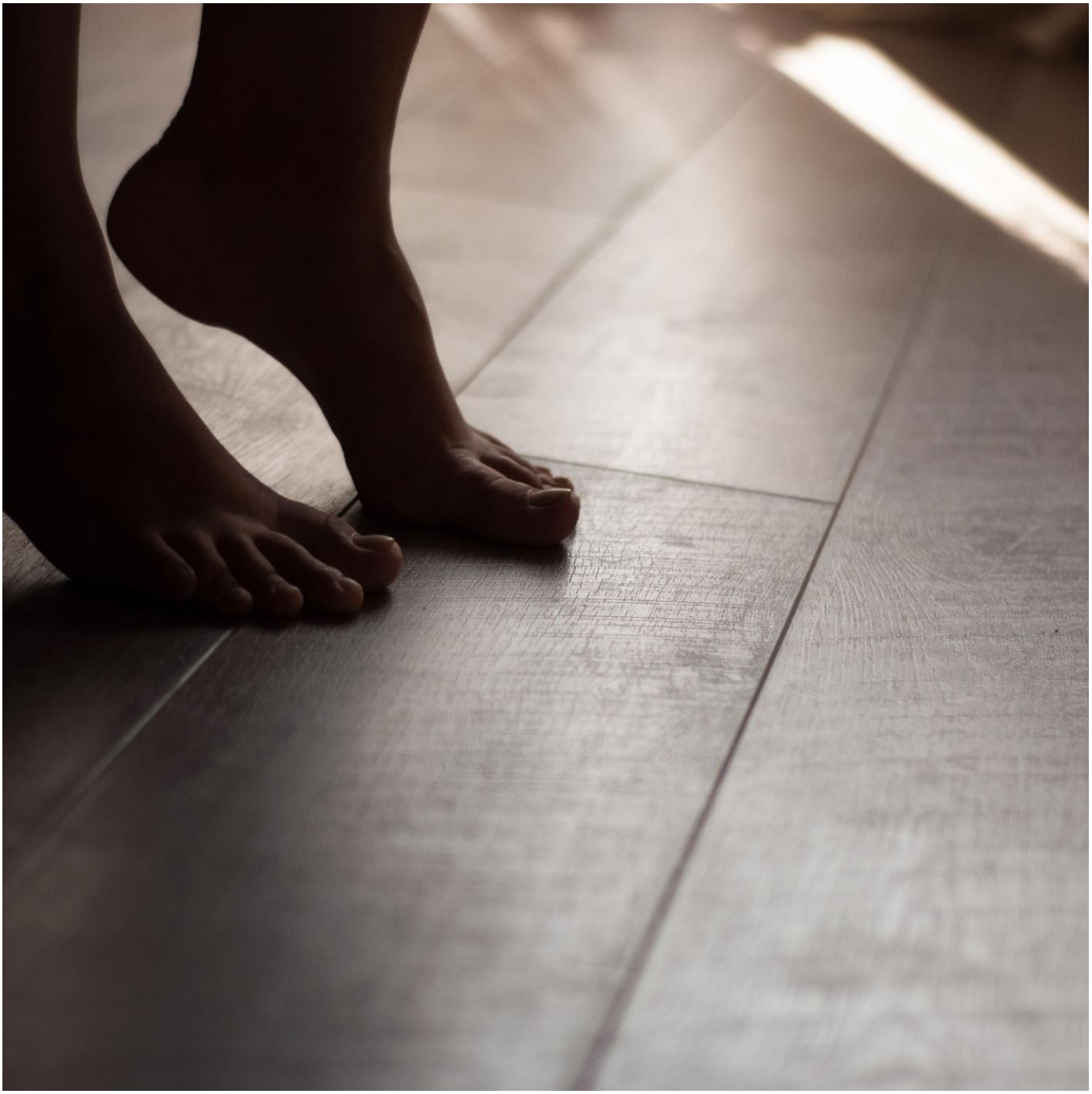


Warm to the touch

Barlinek floors over underfloor heating and cooling systems

Barlinek
FLOORS FOREVER

barlinek.com

1. Overview:

- All Barlinek floors can be installed over underfloor heating systems.
- Three-layer boards and vinyl panels can be installed as either floating or glued floors.
- Hybrid floors can be installed as glued floors only.
- They can be installed over in-screed and on-screed water and electric underfloor heating systems.
- **Installation must be carried out in accordance with the manual and the conditions of use must be observed.**
- Maximum floor surface temperatures must not be exceeded. For three-layer boards: 29°C, for hybrid flooring and vinyl panels: 27°C.
- Special attention must be paid to air humidity, which should be kept within the recommended range of 45-60% (for three-layer boards and hybrid flooring), necessitating the use of humidifiers in the winter season, considering our microclimatic conditions.
