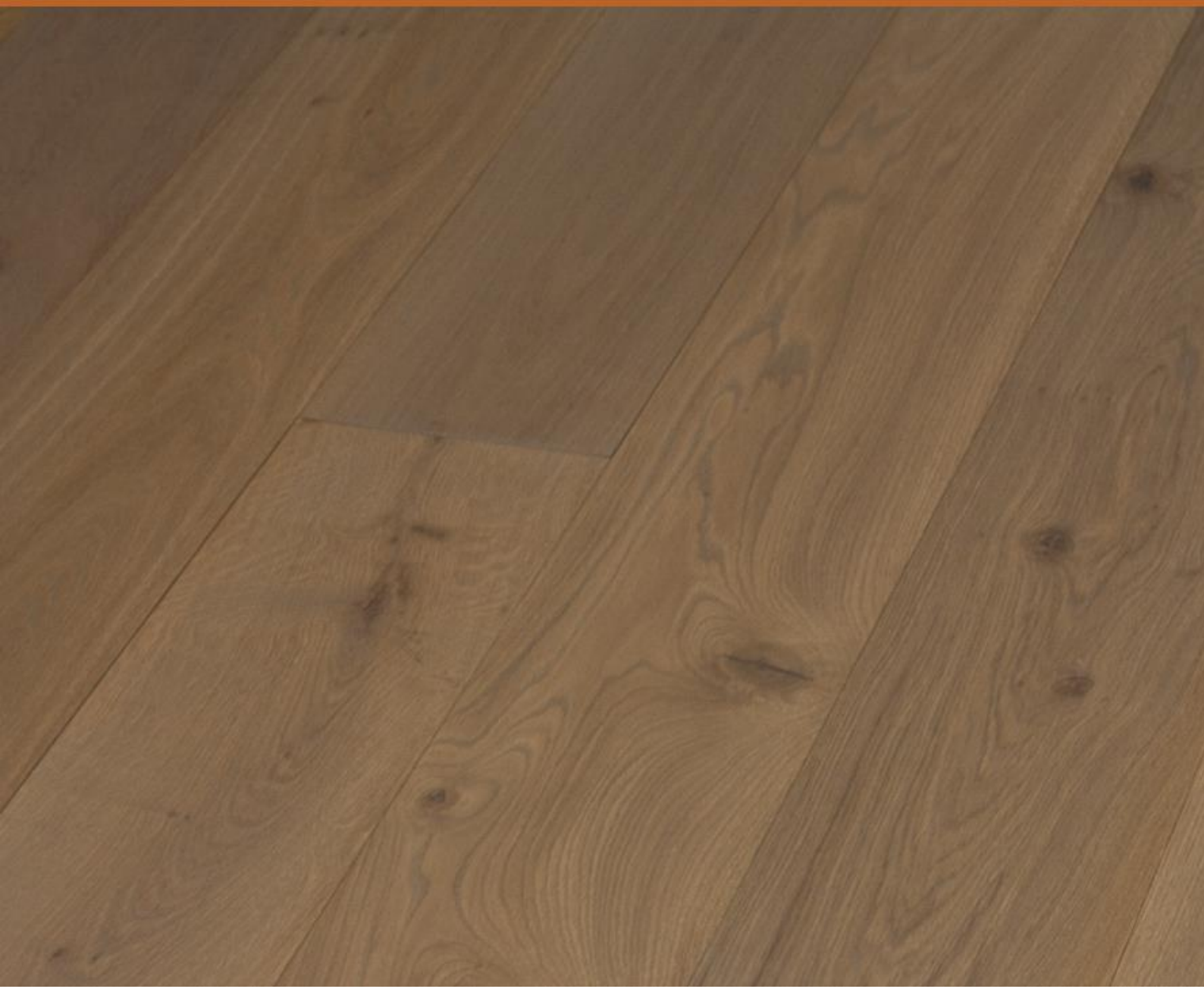


ISTORIATM

WOOD FLOORS

MADE IN ENGLAND BY JORDAN ANDREWS

UNDRFLOOR HEATING GUIDE



Underfloor Heating

Overview

Underfloor heating (UFH) is now an appealing and potentially cost-effective source of heating, hence its increased popularity within the UK market. The type of floorcovering installation needs to be taken into consideration when designing the underfloor heating. Insulation factors of floorcoverings will obviously affect the performance of the underfloor heating whilst some flooring installations may be affected by high subfloor temperatures and large fluctuations in subfloor temperatures.

