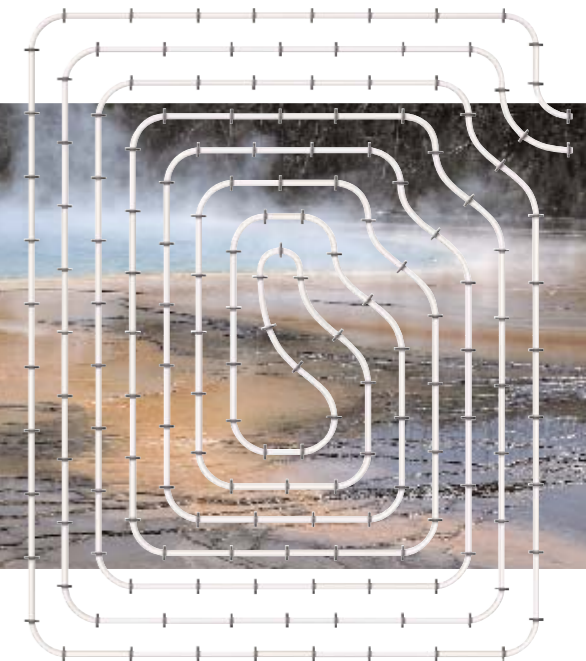




FLOORTEC
Underfloor Brochure & Technical Guide



More design. More flexibility.

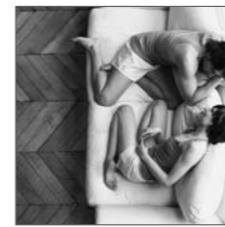
In recent years underfloor heating has been widely acknowledged as one of the most effective methods of heating. It has become the fastest growing market for both domestic and commercial heating sectors. As one of Europe's leading names in heating technology, **MYSON** is at the forefront of the underfloor revolution. In addition to our manufacturing and technical expertise, we provide full planning, design and supply services to help you achieve your perfect home.



heating through innovation.



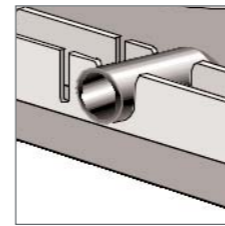
The concept of underfloor heating.



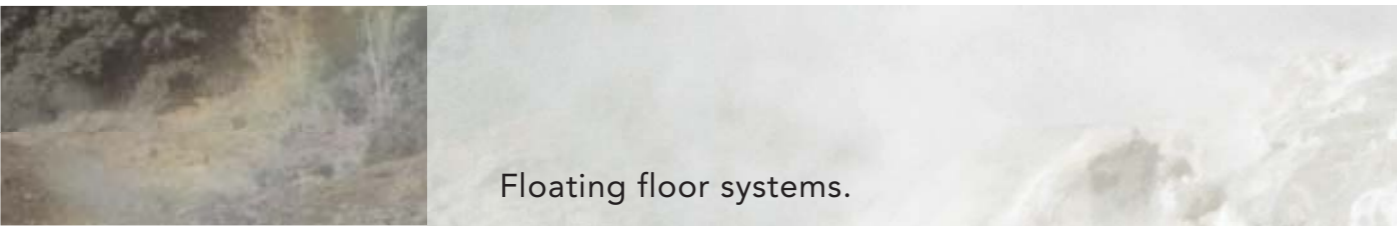
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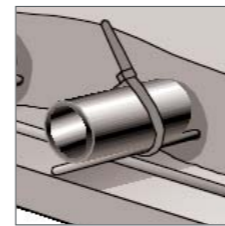
Screeded floor systems.



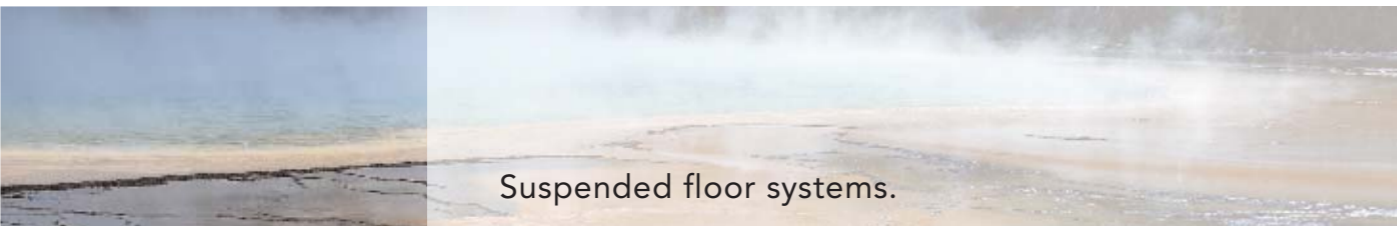
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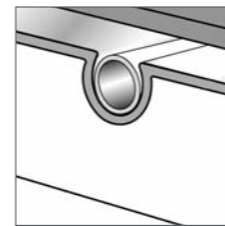
Floating floor systems.



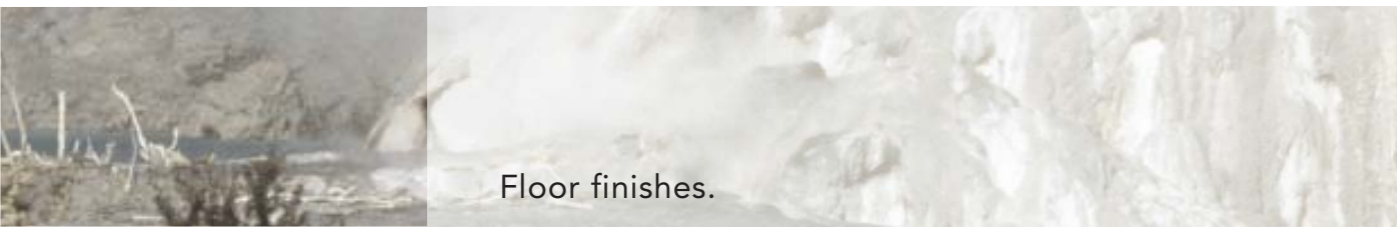
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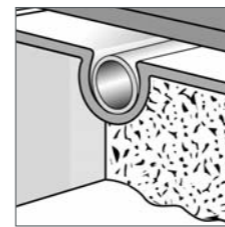
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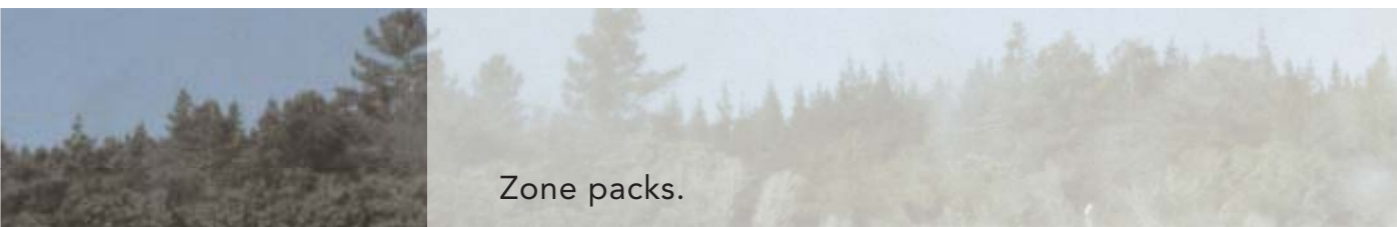
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Zone packs.