- Sudden (step) increase in temperature should be avoided at all times. Floors should be heated gradually with increase in temperature by no more than 5°C/24h.
- Floors with underfloor heating should not be covered with carpets or mats to avoid exceeding the maximum permissible temperatures.
- Furniture should have legs with a minimum height of 10 cm.
- Floor heating systems should come with thermostats, regulators and floor sensors to allow temperature control.
- Where the flooring is installed simultaneously on unheated and heated surfaces, the respective flooring areas should be separated with expansion joints.

NOT APPLICABLE TO GLUED FLOORS.

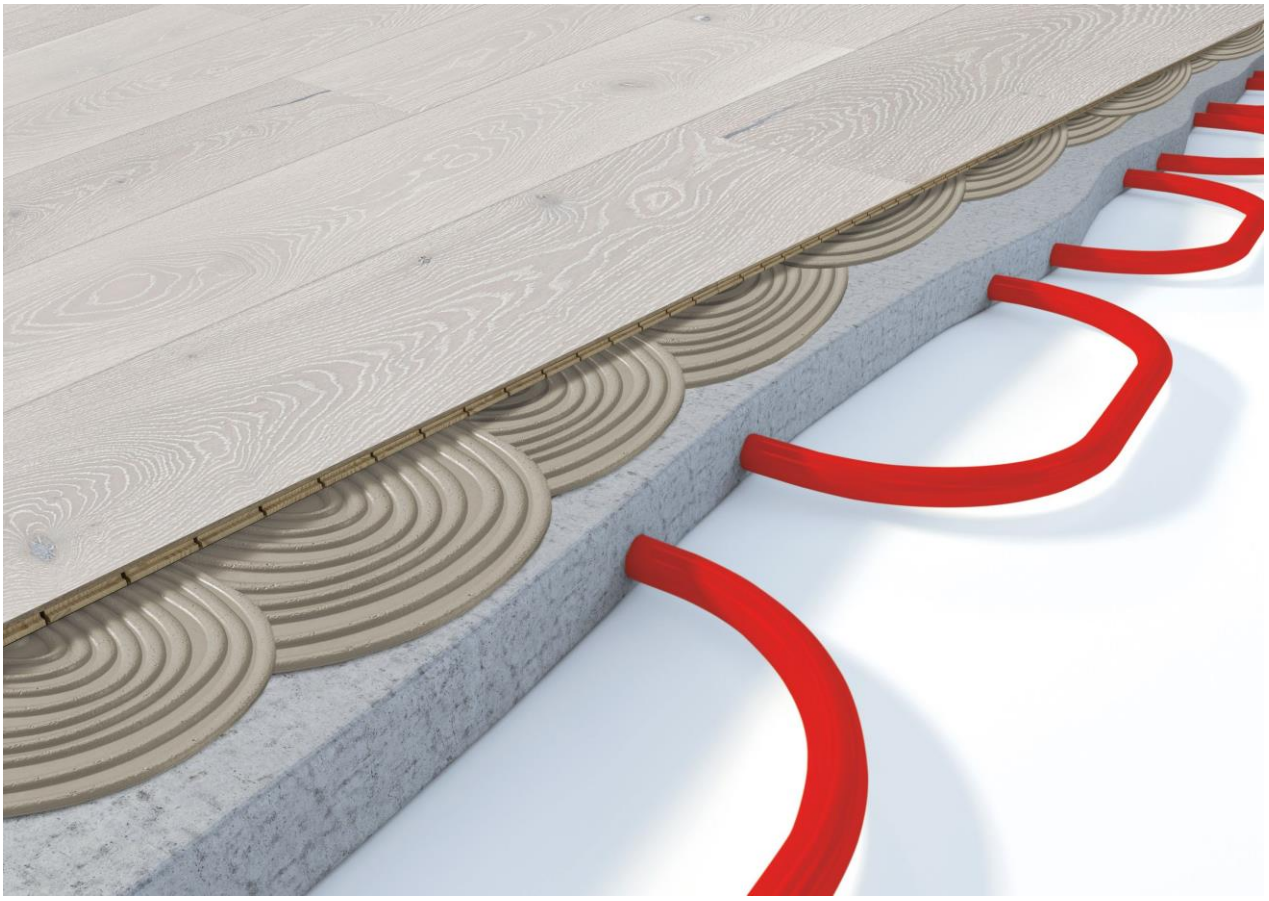
- Prior to the installation, the product should be acclimated for at least 48 hours as described in the installation manual.

