

# Floor Heating under Removable Floorings

## Application Sheet

# Table of Contents

List of Application Sheets.....	2
Application briefing .....	3
Product Selection.....	4
Calculation .....	5
Installation Summary.....	6
Important.....	7
Performance.....	8

## List of Application Sheets

### **Indoor Heating, New building**

Floor Heating in Concrete Floor Constructions  
Floor Heating in Joist Floor Constructions

### **Indoor Heating, Renovation**

Floor Heating under Fixed Dry Floorings  
Floor Heating in Bathroom Floors  
Floor Heating under Removable Floorings

### **Frost Protection**

Frost Protection of Pipe Systems  
Frost Protection of Roof and Gutter Systems  
Melting Snow and Ice from Ground Areas  
Frost Protection of Floor Constructions  
Frost Protection of Concrete Hardening Process

### **Temperature Maintenance**

Temperature Maintenance of Pipe Systems  
Condensation Protection of Floors and Surfaces

### **Heating within Agriculture**

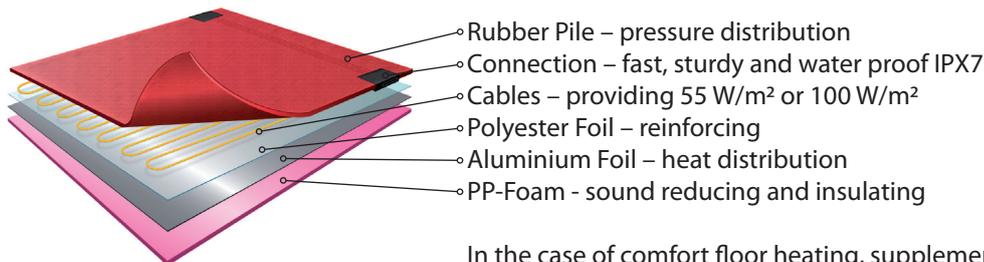
Heating Stable Floors  
Heating Seed Beds  
Heating Vine Yards

# Application Briefing

When floors in flats, houses, basements or patios are renovated, comfort floor heating can be added without using screed or without breaking up the old floor. The comfort is provided by the Devidry™ Click system which is designed to be in contact with wooden sub or top floorings.

## Devidry™ Click system

- consists of a 8 mm pile providing an underlay with multiple properties
- is installed on the old or sub floor, right under the new top floor
- ensures fast responding floor heating and evenly distributed floor heat



- Rubber Pile – pressure distribution
- Connection – fast, sturdy and water proof IPX7
- Cables – providing 55 W/m<sup>2</sup> or 100 W/m<sup>2</sup>
- Polyester Foil – reinforcing
- Aluminium Foil – heat distribution
- PP-Foam - sound reducing and insulating

In the case of comfort floor heating, supplementary heating is required. However, Devidry™ Click system can provide the total heating of sufficiently insulated rooms, up to 80-90 W/m<sup>2</sup>. See Calculation section.

### Opportunities

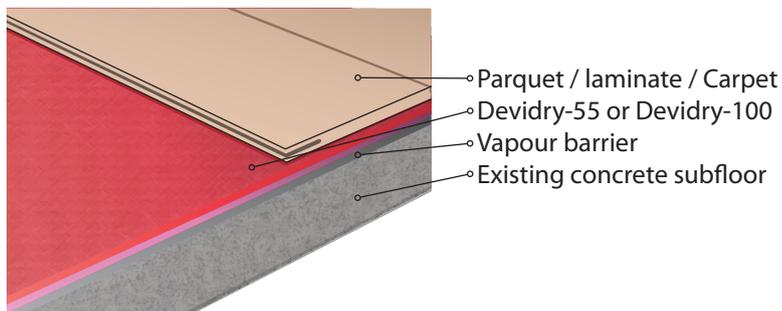
Parquets and laminates up to 22 mm  
Medium thick carpets

### Installation

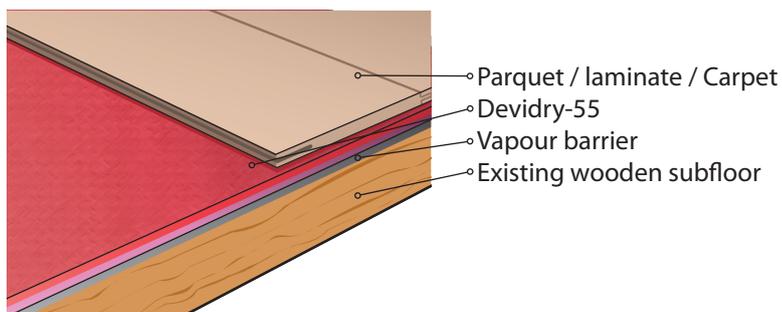
No mason work with screed  
Sound reducing foam build-in  
Building height 8 mm + flooring