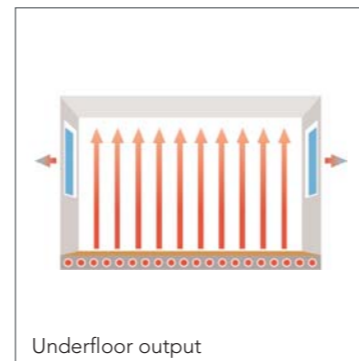
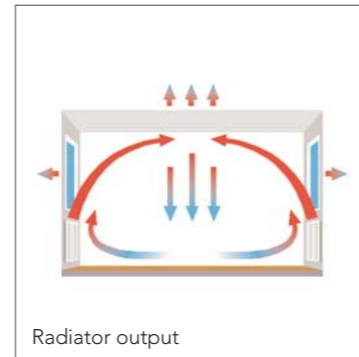


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A better kind of heat.

Underfloor heating works by circulating warm water through a series of continuous pipe loops fitted underneath your floor. The pipework creates a large radiant surface which heats your home from the floor upwards. This radiant form of heating is very different to the convected heat provided by radiators. Radiators work by drawing cold air across your floor, heating it and then convecting it upwards towards the ceiling.

The use of radiant heat rather than convected heat will provide you with a number of significant benefits.



Natural, comfortable warmth.

The main advantage of underfloor heating is its high level of performance. Radiant heat means that the warmth is concentrated where you need it most. Room temperatures higher up are usually around 2°C lower than at floor level. So it's perfect for human comfort - you won't get cold feet and you will keep a cool head!

It's highly controllable heat too. You can make each room a separate zone, varying heat output according to the time of day, outside temperature and location. You'll enjoy uniform heat even in the largest rooms, with no cold spots and no draughts caused by air circulation. It's even good for furniture, with its gentler, more even heat and smaller variations in humidity!

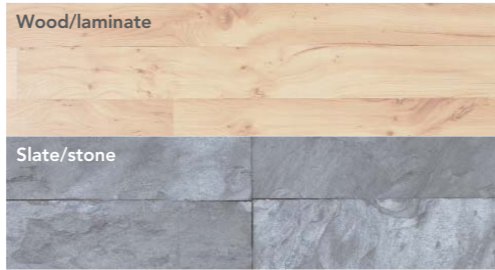


**More benefits.
More flexibility.**

Underfloor heating is also extremely discrete. With nothing showing above floor level, it does not interfere with either your living space or your décor. This leaves you free to make the most of every square foot of your floor and wall space,

It is also a cost effective option. Although installation costs are generally higher than traditional heating methods, underfloor heating's superior efficiency means that your running costs will be significantly lowered so the ongoing savings on your energy bills quickly outweigh your higher initial outlay.

Underfloor heating is even a practical option. It can be used with most types of floors and floor coverings. It is also suitable for use with all sorts of wet central heating systems. It is easy to install and gives you a number of usage options. It can be installed throughout your house, on one level only or in individual rooms. It can be used alone or combined with radiators or other heating systems elsewhere in your home.



Plated Floor

Suspended floor systems include joisted floors with conventional joists supported on end walls of sleeper walls, as well as solid floors with battens fixed to the floor.

Floating Floor

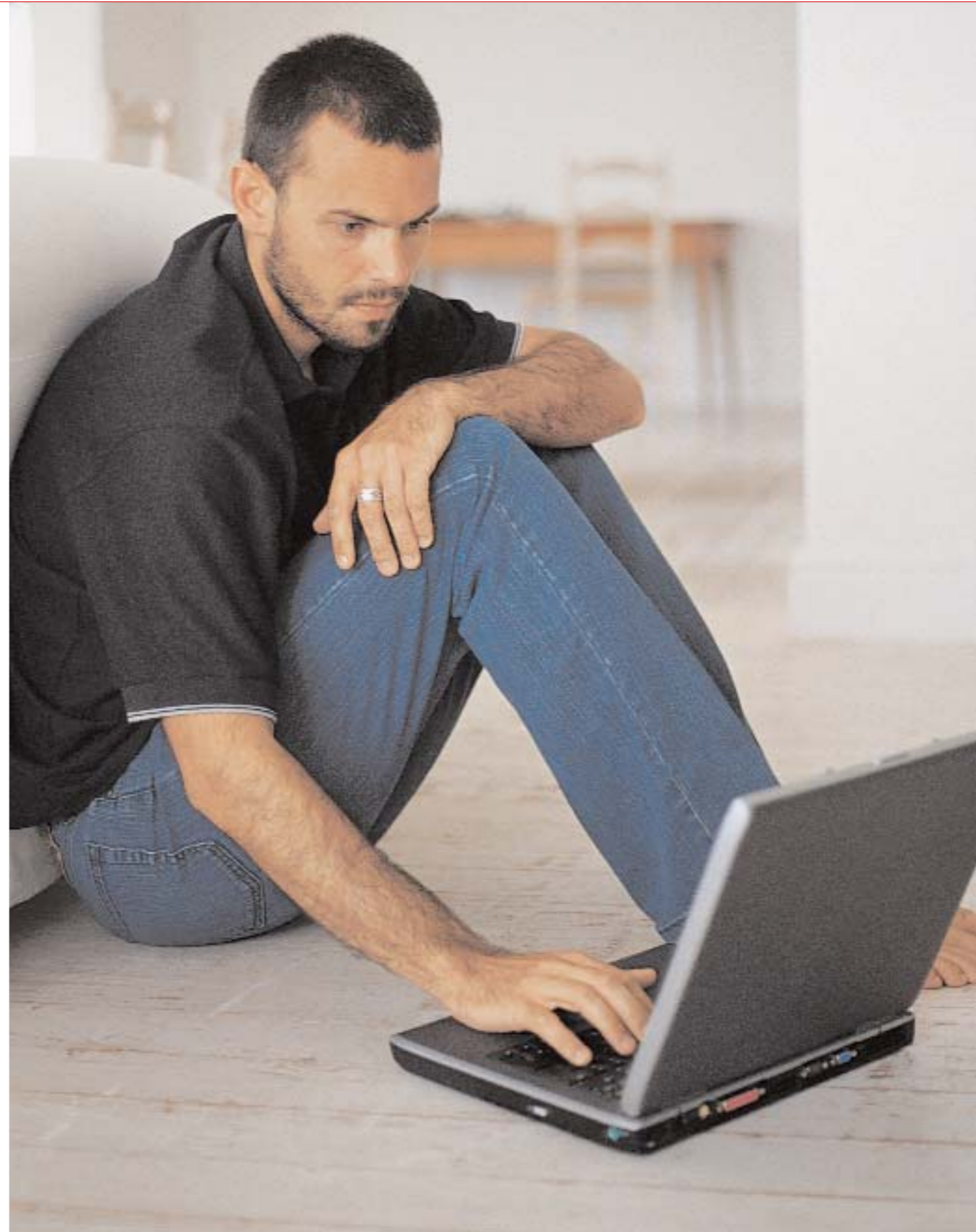
Floating floors reduce the overall loading on the building, reducing the weight of the floor compared to other floor systems. Floating floors also exhibit very good acoustic properties, reducing sound transmission between floors of a building.

Screeded Floor

Solid floor underfloor heating systems have the underfloor heating pipework embedded in concrete or screed. They include concrete screeded floors and Block and Beam floors with a screeded finish.

Tacker

Clip Rail





More technology, More service.

MYSON provide a comprehensive range of underfloor heating materials. These are available either as bespoke systems, single zone packs or as individual components. We offer a choice of seven fixing systems for use with screeded, floating or joisted floors. We supply our own designs of pipework, room temperature controls and water temperature controls. Plus, extremely importantly, our materials are complemented by a full planning, design and technical service. For further technical information, please refer to the following pages.