2. Surface evaluation and preparation

MAXIMUM MOISTURE OF SCREED OVER UNDERFLOOR HEATING

	IN-SCREED (WET) UFH SYSTEMS	DRY UFH SYSTEMS
CEMENT SCREED	**1.8% CM / 65% RH** **GLUED FLOOR INSTALLATION** – In the case of higher humidity, it is recommended to use polyurethane or epoxy primer sealer approved by the manufacturer for use on heated screeds. **FLOATING FLOOR INSTALLATION** – In the case of higher humidity, it is recommended to use vapour barrier film with an SD value ≥75*. The recommended choice for the underlay is FixMat Sound. *diffusion resistance coefficient - the higher the parameter, the more efficient the protection against water vapour	**2.0% CM / 75% RH** **GLUED AND FLOATING FLOOR INSTALLATION –** higher humidity – a vapour barrier film with an SD value of ≥75* should be used as the first layer. *diffusion resistance coefficient - the higher the parameter, the more efficient the protection against water vapour
ANHYDRITE SCREED	**0.3% CM / 40% RH** Trapping moisture in this type of screed should be avoided, as it may lead to its deterioration. The screed must be dried.	**0.5% CM / 50% RH** Trapping moisture in this type of screed should be avoided, as it may lead to its deterioration. The screed must be dried.