### Performance

Noise reduction 17 dB  
Quick responding floor heat  
Ideal for timer control



- Parquet / laminate / Carpet
- Devidry-55 or Devidry-100
- Vapour barrier
- Existing concrete subfloor



- Parquet / laminate / Carpet
- Devidry-55
- Vapour barrier
- Existing wooden subfloor

# Product Selection

The Devidry™ Click System can be controlled in 2 ways, depending on the output, the floor construction and flooring material:

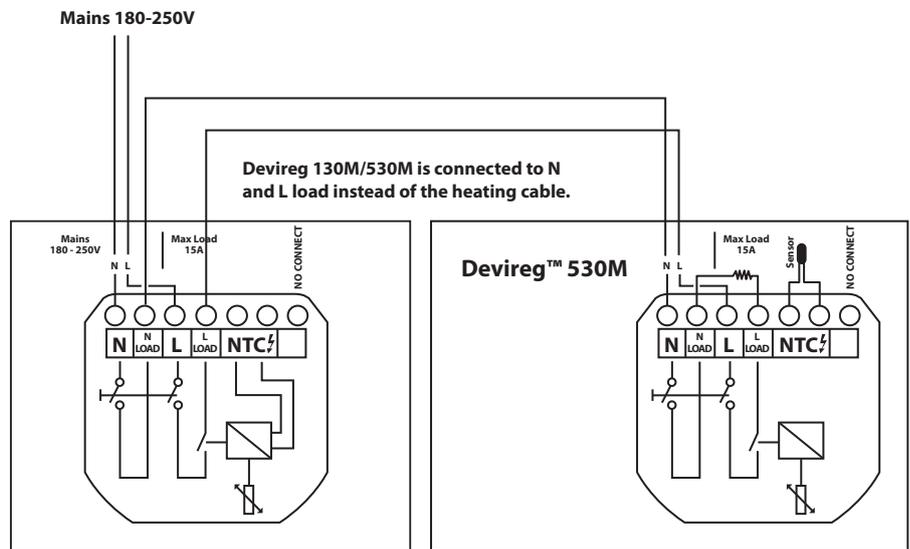
Concept	Devidry™ Control Kit	Output	Floor construction			Flooring	
			Wood	Concrete	Wooden	Laminate	Carpet
 The Click & Plug System	Plug 55 Kit	55 W/m²	●	●	●	●	●
	Plug 100 Kit	100 W/m²	⊘	●	●	●	●
 The Click & Pro System	Pro Kit	55 W/m²	●	●	●	●	⊘
		100 W/m²	⊘	●	●	●	⊘

Product	Options	Description
Devidry™	 Devidry-55, 1 to 5 m² Devidry-100, 1 to 5 m²	For wooden subfloors, Max. 10A per section For concrete subfloors, Max. 10A per section
Plug Kit (required with carpets)	 Devidry™ Plug Kit 55 Devidry™ Plug Kit 100	For wooden subfloors, limited to 30°C, 10A For concrete subfloors, limited to 35°C, 10A
Pro Kit	 Devidry™ Pro Kit	With Devireg™ 535 timer, limited to 35°C, 15A Extra supply cord is required above 10A
Alternative controls (see note below)	Devireg™ 130M Devireg™ 530M	Floor thermostat, limited to 35°C Floor thermostat, limited to 35°C
Sensor	NTC Floor sensor cable Room sensor for Devireg™ 535	Included in all control kits Built-in the thermostat
Accessories	Devidry FM, 1, 2 or 4 m² Devidry™ X25, X100, X200 Devi tape 38 mm x 50 m Devidry Pro Supply Cord	Filler material Extension cords for split elements, supply cord When installed under carpets 1 mm² x 3 m, for installations above 10 A
Other	Vapour barrier Top flooring	Prevents moisture from below