Send us your floor plans and we will prepare a FREE quotation along with a basic components list. Technical advice and help is only a telephone call away on 0845 482 3434.

If you chose to go ahead, then simply place your order with your **MYSON** stockist, quoting your reference number. The stockist will give you a date when your system will be ready.

Once the system is installed, all you have to do then is sit back and enjoy the performance, efficiency and design freedom that **MYSON** underfloor heating provides.



1.0 General Heating Description

MYSON underfloor heating is suitable for use with all types of wet central heating systems, including gas, oil or solid fuels and conventional combination or condensing boilers. It is also ideal for mixed systems with, for example, underfloor heating on the ground floor and radiators on the first floor. Because of its lower flow temperatures, underfloor heating works especially well with condensing boilers, taking full advantage of the high efficiencies achievable, and with low temperature renewable heat sources, such as solar panels and heat pumps.

Underfloor heating can be fitted under screed, floating or timber joist floors, and whether your preference is for fitted carpets, vinyls, wood block, ceramic or stone floors, it will provide a warm and comfortable surface underfoot.

The choice of floor covering will of course affect the output of the underfloor circuit and this should be taken into account at the design stage.

To work effectively, underfloor heating requires water temperatures of between 45°C and 55°C. These are easily obtained by blending flow water and return water from the underfloor by means of the thermostatic mixing facility

When to use Underfloor Heating

Underfloor heating is suitable for;

- Most housing applications
- Buildings or areas with low heat loss
- Buildings or areas that are continually or frequently used
- Buildings or areas with high ceilings.

Underfloor heating is not suitable for;

- Buildings or areas that are used very intermittently or infrequently
- Buildings or areas that have high heat losses, or sudden losses
- Applications where large amounts of equipment or fittings will be fixed into the floor, eg. racking or shelving
- Buildings where future partitioning or internal wall changes may occur.



2.0 General Specifications: Screed floor

Description

Solid Floors

Solid floor underfloor heating systems have the underfloor heating pipework embedded in a concrete or screed. They include concrete screeded floors and Block and Beam floors with a screeded finish. **MYSON** Underfloor Heating systems are available for all of these constructions.

The design and installation of the concrete or screeded floor must conform to the appropriate British Standards and Codes of Practice including BS 8204-1:2002 In-situ floorings and BS 8000:Part 9:1989 Workmanship on Building Sites.

For all forms of solid floor construction the design requirements are based on the structural requirements of the floor. **MYSON** Underfloor Heating presents few constraints in this respect.

Underfloor Heating in Concrete Floors

A typical concrete floor section is shown on pg 16, giving the common elements of the floor structure and showing the **MYSON** Underfloor Heating pipework within the structure.

The sub-base is usually made up of several layers, starting with a compacted or consolidated hard-core.

A blinding layer is added on top of this. A damp proof membrane (DPM) is usually included at this level to stop moisture transfer into the concrete base. Insulation is then laid to reduce the heatloss to the ground below. To prevent the concrete from penetrating or damaging the insulation, a protection layer is included on top of the insulation. This protection layer is a polyethylene sheet of least 0.15mm thick or a material with comparable properties.

MYSON insulation products have this protection layer bonded to the upper surface. This layer is not, however, a functioning damp proof membrane or vapour barrier and if these are required they should be included elsewhere in the structure.

MYSON PeX-a underfloor heating pipework is then laid, held in place with an anchorage system and the concrete. The make up and thickness of the concrete is determined by the structural requirements of the floor. Concrete used for this type of **MYSON**

Underfloor Heating system must not include any insulating materials.

MYSON underfloor heating can be used with many differing screed constructions ranging from the traditional sand and cement screed to anhydrite systems. All screeds must fully comply with the requirements of British Standard 8204.

Underfloor Heating in Screeded Floors

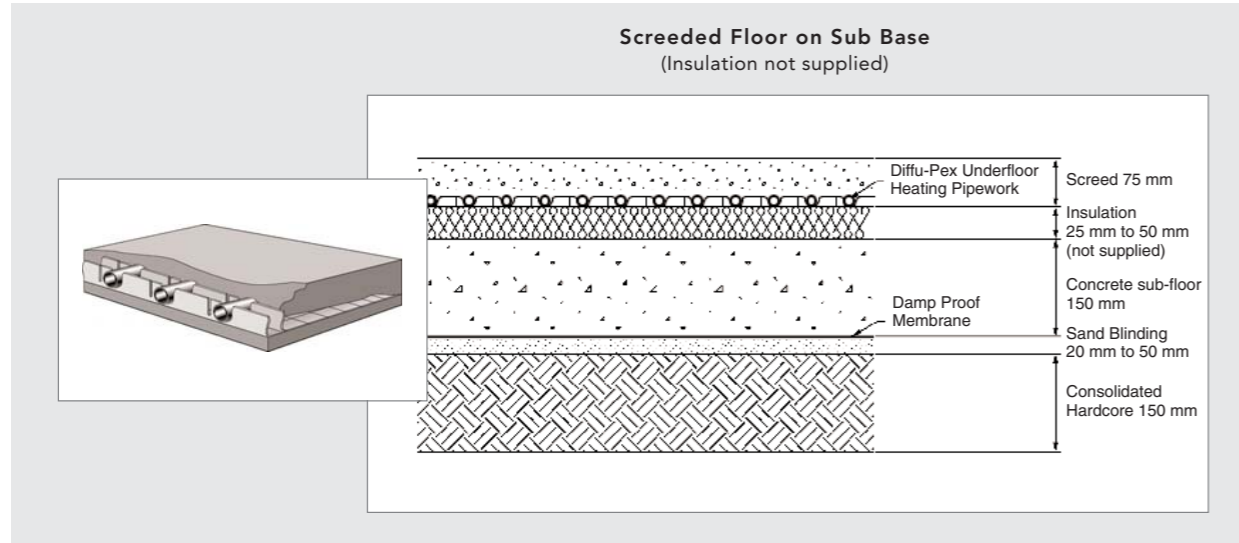
Screeded floors are laid onto a sub-base, which can be a concrete base or a block and beam sub floor. Construction of the floor above the sub-base including the **MYSON** Underfloor Heating will be the same in both cases. Within or directly on top of the sub-base, a Damp Proof Membrane should be included. A layer of insulation is laid directly on the sub-floor, which must meet the U value requirements for Building Regulations as well as the requirements to reduce heatloss. To avoid damage to this layer of insulation and to prevent screed from bridging to the sub-base a protection layer is included on top of the insulation. If other types of insulation are to be used then a protection layer must be laid over the insulation. Protection layers do not act as a Damp Proof Membrane or Vapour barrier and these, if required must be incorporated elsewhere in the floor structure. The **MYSON** PeX-a underfloor heating pipework is then fixed in place using a suitable anchorage system. Finally the screed is laid following the appropriate British Standards and Codes of Practice. Screed materials should not include any insulating materials and a minimum screed thickness of 75mm is required.

Pipework Anchorage Systems

With solid floor constructions the underfloor heating pipework must be held in place prior to the screed or concrete being laid. **MYSON** underfloor heating has five primary anchorage systems to meet all possible installation situations. These anchorage systems are Cliprail, Tacker, 'U' Clip only, Mesh and Pre-Formed Plate. Diffusion plates are for floating and suspended floor.

2.1 Clip Rail

Cliprail systems are designed to attach the underfloor heating pipework to floor insulation that is supplied by others. FLOORTEC do not supply any insulation with Cliprail systems.



Please note: For additional fixing, Anchor clips are available. Suitable for 14-20mm pipework.