- **IN-SCREED (WET) UFH SYSTEMS** – Prior to floor installation, new screeds need to be heated up.
- Heating-up allows to:
    - remove excess moisture and balance screed humidity with the average ambient humidity,
    - reduce shrinkage and thermal stresses as well as surface deformations; the screed surface undergoes changes (deflections) during drying.
- Nowadays, most often, boiler pre-set programs are used for heating-up. The floor installer does not heat up the substrate! The floor installer is neither obliged nor authorized to do so. The floor installer shall receive a declaration from the customer, construction manager or investor's representative that the heating-up process was completed.
- The floor installer is obliged to read the heating-up report and keep a copy for the record.
- In the case of currently popular heat pumps and other low-temperature systems, it is not possible to achieve such high temperatures as provided for in Barlinek's Substrate Heating-Up Report (up to 50°C). Usually, the temperature is within the range of 40-45°C. Nevertheless, with the recommended 30-day heating-up period, it is not a problem, and the achievement of the required parameters is guaranteed.
- The screed drying time depends on several factors:
    - heat supply temperature and arrangement of heating pipes – a higher temperature and denser layout of pipes translates into a more even heat distribution and accelerates drying;
    - drying time – the type and thickness of the screed should be taken into account. A sufficiently long heating-up time allows for a gradual migration of moisture, thus reducing the likelihood of excessive stresses and cracking. The type and thickness of the screed and the type of heating system should be taken into account;
    - type of screed - thickness and heating system.
- The floor installer's duty is to assess the substrate and prepare a measurement report. The following must be checked:
    - substrate moisture – see the table on page 3;
    - evenness – permissible deviations from the plane: for three-layer boards and hybrid flooring – 3 mm over a length of 2 meters; for floating vinyl flooring – 5 mm over a length of 2 meters; (for glued floors, the substrate must be properly prepared, taking onto account the adhesive type, the surface dimensions and static loads);
    - the presence of cracks and impurities.
- Moisture can be measured using various gravimetric, carbide and electronic tools for specific calibration depth and measurement accuracy values.
- During invasive measurements, e.g. CM, attention should be paid to avoid possible damage to the heating pipes. A sample should be cut out from spaces between the pipes (marked on the screed surface by the contractor) or the layout of pipes can be detected with thermal films and thermal cameras.
- Attention should be paid to significant differences in humidity measurements after heating-up, as they may signal not only different thickness or density of the screed, but also leaks or air trapped within the system.
- **ON-SCREED (DRY) UFH SYSTEMS** Permissible deviations from the plane are: for three-layer boards and hybrid flooring – 3 mm over a length of 2 meters; for floating vinyl flooring – 5 mm over a length of 2 meters;
- In the case of floating floor installation, a vapor barrier film with a minimum SD value ≥75 is recommended.



3. Floors glued over underfloor heating.

- Three-layer boards can be glued with one- and two-component polyurethane, silane or STP adhesives. Barlinek offers 1K 950 adhesive.
- Hybrid floors **should be installed over underfloor heating system as glued floors only** using adhesives recommended by Barlinek.
- Vinyl panels should be glued with adhesives recommended by Barlinek.
- The screed hardness should be checked with the surface hardness tester RI RI (with spring in the lower position).
- The screeds must always be sanded. Anhydrite seeds must be sanded until the grains become visible.
- For floors glued on anhydrite screeds, an adhesive system comprising a primer must be used.
- Self-levelling masses should be cement-based masses (CT) with the minimum compressive strength class C25 and the minimum flexural strength class F6.

4. Floating floors installed over underfloor heating

IT IS RECOMMENDED TO USE FLOORING WITH A MAXIMUM THERMAL RESISTANCE OF 0.15 M_2K/W – FLOOR AND UNDERLAY

THERMAL RESISTANCE OF BARLINEK FLOORS:

- **THREE-LAYER BOARD** – thermal resistance of 0.1 m_2 K/W. The recommended underlays to be laid over underfloor heating are FIX MAT SOUND and EXTREME 1.5 mm.
- **HYBRID FLOORS** – thermal resistance of 0.015 m_2 K/W. They cannot be installed as floating floors over underfloor heating. They can only be glued.
- **VINYL FLOORS** – thermal resistance of 0.05 m_2 K/W. They can be used with EXTREME 1.5 mm underlay only.

THERMAL RESISTANCE OF BARLINEK UNDERLAYS – EXTREME AND FIXMAT

EXTREME 1.5 mm

FIXMAT SOUND 2.15 mm

- **EXTREME** (1.5 mm) – thermal resistance of 0.009 m_2 K/W;
- **FIXMAT SOUND** – thermal resistance of 0.009 m_2 K/W;
- **EKO UNDERFLOOR BOARD (**5.5 mm) – thermal resistance of 0.079 m_2 K/W;
- **CORK MAT** (2 mm) – thermal resistance of 0.045 m_2 K/W;

In-screed water underfloor heating systems

- According to Polish building regulations, the minimum thickness of screed over heating pipes/cables should be 4.5 cm (for concrete screeds) or 3.5 cm (for anhydrite screeds).
- Temperature controllers and floor temperature sensors should be used.
- It is recommended to use thermal seals.