Subsequently those in charge of operating the underfloor heating should be aware that sudden large changes in subfloor temperatures must be avoided. The following information is intended to assist the specifier to select the appropriate combination of underfloor heating and flooring installation.

Types

UFH can be broadly categorized into two types, namely warm water systems and electrical systems. Most modern UFH systems in new build projects are warm water systems. Most systems integrate high-tech plastic pipe within the floor - warm water at temperatures of 30-42°C (in general) is circulated through this pipe and this warms the floor surface to a temperature of 23-29°C, with an adhesive bond-line temperature not exceeding 27°C. Electrical systems require the installation of a flexible heating element beneath the floorcovering or underlayment. These elements come in the form of cables, mats or films.

Design Considerations

Most floorcoverings can be used over UFH however this should not be taken for granted. The important principle to bear in mind is that UFH relies on the upper surface of the floor covering being warmed to a temperature of 23-29°C, with an adhesive bond-line temperature not exceeding 27°C.

Floor Temperature Interpretation

The UFH industry designs to BS EN 1264-2: Floor Heating – Systems and components – Determination of Thermal Output; which contains parameters for allowable floor surface temperatures. This Standard allows for maximum floor surface temperatures of 29°C in occupied areas and 35°C for a strip 600-800mm wide under windows and along external walls, furthermore some thicker floorcoverings, especially those with foamed backing layers, have a higher thermal resistance and this can result in excessively high interface temperatures. In areas where the use of these higher temperatures is unavoidable, then agreement from the adhesive and flooring manufacturers should be obtained. British Standards contain differing and conflicting information; for example; BS8204-1 Screeds, Bases & In- Situ Flooring, states 'the usual operating surface temperature of a heated levelling screed is about 27°C; however, some locations operate at higher temperatures, e.g. 35°C'.

BS8203 Code of Practice for the Installation of Resilient Floorcoverings states: When used with many flooring materials underfloor heating can cause problems if the temperature at the interface between the subfloor and flooring exceeds 27°C or is subject to rapid fluctuations in temperature. In the majority of installations this temperature will not need to be exceeded if the building insulation meets the requirements of Part L of the Building Regulations.

BS8425 Code of Practice for Installation of Laminate Floorcoverings and the Code of Practice issued by the

Association of European Producers of Laminate Flooring state that the surface temperature should not exceed 28°C. Whilst there are minor differences in actual temperature level recommendations, specifiers should be aware of the point. It is essential therefore when installing floors over underfloor heating to consult the flooring manufacturer for advice. As a result of the confusion arising from the wording in these Standards the CFA and UK Resilient Floorcovering Manufacturers Association issued a joint guidance note in September 2003 stating that for resilient floorings 'the temperature should never exceed the agreed maximum of 27°C at the underside of the floorcovering (the adhesive line).

Note: UFH designers may refer to this as the 'interface' temperature. Opinions differ between the floorcovering and UFH industries as to where temperatures should be measured; the progressive improvement in Building Regulations Approved Document L has alleviated the situation. Prior to its introduction, the 27°C 'interface' limit restricted the choice of floorcoverings that could be used over underfloor heating. However, the resulting reduction in the amount of heating power required by the successive improvements to Part L now allows systems to work at temperatures below those of concern. For example, some hardwood floor finishes are installed with a maximum floor surface temperature of 27°C.

Floor Screeds

Floor screeds that incorporate warm water UFH systems are commonly referred to as heated screeds. Heated screeds are usually installed as floating screeds and installed at an appropriate thickness on a slip membrane over thermal insulation. Although most types of screeds may be used with UFH it is vital that their selection and design is matched. The most commonly known problems of curling, stress cracking and shrinkage cracking can be exacerbated in a heated screed. Heated screeds expand and contract with temperature changes, recommendations in British Standards are that movement joints should be placed within the screeds at door thresholds, between independently controlled heating zones and at the perimeter of the rooms where heated subfloors abut walls/upstands and where design criteria dictates.

Note: Under no circumstances should movement joints be covered, they should be carried through the subfloor to the floor finish and all applied layers terminated either side of the joint. The joint should be filled with a suitable flexible filler and a proprietary cover strip applied to cover the joint.