## Alternative thermostats

Other thermostats than above mentioned can be used if

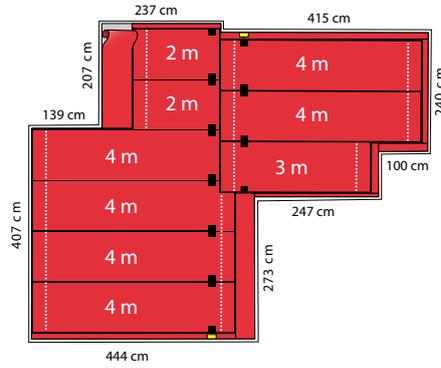
- the flooring is wooden or laminate (NOT carpets)
- connected in series with a Devireg 130M or a Devireg 530M, working as floor temperature limiter according to the diagram.



**Devilink FT**  
Can be installed without floor sensor.

**Example**

The example to the right shows a living room of 35 m<sup>2</sup> that is to be heated. The subfloor is concrete which means Devidry-100 can be installed. A solution for carpets is preferred, which require a Click & Plug system.



The Devidry™ element must be laid with 7 cm distance to the wall, along the sides connected with a supply cord or extension cord. The space is subsequently filled with Devidry™ FM.

Devidry- 100	Coverage	Net Wattage (See Product Sheet)
2 x 2 m <sup>2</sup>	4 m <sup>2</sup>	280 W
1 x 3 m <sup>2</sup>	3 m <sup>2</sup>	240 W
6 x 4 m <sup>2</sup>	24 m <sup>2</sup>	2040 W
In all	31 m <sup>2</sup>	2560 W (83 W/m <sup>2</sup> )

**Devidry Kit 100**

The maximum per kit is 10 A, which equals 2300 W at 230V. This means 2 pieces of Devidry Kit 100 is required. The room naturally divide the system into 2 sections. The left section load is 920W (4A) and the right section load is 1640 W (7,1A).

**Devidry FM**

31 out of 35 m<sup>2</sup> is covered by Devidry-100 heating element and the rest is to be covered by filler material. In this case Devidry™ FM 4 m<sup>2</sup> + 1 m<sup>2</sup> in safety are chosen.

**Extension cords**

Depending on the placement of the Devidry Kit, extension cords might be required.

**Calculation**

The Devidry™ Click system is mainly used for comfort floor heating, which means additional room heating is required to maintain a stabile room temperature all year round.

However, the system can provide the total heating of a room if the room is sufficiently insulated but this requires

a calculation of the actual room heat loss.

The room heat loss  $q_{room}$  depends on the degree and the age of the insulation. In new houses, the building contractor can provide these details but in old houses, it is often difficult to find details about how the building is constructed and thus this can be dif-

ficult to calculate. In such situations, the present energy consumption can give a rough estimation. This must be multiplied by up to 1.5 depending on where in the house the room is located and the general condition of the room.

$$q_{room} = 1.0...1.5 \cdot \frac{E_{house}}{2 \cdot A_{house}}$$

$q_{room}$  W/m<sup>2</sup> Room heat loss provided by the contractor or calculated  
 $E_{house}$  kWh Total energy consumption for the house  
 $A_{house}$  m<sup>2</sup> Total living area in the house

If the room has obstacles such as fixed cupboards, baths etc, this must be taken into consideration when calculating the actual required heat density  $q_{heat}$ .

$$q_{heat} = 1.3 \cdot q_{room} \cdot \frac{A_{room}}{A_{heat}}$$

$q_{heat}$  W/m<sup>2</sup> Room heat loss provided by the contractor or calculated  
 $E_{house}$  kWh Total energy consumption for the house  
 $A_{house}$  m<sup>2</sup> Total living area in the house

The floor heating system may be undersized up to 10% but this means that the floor heating will respond slower.

At 10% shortage, additional heat emitters must be considered to remedy the room's heat loss  $q_{room}$ , otherwise the room temperature will decrease 1 degree for every 10 W/m<sup>2</sup> shortage.

At 25% shortage or more, the heat density provides comfort floor heating only and supplementary heating is required for sufficient room heating.

