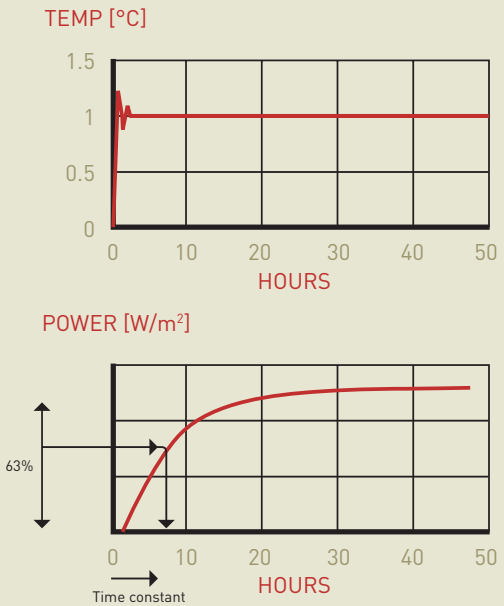
In a series of computational simulations performed by the Division of Building Technology, Royal Institute of Technology (KTH), which were presented during a seminar at Nordbygg-mässan 1996 (the largest building exhibition in Scandinavia), the thermal performance of various underfloor heating systems were demonstrated. Specifically, the thermal inertia of the systems was highlighted.

As boundary condition, the temperature of the water in the pipe was increased by 1 °C in one step. The thermal response was studied by observing how long time it took for the increase in heat dissipation, due to the increase in temperature, to fully be transmitted through the top surface of the floor construction.
This construction was assumed to be a slab on ground with the thickness of concrete corresponding to 150 mm and 150 mm of thermal insulation underneath. The pipe spacing was 300 mm. Ceramic tiles (8 mm) were used as flooring, set with 4 mm of tile adhesive.

IN SIMULATIONS OF THE UNDERFLOOR HEATING SYSTEMS WITH EMBEDDED PIPES, THE PIPES WERE SITUATED SO THAT THERE WAS;

1. 110 mm of concrete above the pipes;
2. 55 mm of concrete above the pipes;
3. 30 mm of concrete above the pipes.

In the fourth simulation, an installation of a surface-mounted system resembling Flooréwa, but with the pipe spacing 300 mm and aluminium foil thickness of 0.5 mm, was modelled.

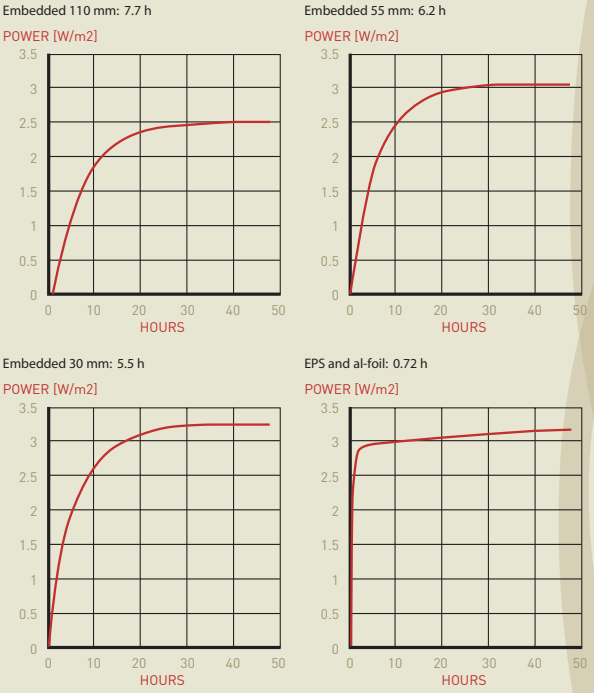


A method of describing thermal inertia is with the so-called time constant, which in is a quantification of the time it took for the construction to adapt to the change in temperature. In this case, the time constant is defined as the time it took for 63 % of the process to occur, until all heat has penetrated through the flooring surface. Results are shown below.

THE FOLLOWING CONCLUSIONS CAN BE DRAWN FROM THE CALCULATIONS:

- A pipe close to the surface will more effectively transmit heat (more upward power per degree Celsius). The concrete will, for pipes embedded deep in the construction, give rise to a thermal resistance between the pipe and surface, even though it has good thermal conductivity.

- Due to the heat capacity of the concrete, the thermal inertia of the construction is large. Time lapses while heat is emitted trough the



masses of concrete. In the case "Embedded 110 mm", no heat leaves the surface until one hour has passed.

• Surface-mounted systems react quicker to meet heating requirements with lower water temperatures than the embedded systems. What is not revealed in the case "Embedded 30 mm" is that the surface temperature is quite non-isothermal: a foot can detect were the pipe is situated. The knee in the figure labelled "EPS and al-foil" is due to that heat is conducted to the flooring surface during the initial stages of the process.
Thereafter, the concrete slab beneath the system will successively be heated and as this occurs, more heat will be conducted upwards.

Flooring materials

CERAMIC TILES – DRY SPACES

In dry spaces, ceramic tiles can be installed directly on Flooréwa- or EASY-panels.
Two types of tile adhesives have been used in this way, which through experience (since 1991) and test have shown to have the following characteristics:
• Good attachment onto aluminium, so that the surfaces do not need a layer of primer;
• Slightly flexible which allows small movements in for intermediate floors with wood beams.
These two products are Mapei Granirapid and two component Mapei Kerabond & Isolastic.

WET ROOMS

In wet rooms, the panels must first be primed and screeded before applying wet-proofing membranes. Alternative methods are possible, for example advanced membranes such as Mapei's Mapelastic.

WOOD FLOORING

Parquet, laminate and floor boards are commonly laid floating with two intermediate layers, usually paper felt on top of a 0.2 mm thick PE-foil. Noise reduction layer may be optional, but usually hinders heat flow from the UFH.

Flooré Produktion AB

Flooré Produktion AB is a Swedish innovative company that was established in 2000. However, experiences from underfloor heating can be traced back to 1991 when a successful research project was initiated by the innovator Håkan Rodin and the Department of Building Technology at the Royal Institute of Technology (KTH).

The project developed and tested an electric underfloor heating system (UFH) – Flooréco –which gave experiences and verified design models for UFH-systems. Tests and measurements were in co-operation with KTH and Vattenfall Utveckling AB partly financed by the Swedish Council for Building Research. During following years, continued development resulted in a couple of patents around the world. Our speciality is a hydronic surface-mounted underfloor heating system.

The head quarter and production is situated in Ånge; the geometric mid-point of Sweden. With a sales office in Stockholm and a development office in Bollnäs, Flooré has today 10 employees. As the company is heavily expanding to meet the markets demands for our products, our sales are increasing in Sweden, Norway, Iceland, France and the UK.

On the Swedish market, Flooré supplies complete systems that offer the most adaptable systems on the market. As a systems supplier, we provide our customers with a number of services so that they obtain a well-functioning UFH. We perform AUTO-CAD layout drawings and design calculations. These calculations serve to establish heating requirement, circuit flows, pressure loss and supply water temperatures.

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