THREE-LAYER BOARDS	HYBRID FLOORS	VINYL FLOORS
YES	**YES**	**YES**
INSTALLED AS FLOATING OR GLUED FLOORS	**INSTALLED AS GLUED FLOORS ONLY**	**INSTALLED AS FLOATING OR GLUED FLOORS**
***floating floor** – with recommended FIXMAT SOUND and EXTREME 1.5 mm underlay	***dedicated adhesives** – as recommended by third parties	***dedicated adhesives** – as recommended by third parties ***dedicated underlay** – EXTREME 1.5 mm

Dry installation of a water underfloor heating system

- Temperature controllers should be used.
- Temperature controllers and floor temperature sensors should be used.
- It is recommended to use thermal seals.
- If the substrate material is XPS or EPS polystyrene, attention must be paid to its compressive strength (CS), which should be at least 200 kPa.
- Stability and evenness of the substrate must be examined, especially in old buildings.
- When adapting old buildings that are poorly insulated, in order to provide the right amount of heat, high water temperature and high flows should be set (which entails the risk of excessive drying of wooden floors).

THREE-LAYER BOARDS	HYBRID FLOORS	VINYL FLOORS
YES	**YES**	**YES**
INSTALLED AS FLOATING OR GLUED FLOORS	**INSTALLED AS GLUED FLOORS ONLY**	**INSTALLED AS FLOATING OR GLUED FLOORS** **ONLY after installing an additional gypsum fibre board** e.g. Fermacell, Jumpax, Thermo-Top, Wakol RP
***floating floor** – it is best to use an intermediate underlay, e.g. Fixmat Sound ***glued floor** – after installing an additional gypsum fibre board, e.g. Fermacell, Jumpax, Thermo-Top, Wakol RP	*after installing an additional gypsum fibre board, e.g. Fermacell, Jumpax, Thermo-Top, Wakol RP	***glued floor** – recommended adhesives. Dispersion adhesives must not be used. The suitable adhesives include PU and MS adhesives. ***floating floor** – EXTREME 1.5 mm underlay

Water underfloor heating systems installed in grooved screed

- No specific guidelines. To be agreed in cooperation with Barlinek.
- It should be checked whether the grooves are not too shallow and the pipes do not protrude above the substrate surface.
- Special care should be exercised when immersing the pipes and filling in the grooves. The pipes must be thoroughly covered or a liquid mass should be poured over them to encapsulate the pipes much better. Under no circumstances cracked mass or tile adhesive (especially for glued floors) must be used.
- For newly poured substrates, there is no possibility of "heating-up". The substrate should be allowed to dry naturally or a primer sealer should be applied to create a moisture barrier.
- When adapting old buildings that are poorly insulated, in order to provide the right amount of heat, high water temperature and high flows should be set (which entails the risk of excessive drying of wooden floors).
- Temperature controllers and floor temperature sensors should be used.
- It is recommended to use thermal seals.

THREE-LAYER BOARDS	HYBRID FLOORS	VINYL FLOORS
YES	**YES**	**YES**
INSTALLED AS FLOATING OR GLUED FLOORS	**INSTALLED AS GLUED FLOORS ONLY**	**INSTALLED AS FLOATING OR GLUED FLOORS**
***floating floor** – it is best to use an intermediate underlay, Fixmat Sound or Extreme	***dedicated adhesives** – as recommended	***glued floor** – recommended adhesives. Dispersion adhesives must not be used. The suitable adhesives include PU and MS adhesives. ***floating floor** – EXTREME 1.5 mm underlay

