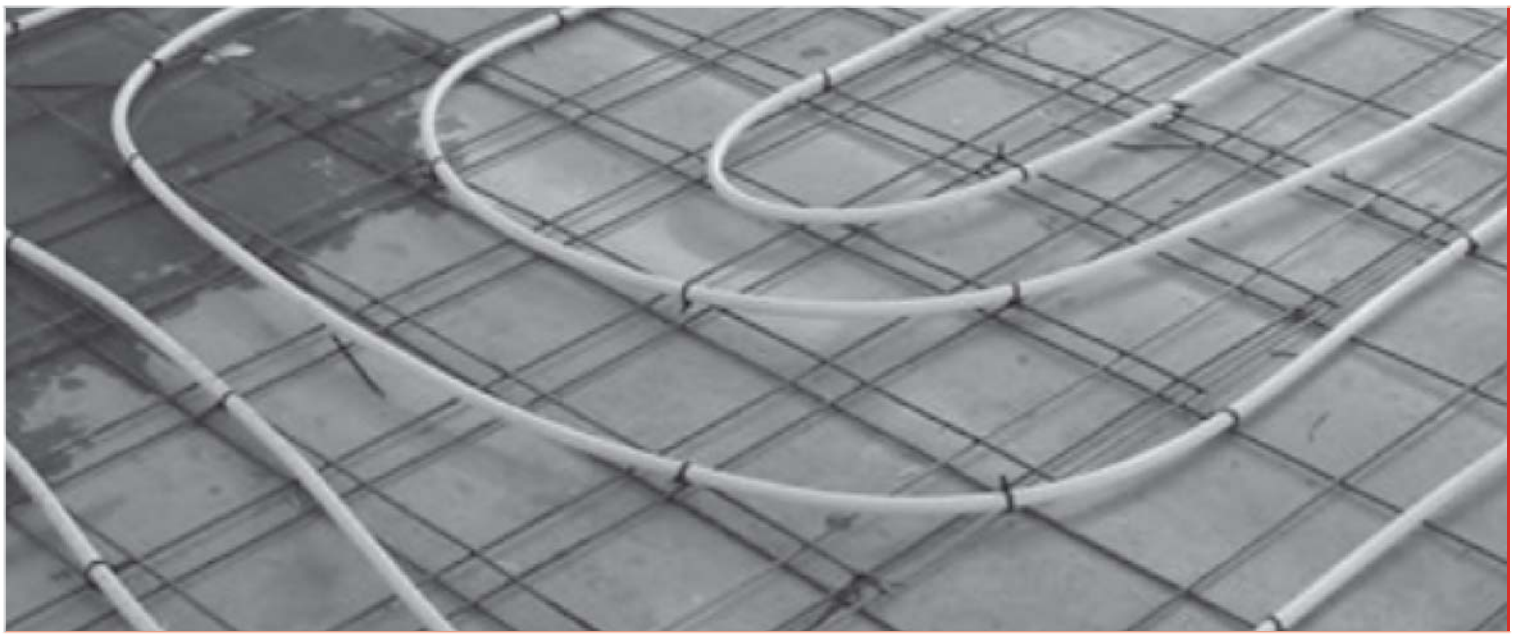
amuheat
hydronic floor heating



Speedfit Hydronic Installation Manual

Guidelines for designing & installing
Amuheat Speedfit Hydronic Underfloor Heating

SF09-V1

Overview

Background

Manufactured by the world's largest manufacturer of push-in pipe fittings, John Guest has been pioneering revolutionary plastics manufacturing technologies since the early 1970s. Every aspect of the company's operation is characterised by the pursuit of total quality zero defect process controls built into all design, manufacturing and assembly processes to achieve optimum standards of long term product reliability.

Speedfit Hydronic products are fully certified by the British Board of Agrement, approved by the Water Regulations Advisory Scheme, and are Kitemarked to BS7291 Parts 1 and 3 (and complies with Australian standards and building codes).

Speedfit Hydronic PEX Piping is offered with a 25 years manufacturers warranty. All other components are suplied with a 2 year guarantee against defects in materials and manufacture.

Underfloor Heating Basics

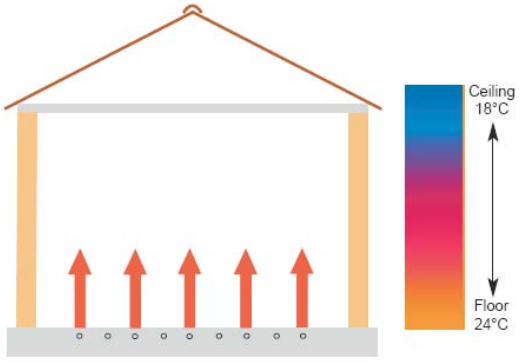
The majority of modern UFH systems are warm water systems, which integrate high tech plastic pipe either within or just below the floor.

Normally, hot water is pumped from the heat source to the Speedfit Pump Pack, where the water is mixed to approximately 50ºC via the unique mixing valve before being pumped to the manifold.

The Speedfit PEX pipe is connected to the manifold from where it runs out to for the heating circuits. These pipes are embedded in the slab or into a solid screeded floor, which can be covered with almost any floor finish.