2.2 Tacker

'U' Clip and Tacker System

MYSON underfloor heating insulation is a PS20 (EPS100) with a webbing foil bonded to the top surface. This webbing foil acts as the protection layer and, after laying, all joints are taped to maintain integrity. A 50mm grid is marked onto the foil to assist in the positioning of the MYSON PeX-a underfloor heating pipework.

The pipe is positioned in place and then a barbed 'U' clip is fixed over the pipe by means of a MYSON Tacker. The barbs snag on the webbing material holding the pipe until the screed or concrete is laid.

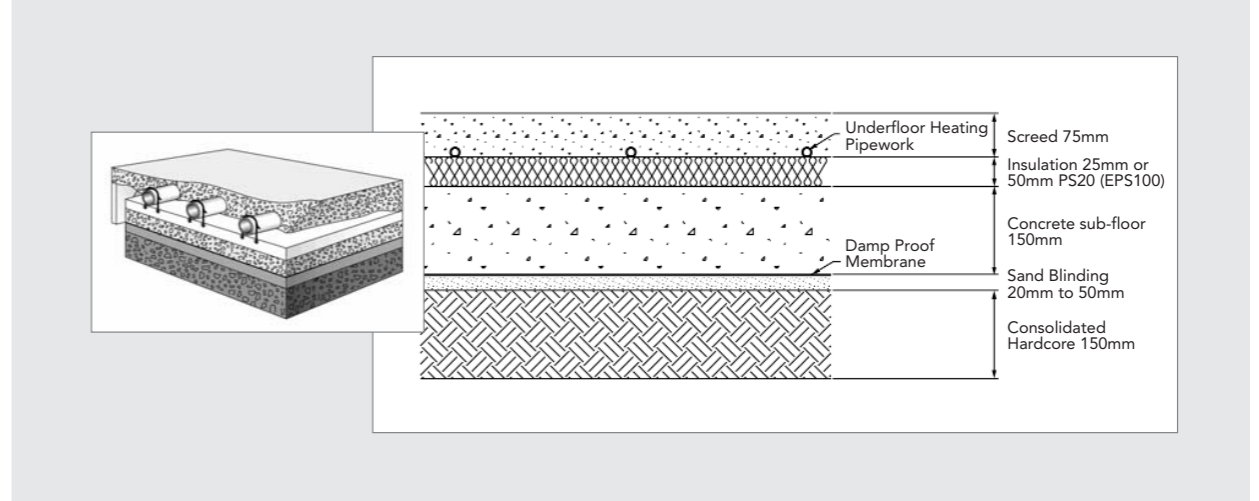
This is a fast and effective method of anchoring the MYSON PeX-a underfloor heating pipework and is very flexible allowing both reverse snail and serpentine laying patterns.

PS20 (EPS100)

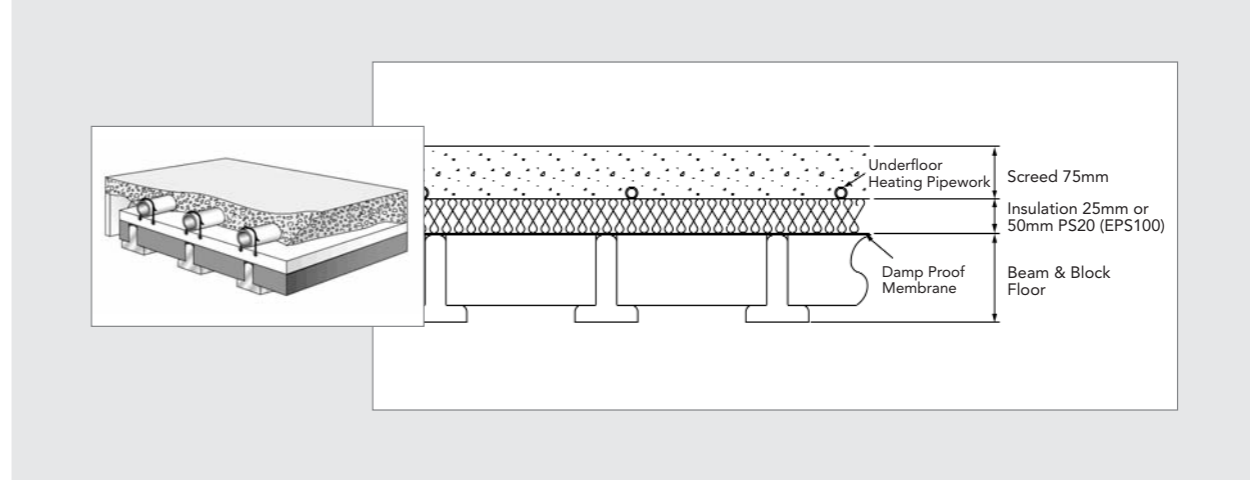
mm	Quantity	Heat
25	10M ²	0,040 W/mK
50	10M ²	0,040 W/mK



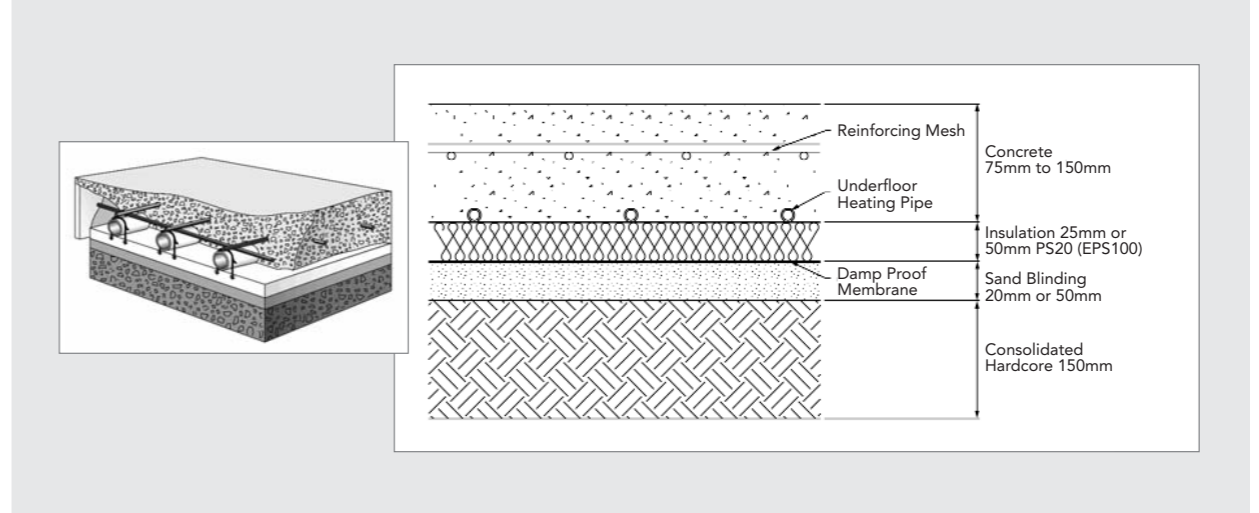
2.3 Screeded Floor on Sub Base (TACKER System Shown)



2.4 Screeded Floor on Block and Beam Base (TACKER System Shown)



2.5 Concrete Floor Structure (TACKER System Shown with Reinforcing Mesh)



2.6 Pre-Formed Plate

The new Pre-Formed Plate underfloor heating system is ideal for a single person installation and is suitable for use with 14mm pipework. A castellated fixing system comprises of an expanded

polystyrene base with raised burls designed to firmly grip the PeX-a pipe. Pre-Formed Plate is laid over the concrete sub floor and is covered with floor screed, as with the other systems.