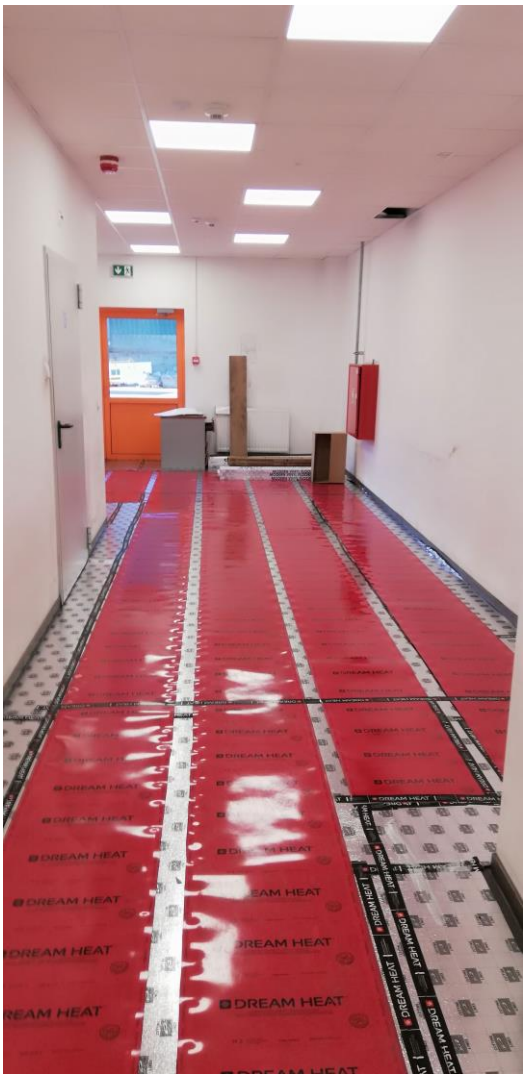
In-screed electric underfloor heating systems

- The most important thing is to choose the proper heating capacity, taking into account the type and requirements of the floor, screed thickness and installation recommendations.
- Attention should be paid to the proper installation of heating cables. They must be laid on the same level, therefore it is recommended that they are first covered with a suitable mass, followed by a levelling mortar.
- The quality of the materials used must be checked. The masses used must be dedicated for heating underlays and their minimum thickness must be in line with the manufacturer's recommendations.
- It is unacceptable to embed cables in tile adhesive, especially in the case of glued floors.
- It is recommended to use heating cables with a lower heating capacity and arrange them in a denser manner (recommended 5W/m) to ensure more even heat distribution.
- Lower thickness of the screed layer means that the heating-up process will be completed faster.
- It is necessary to use temperature controllers.
- It is necessary to use floor temperature sensors.
- It is recommended to use thermal seals.

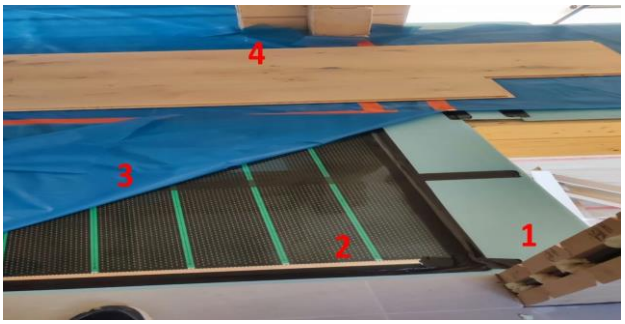
THREE-LAYER BOARDS	HYBRID FLOORS	VINYL FLOORS
YES	**YES**	**YES**
INSTALLED AS FLOATING OR GLUED FLOORS	**INSTALLED AS GLUED FLOORS ONLY**	**INSTALLED AS FLOATING OR GLUED FLOORS - recommended**
***floating floor** – it is best to use an intermediate underlay, Fixmat Sound or Extreme	***dedicated adhesives** – as recommended by third parties *screed thickness must be checked; according to Barlinek's guidelines, the minimum thickness is 15 mm above the heating cables	***glued floor** – recommended adhesives. Dispersion adhesives must not be used. The suitable adhesives include PU and MS adhesives. ***floating floor** – EXTREME 1.5 mm underlay *underlay thickness must be checked; according to Barlinek's guidelines, the minimum thickness is 20 mm above the heating cables