Wire Heating Systems

It is extremely important to ensure that there is an adequate amount of underlayment to cover the wires as there may be a tendency for the underlayment to crack directly over the wires themselves. Due to the properties of the heating element wire, heat is generated as current is passed through it. These elements

come in the form of cables, mats or film/foils (speak to manufacturer of the film/foil systems for installation instructions) and are more commonly found in domestic and DIY installations. They are deemed to be particularly suitable for use with hard ceramic or natural stone tiling but may be used with textile, resilient and timber floorcoverings. Detailing of movement joints should be carried out as mentioned above and must be in accordance with the underfloor heating manufacturers' recommendations.

Note 1: Sometimes these systems are applied over an insulating mat/tile backer board or plywood and it is important to ensure that the insulation mat/board is capable of supporting the chosen floor finish. It must be securely fixed to the substrate and may require priming before an underlayment is applied.

Note: The wire elements or heating mat are sometimes fixed to the insulation board with self-adhesive tape; excess use of the tape will reduce the potential contact area of the floor smoothing underlayment and may cause failure of the floorcovering.

Start Up / Drying Out

It is essential that before any floorcovering is installed the screed is preheated as prescribed in BS EN 1264 Part 4 and BS8204 Part 1.

1. Heat up must not begin for 21 days after laying cement and sand screeds, or 7 days for calcium sulphate.
2. Initial heat up should begin with an ambient water temperature for a period of 3 days. After this, water flow temperature may be raised incrementally by a maximum of 5°C per day until the design temperature has been attained, this should be maintained for another 4 days minimum, although this can be extended until the screed is dried. Cooling is a reverse of the above process.
3. When electrical element systems are utilized individual manufacturers should be consulted for advice.

When additional levelling compounds are required on the sub-screed surface to make good levels or remedial action, consideration must be taken to ensure that enough time has elapsed between the application of these systems and the overlaying of final floor finishes. In extreme cases (e.g. poor site conditions) it may be necessary to apply background heating to the sub-screed to ensure adequate drying out has occurred, in all cases the material manufacturer should be consulted to ensure the correct recommendations are applied.

Note: Conventional liquid applied waterproof surface membranes are generally not used on heated screeds. Some membranes are available; however, they should only be considered when approved by the relevant manufacturer. In all instances, underfloor heating systems must be commissioned and run before any subfloor preparation or installation of decorative floorcoverings are installed.

The information above is provided by the contract flooring association (CFA) and is correct as of the time this sheet being produced.

Wood Flooring

If your wood floor is being floated, then a suitable underlay that has a low tog rating and will therefore reduce thermal resistance must be used. If the floor is being fully adhered the moisture level in the subfloor must be checked and be at an adequate level to avoid moisture rising into the floor. Prior to installation the under-floor heating system must be commissioned as per manufacturer's recommendations**, the flooring must be laid with the under-floor heating system switched off. A room temperature of 18 – 20 °C should be maintained during installation of the floor and it may be necessary for an independent heat source to be used to maintain this temperature.

Floor surface levels must be within industry standards of +/- 3mm over a 3l/m straight edge so as to avoid any airspace under the floor as this will cause undesirable temperature fluctuation. Once laid and the adhesives fully cured the under-floor heating can be switched on. The floor temperature must be raised very slowly, from a low starting point over several weeks to the maximum recommended temperature of 27°C. A rapid rise in temperature from cold to hot must be avoided. If the floor is protected (covered) after laying it is important that the under-floor heating remains off so as to avoid excessive build-up of heat.

Failure to do so can result in potential warping and /or bowing of the engineered wooden floor and uneven subflooring which could result in excess movement that might cause gapping and possible breakage or squeaking.