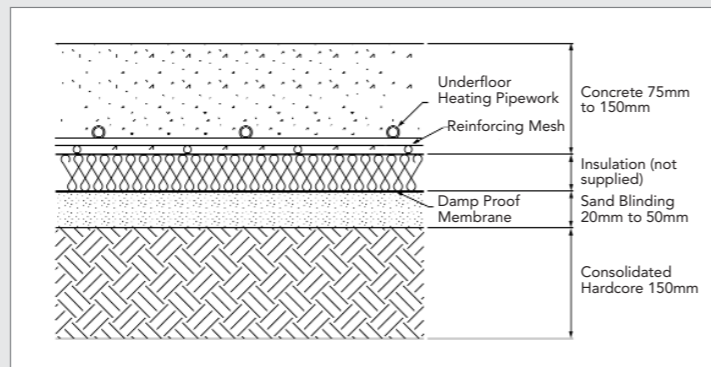
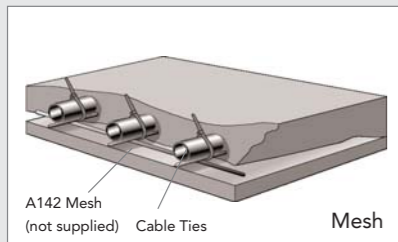


2.7 Mesh

MYSON underfloor heating mesh system (suitable for both 14mm and 17mm pipework) consists of underfloor heating pipes laid to a pre-determined configuration in accordance with design drawings. In order to avoid damage to the layer of underfloor heating insulation and to prevent slab/screed concrete from bridging to the sub-floor, a separate layer is insulated (not provided by MYSON) on top of the insulation (not provided by MYSON). This is usually in the form of 500g Visqueen or similar, according to the requirements of the specifier. A steel reinforcing mesh, B98 (A142), is laid on top of the protection layer (not provided by MYSON).

Flow and return manifolds are installed at design locations, followed by heating pipe work. The heating pipe work is connected to the flow manifold and then laid out in the required configuration in accordance with the approved design drawings supplied. Pipes are held in place using cable ties affixed to B98 (A142) mesh placed previously over a separate layer (not provided by MYSON). The tails of return pipe work are then cut to length and connected to the return manifold. All pipe work is fed to the manifold using pre-formed pipe bends to ensure no creasing occurs during transition from horizontal to vertical alignment.

Concrete Floor Structure (Mesh system shown)



3.0 General Specifications: Floating Floor Systems

Description

A floating floor underfloor heating system has been developed by MYSON to meet the increasing demand for this type of flooring structure. Floating floors reduce the overall loading on the building, reducing the weight of the floor compared to other floor systems. Suitable for 17mm pipework only.

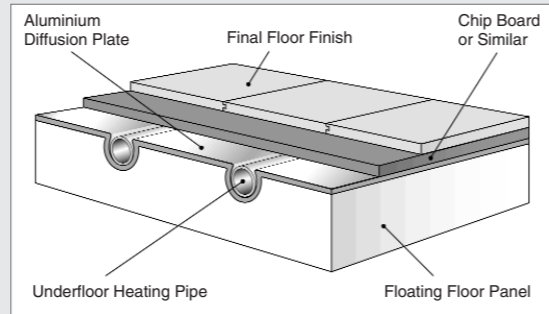
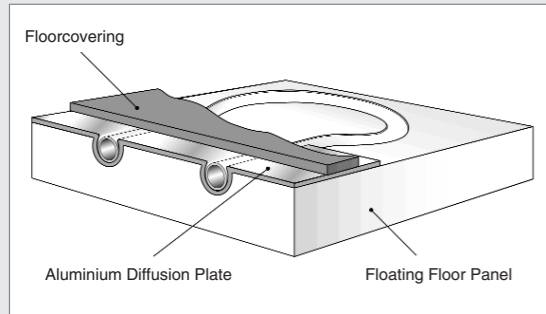
Installation Outline

- Extruded Polystyrene panels are pre-grooved with grooves on 200mm centres.
 - 30mm thick made from XPS Extruded Polystyrene
 - 40mm thick made from XPS Extruded Polystyrene
 - 50mm thick made from XPS Extruded Polystyrene
 - Size - 2400m x 1200m
- A U-shaped groove is provided at one end of each panel to allow for turning of the pipework at the end of a run.
- The grooves are dimensioned to accept aluminium diffusion plates, which spread the heat from the underfloor heating pipework to the floor.
- Panels are laid with the U-shape at each end of the room, with the sheets butt jointed and cut to size.
- Once the panels are laid aluminium diffusion plates are

laid onto the sheets with the grooves in the plates fitting into the grooves in the polystyrene panel.

- The area at the end of each pipe run is left clear of plate to allow for the pipe turns.
- However, after fitting of the pipework, these areas are covered with flat aluminium plates to assist with heat distribution.
- Underfloor heating pipework is walked into the grooves in the plate and, after pressure testing, the floor decking is floated onto the floor.
- The decking will conventionally be a tongue and grooved flooring material with the panels glued together along the tongue and groove.
- Adhesive should be applied to both sides for the joint to ensure a sound fixing.
- The floor decking is left 10mm short of the walls of the room to allow for expansion of the decking and is held in place at the edges, usually by the skirting board.

3.1 Floor Sections



Performance

Compression Resistance

All materials are compressed under load. Insulation materials used in floors should be capable of accommodating the applied loads with the minimum of compression. Polyfoam Floorboard is highly resistant to compression and withstands both occasional and long term static loads. A factor of safety for design loads of 3 (5 for long term static loads) is applied to the compressive strength of the product as outlined in the product data table.

Floating Floor Product Data

Thickness (mm)	30	40	50
Length (mm)	2400	2400	2400
Width (mm)	1200	1200	1200
Nominal Density (Kg/m ²)	30	30	30
Thermal Conductivity (W/mk)	0.029	0.029	0.029
Minimum Compressive Strength (kPa)	200	200	200
Design Loads* Long Term Static Load (kPa)	40	40	40
Design Loads* Occasional Loading (kPa)	66	66	66
Water Vapour Resistance (MNs/gm)	480	480	480
Moisture Absorption (by vol.)	0.3%	0.3%	0.3%
Continuous Service Temp Limits °C	-50 to +75	-50 to +75	-50 to +75

*Design loads by calculated methods.

Materials

The **MYSON** range of extruded polystyrene products are HCFC and CFC free, are 100% ozone friendly, and are manufactured in accordance with European Directive EC 3093/94 and EC Regulation 2037/2000.

Outputs

MYSON underfloor floating floor systems have an effective output of 70 W/M².

4.0 General Specifications: Suspended Floor System

Description

Suspended floor systems include joisted floors with conventional joists supported on end walls of sleeper walls, as well as solid floors with battens fixed to the floor. The underfloor heating system consists of aluminium diffusion plates fitted between the joists or battens. These are grooved to accept the underfloor heating pipework. Suitable for 14mm and 17mm pipework only.

Installation Outline

For **MYSON** underfloor heating to function effectively the heat from the PeX-a underfloor heating pipework must be distributed as evenly as possible across the floor. In solid floor constructions the screed accomplishes this. With timber suspended floors an aluminium plate is used to conduct the heat from the pipework and distribute it across the floor. Aluminium is used for its excellent thermal conduction as well as its low weight.

Plates are manufactured from aluminium sheet and are available in three sizes (see table). Grooves pressed into the plate are sized to accept 14mm or 17mm Diffu-Pex pipework, holding it firmly in place without damage to the pipe or external oxygen diffusion barrier.