Electric underfloor heating films

E.G. DREAM HEAT, RED SNAKE, CALEO, HEAT DECOR



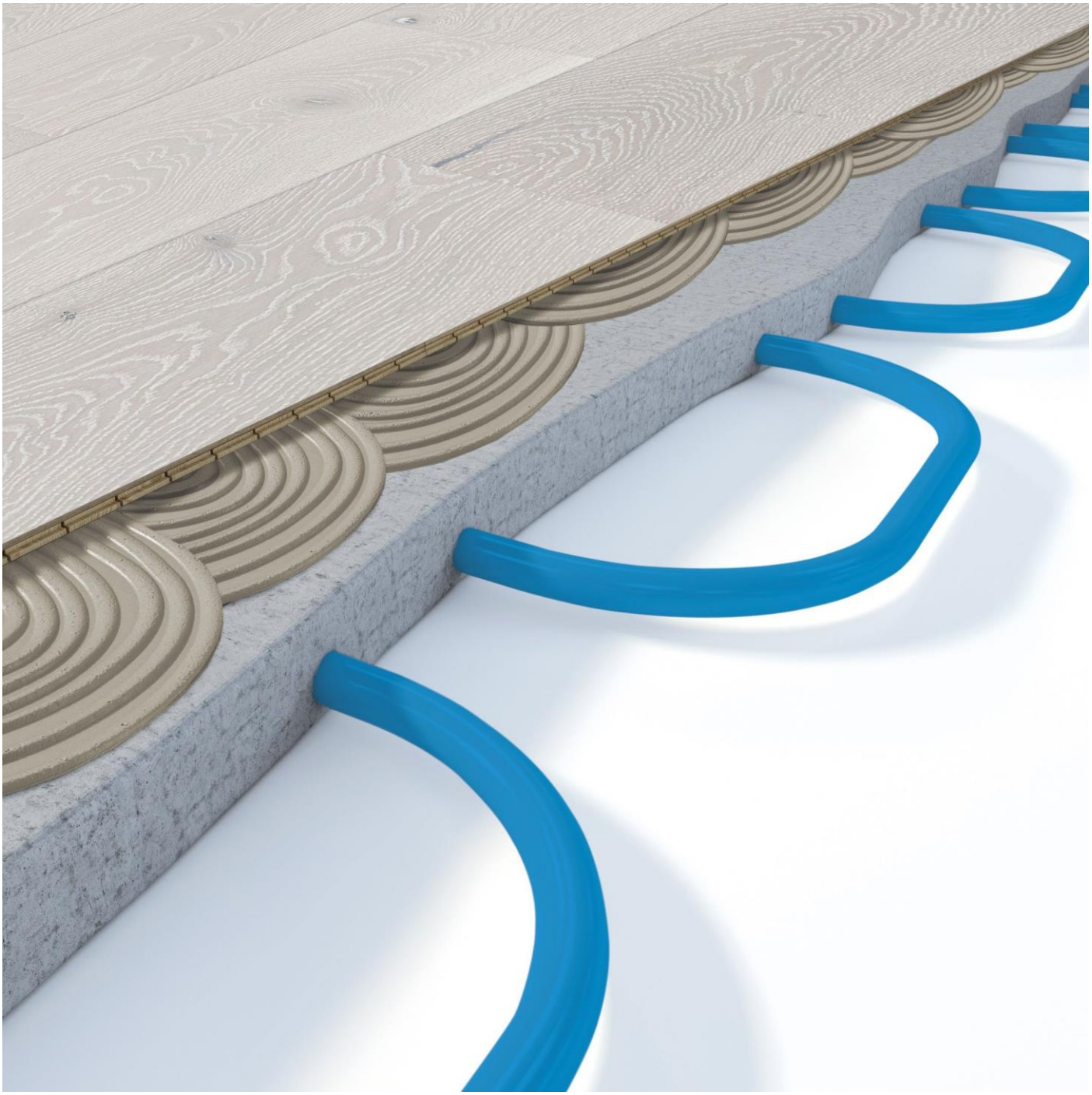
- The most important thing is to choose the proper heating capacity, taking into account the type and requirements of the floor as well as installation recommendations.
- There are considerable differences in the quality of the films, mainly those imported from China. The most common are ladder-type films made of resistance strips. There are problems with uneven temperature distribution even within one piece of film; therefore, it is recommended to check the temperatures with a pyrometer after installation.
- Films filled with carbon paste, e.g. Dream Heat, heating the entire surface of the film, are considered safe.
- Heating films work at full capacity or not at all, so it is recommended to increase the temperature gradually.
- Below is an example of a typical on-screed heating system:



1. underlay - minimum 4 mm thick, well insulating - usually XPS;
the thickness of the underlay is to allow connectors and wires to be placed inside; 2. heating film;
3. vapour barrier film; 4. Barlinek layered board;

- It is necessary to use temperature controllers.
- It is necessary to use floor temperature sensors.
- It is recommended to use thermal seals.

THREE-LAYER BOARDS	HYBRID FLOORS	VINYL FLOORS
YES INSTALLED AS FLOATING FLOOR ONLY	NO	NO **except for NOTE!** **– installation possible only on Dream Heat heating films** * in this case, it is possible to use a different underlay than the one recommended by us, i.e. a dedicated cork mat *installation must be carried by an authorized installer and according to the manufacturer's recommendations



Barlinek floors over underfloor cooling systems

Underfloor cooling has become an increasingly common solution. A floor cooling system allows the floor to absorb the ambient heat, thus lowering the room temperature. The heat is absorbed by cold water supplied by pipes embedded in the screed. This solution allows a comfortable temperature indoors on hot summer days. The "cooling" function is then performed by the entire floor surface, whose temperature is lower than the room air temperature. This is in accordance with the thermodynamic principle of heat transfer from the hotter medium to the colder one. This solution is facilitated, among others, by the currently popular heat pumps.

Barlinek allows the use of its products over underfloor cooling systems only if they are supported by an air-conditioning system. This applies primarily to three-layer boards.

The following information presents the key parameters and guidelines related to the use of underfloor cooling systems over which Barlinek floors have been installed:

1. The combination of underfloor heating and cooling systems should be planned already at the building design stage.
2. Circuit water temperature regulation should be correlated with the temperature and humidity of the air.
3. The floor temperature should not be lower by more than 4°C compared to the air temperature.
4. During the operation of an underfloor cooling system, a lower floor temperature tends to cause an increase in air humidity close to the floor surface; therefore, the underfloor cooling system should be combined with an air conditioning system and an efficient ventilation system (preferably mechanical). Active air conditioning supports the floor cooling system to a large extent, primarily, by reducing the air humidity.
5. In addition, air conditioning and ventilation system intensify the movement of air indoors, thus improving the sense of thermal comfort. With greater air movement and lower humidity, the perceived temperature is lower than the actual one.
6. In sun-exposed areas (southern, eastern side), blinds or screens should be used to prevent the floor from heating-up and thus avoid the formation of dew.
7. Floors should not be covered with, e.g. carpets, and furniture with short legs should not be used.
8. Installation of low thermal resistance floors. From among Barlinek's floors, the best choice would be hybrid and LVT floors. In the case of wooden floors, it is advisable to choose lacquered ones (lacquer restricts the penetration of moisture from the air to the board).
9. It is recommended to install the floors by gluing them with moisture-resistant adhesives.
10. Additionally, automatic temperature and humidity control systems should be installed for the rooms, as the air humidity must not exceed 50%. In each room with an underfloor cooling system, a sensor should be installed to calculate the dependence of relative air humidity on the board surface temperature and cut off the cold water supply to prevent reaching the so-called dew point, i.e. temperature at which airborne water vapour condenses on the board surface. The lack of such protection may cause the penetration of condensed water from the air into the floor, causing uncontrolled moistening of the wood, resulting in damage to the wooden floor, such as deformation, discoloration, or formation of gaps between the boards.

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For every pack we
plant a tree

We are saving
the peregrine falcon

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under our care