Important steps

1. Read the manufacturer's instructions, this one sounds obvious, but you'll be surprised how many people fail to read through the manuals before use. Specific steps can vary from heater type to heater type, and from one brand to another, so make no assumptions.
2. Do not be tempted to turn on the system immediately after laying the finished floor. Depending on the floor covering please allow time for the adhesive or levelling compound to cure completely (see manufacturers guidelines). Bring the system up to temperature gradually in stages over the next few weeks. **We recommend turning up the heating 1°C per day to a maximum 27°C (floor temperature).**
3. Most heating systems are direct acting. However, depending on the subfloor and the floor covering installed there may be a certain amount of thermal lag in the system (heat-up and cool down periods). Please anticipate these when switching your system on and off. Careful time clock control of on/off periods ensure maximum comfort at minimum cost.
4. Set the thermostat to your desired comfort level and leave it. Setting the thermostat to a high temperature will not make the room get to temperature quicker. It will merely over heat the occupants once the set temperature is reached.
5. The temperature of the actual floor can be varied to suit individual comfort levels. We recommend a maximum floor temperature setting of 28°C for optimum comfort conditions.
6. Ensure the underfloor heating system is working correctly before laying your flooring. This is very important as you don't want to pull up a newly laid floor to repair a loose wire.
7. If you are unsure about any aspects of your underfloor heating, please contact the manufacturer to avoid damaging the system.

Basic rules of screed flooring for reference

Please note: at all times, manufacturers' guides should be read and closely kept to as variations within types can occur and affect drying times/rules.

Anhydrite

- Anhydrite Screed flooring to be appropriately dried according to thickness (1mm per day up to 40mm, then 2mm per day) in warm and well-ventilated conditions.
- Commissioning of underfloor heating system (to manufacturer's specification and guidelines) must begin no earlier than 1 week after laying an anhydrite screed floor.

Latex/ Quickset

- Working time: 20-30 minutes at 20°C
- Waiting time before covering: 72 hours
- Time to foot traffic: 2-3 hours at 20°C+

Sand/ Cement screed

- Sand / cement screed flooring requires a great deal of time for excess water to evaporate due to hydration in preparation and this should be considered when scheduling floor laying.
- Drying period approximately 1mm per day up to 50mm under optimum drying conditions i.e. 20c and <65% RH

General rules for all screed floors

- Screed flooring must be fully dried out prior to laying final flooring – Please check with manufacturer for type of screed for drying time (quick set/ latex has a faster time than Anhydrite)
- Subflooring must be level to <3mm over a 3m linear straight edged run.
- Site must be free of wet trades
- Forced drying of these screeds is possible if required. After 7 days, heaters and dehumidifiers may be employed to improve drying conditions and any underfloor heating must be commissioned and slowly brought up to temperature.
- Laid screed flooring must be kept clear of debris and traffic
- Screed flooring must not be subjected to severe draughts, direct sunlight or heating for the first 72 hours.
- Sanding to remove surface layer to be carried out at latest 4 days after laying.
- Flooring must be in weathertight, waterproof conditions i.e. fitted windows and sealed roof
- Before finishing floor is laid RH levels must be recorded at 75% or lower and 65% or lower when certain timber products are laid on. Testing to be done by fully calibrated Hygrometer with any underfloor heating switched off 96 hours prior to testing. Test results will take a minimum of 48-72 hours to calibrate.
- According to CFA** it is essential that before any floor covering is installed, a heating system is commissioned

(Section 4, BS* 8203:2001+A1:2009)

**CFA: Contract flooring association

*BS: British standards institution

Please note the risks of not adhering to the proper practices of installation of screed flooring are numerous and can have a long-lasting effect on the quality of your final flooring:

- Screed flooring may not be dry enough to receive final flooring
- Failure of bond between primer and screed (essential for smoothing compound and floorcovering) leading to potential warping and /or bowing of the engineered wooden floor
- Uneven subflooring could result in excess movement that might cause gapping and possible breakage or squeaking.

UFH System Checklist

Electric Water

Manufacturer:

Model:

Sensor Type:

Date of installation:

UFH commissioned date:

Commissioned by:

Sub floor type:

Subfloor moisture checked:

Subfloor moisture reading:

Wood flooring finish:

Date of flooring delivery:

Days left to acclimatise:

Date of floor install:

Underlay/adhesive used:

Expansion gap left (mm):

Was the floor protected/ Covered after installation?

Protection products used:

How long was the flooring covered?

- Day 1 heating temperature
- Day 3 heating temperature
- Day 5 heating temperature
- Day 7 heating temperature
- Day 9 heating temperature
- Day 12 heating temperature
- Day 15 heating temperature
- Day 18 heating temperature
- Day 21 heating temperature
- Day 24 heating temperature
- Day 27 heating temperature
- Day 30 heating temperature

For oiled floor:

- Date last oiled Product used
- Date last oiled Product used
- Date last oiled Product used
- Date last oiled Product used