The floor void is insulated with either loose fill insulation, such as Vermiculite, or mineral wool insulation, such as Rockwool (not supplied by **MYSON**). It is essential that air movement in this void is reduced to a minimum otherwise excess heatloss will occur.

Following installation of the insulation material the aluminium diffusion plates are fitted in place and are secured either by nails or double-sided adhesive tape. An area of 300mm to 350mm at the end of each joist run is left clear of plates to allow for the pipe turns.

Gaps of 75mm to 150mm are also left between plates to allow for movement of the plate and pipework without risk of damage. This is necessary as plastic pipework has a high coefficient of thermal expansion and some movement of the pipework and plates can be expected.

Once the plates have been fitted the underfloor heating pipework is installed into the grooves in the plates. At the end of a run the pipework must pass over the joist, which must be notched to accommodate the pipe. An additional run of notches in the joists will be required to route the pipework back to the manifold. Finally, after pressure testing, the floor finish is laid.

Aluminium Diffusion Plates for 14mm pipework

All 1000mm Long / 0.6mm Thick		
Plate Width	Joist Size	Pipe Centres
mm	mm	mm
388	400	200

Aluminium Diffusion Plates for 17mm pipework

All 1000mm Long / 0.6mm Thick		
Plate Width	Joist Size	Pipe Centres
mm	mm	mm
388	400	200
588*	600	200

*Special order only.

4.1 Special Floor Structures

This underfloor heating plated system can be easily adapted to accommodate a number of special floor details including sprung floors, acoustic pads and cross battens.

Spring Floor

With battens loose laid on to blocks supported on a solid base, the underfloor heating is fitted in the normal manner but using double sided tape to hold the plates in position. This avoids dislodging the battens when fixing the plates.

Acoustic Pads

To reduce sound transmission from the floor an acoustic pad is included in the floor make up. This pad should be fitted to the top of the joist or batten with the diffusion plate fixed to the pad with double sided tape. Fixings must not penetrate the pad as this will lead to acoustic bridging. Please note that these cannot be supplied by **MYSON**.

Cross Battens

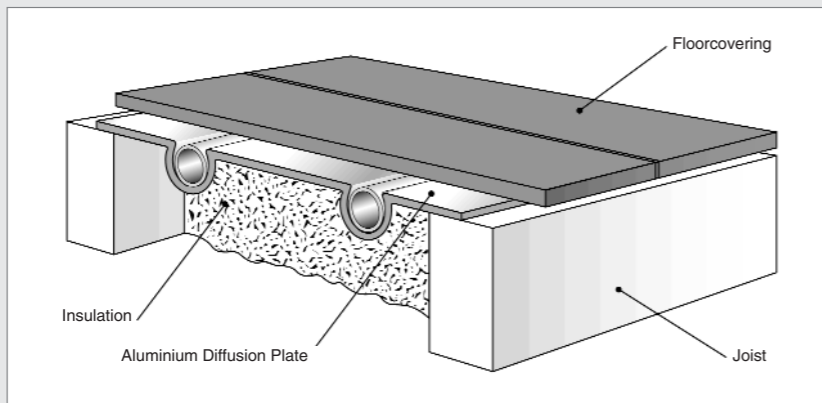
If joist centres are not suitable for placing of the diffusion plate or cannot be notched for structural reasons, the floor can be cross battened with the battens set at 400mm centres. The underfloor heating can then be laid onto the cross battens. Insulation must, however, still be installed directly under the diffusion plates.

Performance

Outputs

Outputs from plated underfloor heating systems are limited to 70 W/M2 and floor loadings are unaffected by the underfloor heating and will be dependent upon the floor construction.

Floor Section



5.0 Floor Finishes

When considering the output for a mean water temperature and pipe centre combination the floor finish must also be taken into account. Floor finishes with greater thermal resistance reduce the output from the underfloor heating.

There are four basic floor finish types which should be considered: ceramic, which includes natural stone and manufactured stone materials such as flag stones; plastic or vinyl floor coverings; timber and timber products; and carpet.

Typical floor finishes and their corresponding resistance to heat transfer are detailed in the table below. Ceramic finishes have the least thermal resistance with carpets having the greatest. When selecting carpet and underlay combinations the combined thermal resistance should not exceed a value of approximately 0.15m² K/W (or a 1.5 tog rating).

Suspended and Floating Floor Systems

With floating and suspended floor systems it is possible to vary the mean water temperature but the pipe spacing will be fixed by the system type. With suspended floors the centres all have 200mm spacing. Due to the system characteristics the maximum output from both suspended and floating floor systems is 70 to 75W/m².

Ceramic Floor Finishes

Ceramic flooring products, such as tiles have a low thermal resistance, typically 0.02m²K/W, and will function very well with **MYSON** underfloor heating systems. This low thermal resistance is the reason for this type of floor finish feeling cold to the touch (without the benefit of underfloor heating).

Typical Output

Floor Finish	Typical Thermal Resistance m ² k/w	Typical Tog Rating	Output
Screed / Ceramic Tile	0.020	0.020	141
Vinyl	0.075	0.75	106
Carpet - Standard	0.10	1.0	95
Timber / Carpet - Thick	0.15	1.5	79

Temperature constraints do not apply to ceramic type floor finishes and these can be run at the maximum design floor surface temperatures, 29°C in general areas and 35°C in bathroom, perimeter and wet areas.

Differential thermal expansion between the ceramic floor finish and the screed must be taken into account during the floor design. This differential expansion limits the areas that can be laid without the inclusion of a thermal expansion joint. Underfloor heating standard BS EN 1264 limits this area to 40m² with a maximum length of 8m, after which the area should be split using a flexible expansion material.

Another important consideration is the propagation of cracks within the screed and the potential for the cracks to extend into the floor finish. All screeds will crack and it is the limiting of the propagation of these cracks that must be considered. Two possible solutions are available:

- The inclusion of a reinforcing mesh approximately 25mm from the upper surface of the screed.
- The use of a fibre-bonded screed to help limit crack propagation. In this type of screed small fibres are added to the screed mix, which provide bridging across any developing crack.

Performance

Outputs

Outputs are based on a mean system temperature of 45°C and pipe centres of 150mm and a room temperature of 20°C.

Floor Finishes Continued...

Plastic or Single Floor Coverings

In general vinyl and plastic type floor finishes have a low thermal resistance, 0.075m²/w and will function well with **MYSON** underfloor heating. There are a small number of specialist plastic floor finishes that can be classified, as plastic but these will have higher thermal resistance. Some sports hall floor coverings are made from a 'foamed' plastic and the thermal resistance of such coverings should be checked before their use with **MYSON** underfloor heating. A resistance of up to 0.15 to 0.20m²K/W (1.5 to 2.0 tog) will function satisfactorily with **MYSON** underfloor heating but above this value the design of the system must be checked.

Vinyl and plastic floor coverings are flexible in nature and therefore differential expansion will not cause any problems to the stability of the floor structure. Consideration to the type of adhesive used must be given as these can be subjected to temperatures in excess of 35°C and, therefore, must be suitable for such temperatures.

As with ceramic floor coverings, a vinyl covering will seal the surface of the screed and therefore the curing and drying of the screed must be carried out before the floor covering is laid. If this is not done, damage to the screed or the floor covering could result either with moisture developing between the screed and the floor covering, resulting in bubbling of the vinyl or with the screed 'humping' as with a ceramic floor covering. The process is the same as for a ceramic floor with the screed being allowed to cure for a minimum of 21 days and then heated by the **MYSON** underfloor heating until the moisture has been removed. Starting with the flow temperature set to approximately 30°C and then elevated by 2° to 3°C per day until the operating temperature is reached and then held at this temperature for 5 days. After this period the heating is turned off and the floor covering can be laid.