# Installation Summary

## Required tools:

Included in Devidry™ Kit

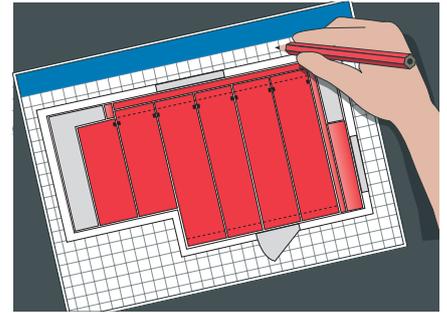
- Connection Tool
- Aluminium tape
- Installation manuals

## Other tools

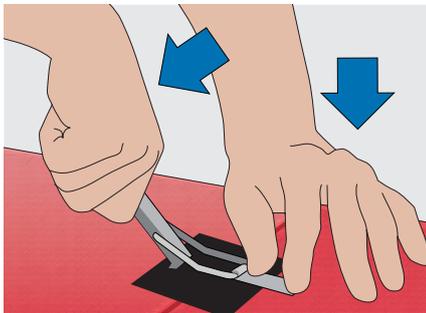
- Knife
- Devi tape 38 mm x 50 m



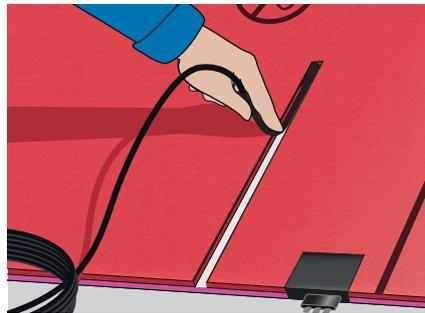
1) Make sure that the subfloor is reasonably level, firm and stable. New concrete needs to dry out for 30 days before installation.



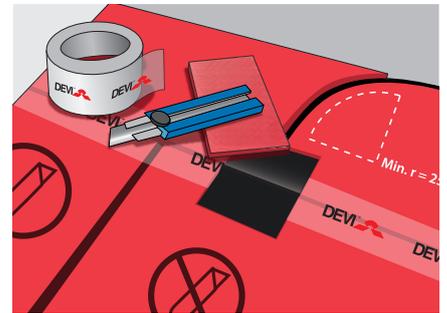
2) Recheck the layout e.g. the placement of the control kit, floor sensors. Avoid all present and future objects fixed to the floor such as cupboards.



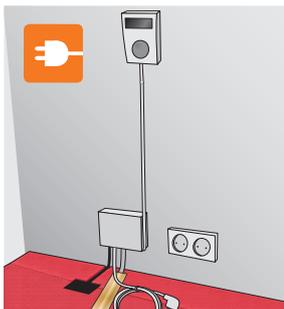
3) Lay out a moisture barrier. Roll out the Devidry™ elements, remove the end stops to connect the elements by means of the connection tool.



4) Rip off the pre-cut strip and lay the sensor in the groove. Attach the included aluminium tape on top to fix the sensor cord.



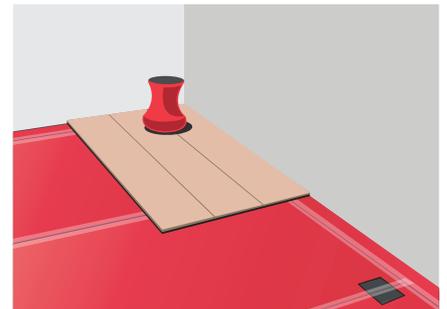
5) Cover the remaining part of the area with filler material. Cut out for supply and sensor cord and optionally extension cord. It is recommended to tape the elements together under carpets.



6) Devidry Plug Kit:  
Mount the controller and safety box and plug the control system into the socket and make sure that the Devidry™ elements are heating before installing the floor finish.



7) Devidry Pro Kit:  
Check the insulation resistance of the heating elements. Plaster the wall groove and connect the cold tail, sensor and thermostat. To be done by authorized installer.



8) Install the floor finish directly onto the Devidry™ elements at a room temperature of approximately 15°C.

## Commissioning

9) The Devireg™ thermostat must be commissioned as prescribed in the thermostat manual.  
According to ISO 13732-2, the comfortable floor surface temperature depends on the flooring material.

- Soft wood (pine) 22.5 - 28°C
- Hard wood (oak) 24.5 - 28°C
- Textiles (rugs, carpets) 21 - 28°C

However, observe the maximum floor surface temperature according to the flooring manufacturer. For most wooden floor products, the temperature is usually around 27°C.

All temperature settings must be set some degrees higher to compensate for the heat resistance in the top flooring.

Thermal resistance [m <sup>2</sup> K/W]	Examples of flooring	Details	Approximate setting for 25°C floor temperature
0.05	8 mm HDF based laminate	> 800 kg/m <sup>3</sup>	28°C
0.10	14 mm beech parquet	650 - 800 kg/m <sup>3</sup>	31°C
0.13	22 mm solid oak plank	> 800 kg/m <sup>3</sup>	32°C
<0.17	Max. carpet thickness suitable for floor heating	acc. to EN 1307	34°C
0.18	22 mm solid fir planks	450 - 650 kg/m <sup>3</sup>	35°C

10) Train the end-user or daily supervisor in the operation of the Devidry™ Click system.

increased slowly during the first week to let the new floor settle. This is also recommended in the beginning of a heating season.

11) The floor temperature must be

## Important

Avoid Beech and Maple in multilayered constructions unless press dried.

Wood shrinks and swells naturally, depending on the relative humidity RH in the room. The optimal range is 30-60% RH. In order to keep the relative humidity uniform and within the optimal range:

- Install a vapour barrier for subfloors <95% RH and damp proof membrane >95%.
- Ensure 100% contact between element and the floor materials above (no air gaps).

- Install the heating system in the whole floor area at 15°C surface temperature.
- Always install a floor sensor to limit the floor surface temperature.

The total insulation value R above cables is max. 0.18 m<sup>3</sup>K/W (1.8 Tog). Carpets up to 0.25 m<sup>3</sup>K/W are applicable but will reduce the floor temperature by 1-2 degrees.

Keep an air gap of min. 6 cm under permanent objects like desks and beds.

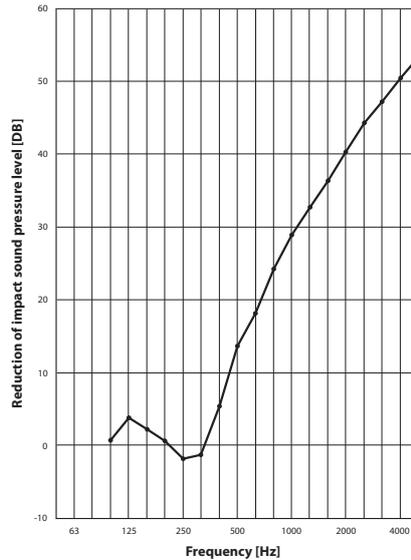
For Devidry™ Kit Pro, all electrical connections must be done by authorised persons according to local regulations.

# Performance

## Sound reduction

The graph on the right shows 14 mm laminate on Devidry installed on a concrete subfloor.

Weighted reduction of impact sound pressure level according to EN ISO 717-2:1996/2006 is  $\Delta L_w = 17$  dB

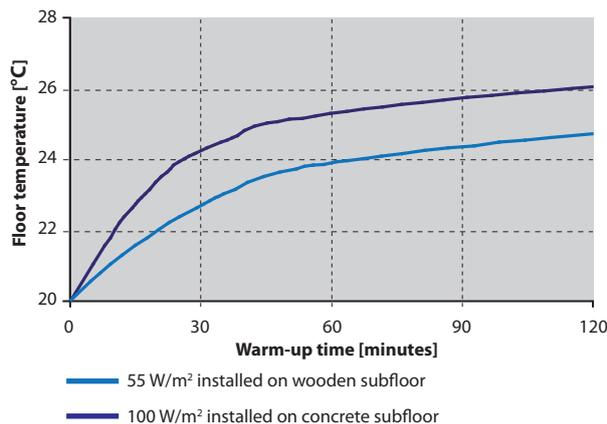


## Response time

Devidry™ is placed right below the flooring which gives a quick responding floor surface temperature.

The graph on the right shows the response time when Devidry™ is installed as comfort heating.

**Approx. warm-up time at 20°C Room temperature**  
Devidry™ under 8 mm laminate



## Energy consumption

The quick response time makes it ideal for timer thermostats.

For short time comfort floor heating ( $e_{\text{heat}} \leq 2$  hrs/day), the approx. annual energy consumption is:

$$e_{\text{heat}} = 0.3 \cdot q_{\text{inst}} \cdot \tau_{\text{heat}}$$

For 100 W/m<sup>2</sup> and 2 hours daily comfort heating, the approx. annual energy consumption is:

$$e_{\text{heat}} = 0.3 \cdot 100 \cdot 2 = 60 \cdot \frac{\text{kWh}}{\text{m}^2}$$