A limit thermostat can be fitted to the floor to ensure its surface does not exceed any maximum temperature dictated by the floor covering manufacturer.

Timber and Timber Products

Timber products present their own problems with regards to use with **MYSON** underfloor heating which relate to the moisture content of the timber and screed. Thermal resistances of timber products usually fall within the acceptable range for use with **MYSON** underfloor heating (0.15m²K/W, 1.5 tog).

Timber is a natural material and in its raw state will have high moisture contents. If this were laid onto a **MYSON** underfloor heating system the timber would shrink when heated, causing excessive gaps between 'planks' as well as the possibility of warping. To avoid these problems the timber product moisture content must be no greater than 10% with kiln dried timber being most widely used. Where older 'well seasoned' timber is to be used this should be stacked in the heated room for a minimum of two weeks with the heating running at its operating temperature, which will ensure that the moisture within the timber is removed.

As the floor is heated the residual moisture in the timber will be removed and the timber will shrink. This shrinkage is minimal as long as the timber used has a low moisture content and the maximum surface temperature is limited to 27°C.

When laid onto a screed it is essential that the moisture within the screed be removed before the timber is laid otherwise the moisture will penetrate the timber resulting in warping. The same process is used to dry the screed allowing it to fully cure for a minimum of 21 days. The **MYSON** underfloor heating at a flow temperature of 30°C and elevating the flow temperature by 3°C per day until the operating temperature is reached. Operating temperatures must be held for a minimum of 5 days before the **MYSON** underfloor heating is turned off and the flooring is laid.

Carpets

Although care in selection of carpets and their associated underlay must be taken to avoid excessive thermal resistance they present few problems to **MYSON** underfloor heating. The thermal resistance of the carpet and underlay combination should not exceed 0.15m²K/W (2.5 tog).

Carpet is flexible and therefore does not present any differential expansion problems, it is also permeable to moisture transfer and therefore will allow moisture to be expelled from the screed during the drying process.

6.0 Data Controls

Control Systems

Underfloor heating requires water flow temperatures of approximately 45°C to 55°C dependent upon the design, heat loading and type of the system used. With a typical temperature drop across the underfloor heating flow and return of 8°C, the return water temperatures will be as low as 37°C.

Constant Temperature Systems

The **MYSON** underfloor heating system mixes return water from the underfloor heating with flow water from the primary pipework. The mixed temperature is controlled at a constant temperature and the proportions of flow and return water are varied accordingly. Mixing is undertaken in a three port mixing valve, either a thermo-electrical device or an electrical mixing valve controller.

Sensing the flow temperature leaving the valve, the flow port, fed from the boiler or primary pipework, and the return port, fed from the return from the underfloor heating, are modulated to achieve the set flow temperature.

Optimisation

The speed of response of the underfloor heating system, both in heating up on start up and cooling down on shut off is a characteristic of the heating system and building fabric. To ensure that the required internal temperature is met by the occupancy time, it is necessary to start the heating system in advance of the occupancy time. This can be simply done by means of a system time clock or programmer. However, this does not take into account the room temperature or the prevailing climatic conditions. These factors will reduce or increase the response times of the system. Optimisation controllers measure the internal temperature and adjust the start or stop time of the system accordingly. Adjustment to the period can be by a set time period per degree rise in temperature required. With modern microprocessor based controls, it is possible to have a 'learning' optimisation program that will adjust the heat up and cool down periods based on past experience of the system, the required room temperature and the current room temperature.

Set Back Temperatures

It is normal practice with underfloor heating systems to operate the system with a night or unoccupied set back temperature. This allows the heating system to maintain a background heat within the property during the 'OFF' periods of the system.

This is achieved by means of a separate thermostat that overrides the system during the off periods or by means of programmable room thermostats that can have multiple time and temperature periods.

Set back has two distinct advantages when used with underfloor heating. It maintains the building fabric at a temperature, avoiding large swings in temperature and freezing, and it reduces the heat up period when the system is started after an off period.

Set back temperatures will normally be approximately 15°C dependent upon the building usage and occupants requirements.

Individual Room Control

Individual rooms fed from the same manifold can be controlled by means of room thermostats and **MYSON** thermoelectric actuators. **MYSON** thermoelectric actuators can be supplied in 230 volt and 24 volt options and are designed for simple snap fitting to the regulating valves on the return header of the manifold. They operate by means of wax filled bellows with a heating element. When there is a call for heat the heating element is energised, heating the wax, which expands, causing the valve to open.

When multiple room control is required, the room thermostats can be wired through a **MYSON** Wiring Centre. This has the advantage of providing a boiler and pump demand as well as connections for time channel input.

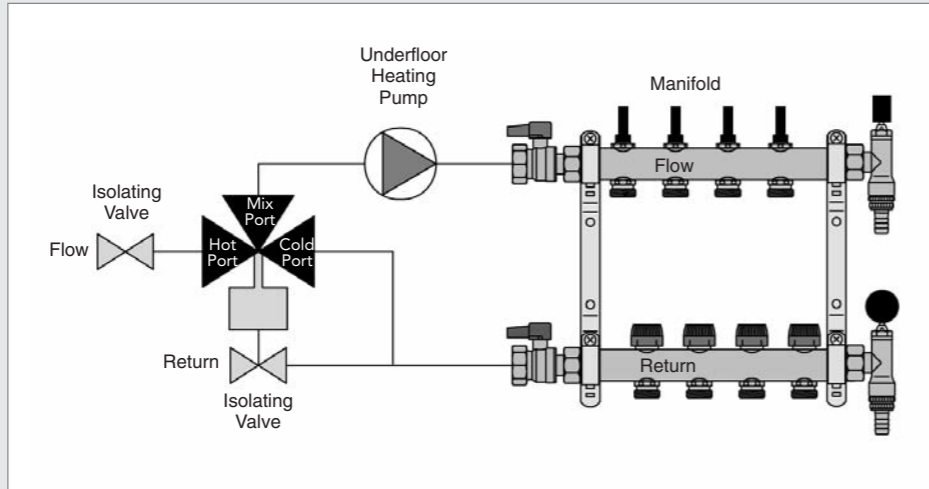
Condensing Boilers

Condensing boilers are manufactured from materials that resist the action of the acids contained within the flue gas condensate. This enables lower return water temperatures to the boiler and thereby providing higher efficiencies over conventional boilers. Condensing of the flue gases will also release the energy held in latent form, further increasing the boiler efficiency.

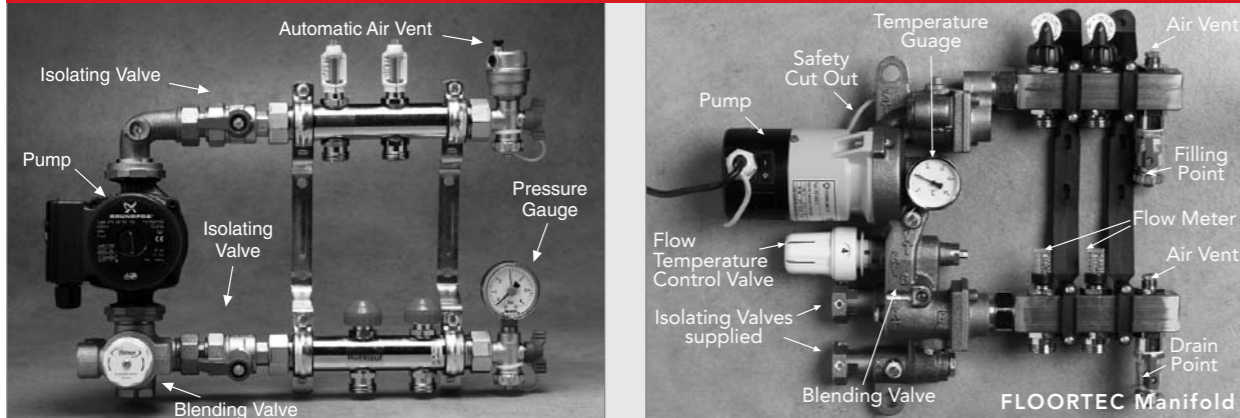
Heat Pumps

Heat pumps save energy by extracting heat from an outside source and delivering it within the building. Heat pumps are ideally supplied for use with underfloor heating due to the lower running temperatures required.

6.1 Mixed Circuit Flow Diagram



6.2 Manifold and Manifold Control Centre



6.3 Hard Wired

24v - Room Thermostat

- Simple and accurate
- Temperature range 6 to 30°C
- Modern neutral design
- One thermostat can control several loops.

Wiring Centre

- 24V Supply
- 24V to room stats and actuators
- Can control up to 10 heating thermostats
- Can control up to 12 actuators.



MRTE - Electronic Room Thermostat

- Upmarket electronic thermostat
- Attractive slimline design
- Clear, accurate LCD display
- Displays actual temperature
- No neutral, two wire connection.

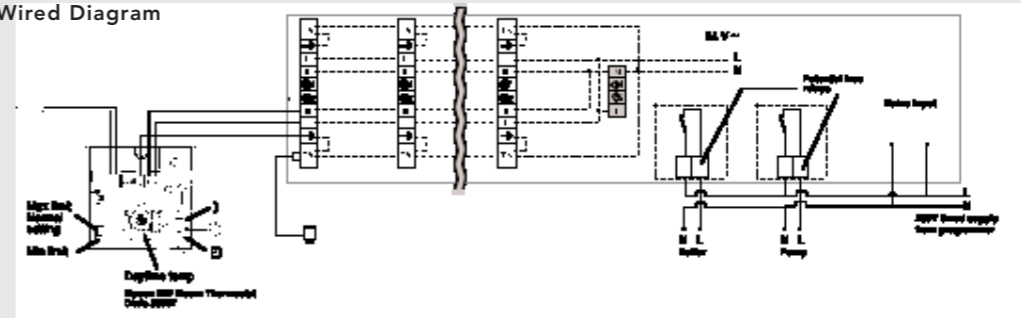


MPRT - Programmable Room Thermostat

- Easy to use slimline multifunctional thermostat
- Seven-day programming
- Three temperature settings - comfort, economy (set back) and frost
- Four programmes (three preset, one adjustable) with manual override
- Clear, accurate LCD display
- Vacation delay setting from 1 hour - 50 days
- Installer optional adjustments (differential, calibration, heat or cool, frost setting, 1 minute pump on function, high and low limit adjustment settings, password protection)
- No neutral, two wire connection
- MPRT is suitable to be classified as both a "Delayed Start" thermostat and a "Load Compensator" as defined in SAP 2005.



Hard Wired Diagram



Wiring Centre (no. 83060690401)
 Phase 24V . Terminal L
 Neutral 24V . Terminal N
 Switched phase . Terminal I

6.4 Wireless

Thermostat

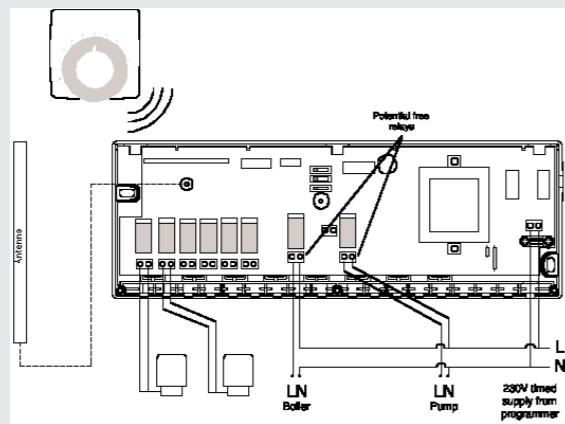
- No external wiring connections
- 30 metre spherical transmission range
- Ambient temperature 0 - 50°C
- One thermostat can control several loops
- Temperature scale 10-30°C +/- 2K
- Battery service life - minimum 5 years.

Base Unit

- 230V Supply
- Can control up to 20 actuators and 6 room thermostats
- Units can be joined for larger applications
- Night set back facility (4°C)
- Option to exercise pump and valves daily to prevent seizing or sticking.



Wireless Diagram



6.5 Programmer

MEP1C - Programmer

- Can be set for 24hr, 5/2 day or 7 day operation
- Easy to read, backlit screen
- Pre-set clock
- Automatic summer/winter time change
- Memory saver - programmer and clock will not require resetting in the event of power loss
- Advanced and up to 3 hour extend features
- Time switches are ideal for combination boilers and control of additional zones etc (volt free contacts)



7.0 Zone Packs (Cliprail)

Plan the installation carefully, and consider the following:

- The underfloor heating must be connected to a traditional two pipe heating system.
- Carefully consider the manifold position so it is both near the area(s) to be heated, and also easily connected to the heating pipework.
- We recommend that the underfloor heating be connected as a separate timed heating zone.
- This may require an additional timer and zone valve, which are not supplied. Should it be connected into an existing heating zone, consideration must be given to the response time of the heating system.
- If you are unsure of any of the above points, contact your heating engineer.



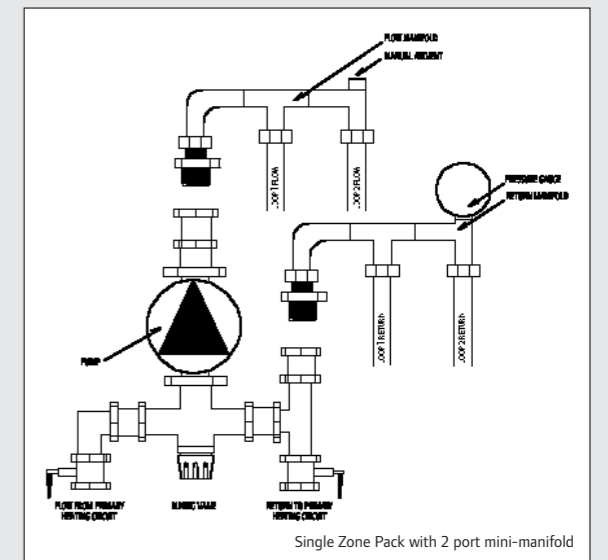
The Cliprail Zone Pack consists of a MYSON Compact UFH Control unit that takes heat from a normal heating system and distributes it into a screeded floor, via manifolds and 17/2 Diffupex pipe. The installation instructions for the MYSON Compact UFH Control unit are supplied in its box, and are not covered in detail here.

Important Notes

Care must be taken when using underfloor heating with floor coverings, which may be affected by heat, such as wood or vinyl products. Consult the flooring manufacturer for guidance.

The underfloor heating installer must ensure the heat requirement of the area to be heated is within the potential outputs detailed above. Supplementary heating may be required if the heat requirement is in excess of the above outputs, if the system is to be operated intermittently, or a swift response time is required. Myson is not responsible for providing any form of temperature guarantee.

It is assumed that pipes are laid with 200mm spacings. Minimum of 75mm screed depth required above the pipework.



Single Zone Pack with 2 port mini-manifold