These systems are economical to run, virtually maintenance free and utilise effective controls (one or more thermostats, which signal the Pump Pack when heat is required.). They provide the most comfortable all round warmth of any heating system.The system is controlled by

When compared to other forms of heating, the overall effectiveness of an underfloor heating system can be seen below. The heat is concentrated where it is most needed for human comfort and energy efficiency.

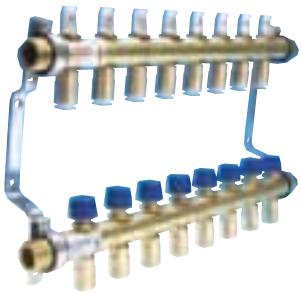


System Components

Manifolds

Available with 4, 6, 8, 10 or 12 ports.

Speedfit Manifolds are made from high quality DZR Brass and individually tested to the highest of standards. The manifold is a precision engineered product and has proved itself in thousands of installations.



A unique feature is that flow and return pipes are connected to the manifold by standard Speedfit push fit connectors, offering much reduced installation time.

Maximum efficiency can be achieved because each manifold circuit can be controlled and
monitored by adjustable flow gauges.

Pump Packs

A Pump Pack, consisting of Modulating Pump, Mixing Valve and Overheat Temperature Stat, is connected to the manifold. This takes heated water from the primary boiler heating flow and mixes the water down to the required temperature for underfloor heating and circulates that water through the pipework in the floor.

The Pump Pack can deliver up to 10kw of heat and is adjusted for temperatures between 47º C and 62º C.

The Pack continually checks and alters the volume of flow, automatically injecting heated water into the system to maintain the required temperature.

This ensures that the Pump Pack delivers the exact amount of water flow required by the system.

The flow temperature is altered by turning the adjustable hand wheel on the mixing valve unit.

Circuit Actuators

Actuators operate to open or close the flow of water to individual pipe circuits, controlled by a signal from a thermostat or programmer. This can provide individual temperature control of a room or area in the property.

System Components

Wiring Centre

At the heart of the system is the compact control centre with night set back control, which connects the wiring from thermostats, actuators, boiler and pump and manage the control of the underfloor heating system. Full wiring instructions are included with the fitting.

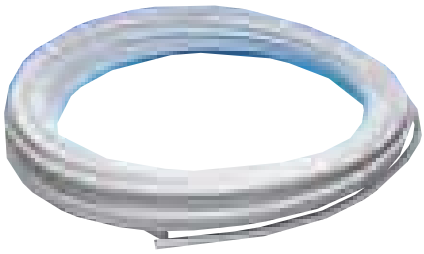
Thermostats

Room thermostats are used to control the temperature in an individual room or ‘zones’ of 2 or more rooms. They are wired back to the control centre so that circuits can be opened or closed.

Speedfit PEX Pipe

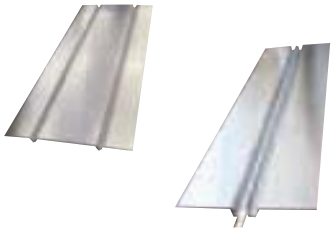
Speedfit B-PEX 15mm pipe for underfloor heating has an inner barrier to stop the ingress of atmosphere. It is commonly fixed to insulation embedded in a solid screeded floor. Speedfit Pipe can be easily cut using Speedfit Pipe Cutters.

Pipes should be laid in a continuous length, connections must not be made in the area to be screeded.



Spreader Plates

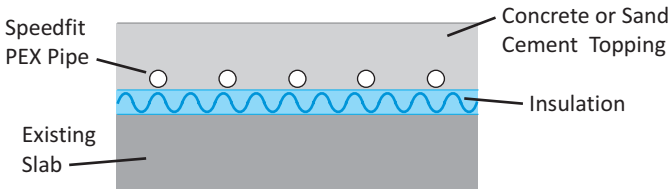
Spreader plates are available for use under timber flooring. They allow the heat from the pipe to spread more evenly across the floor. The Speedfit pipe is pushed into the grooves in the plate before the flooring is laid on top.



Installation Principles

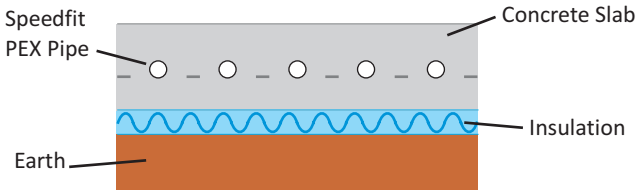
Solid Screeded Floors

Pipes are installed onto insulation over an existing slab, then embedded in a solid screed floor.



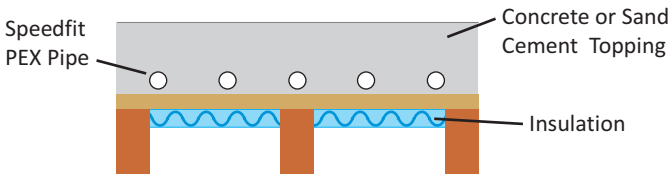
Slab on Grade

A high efficiency method with very high heat output.



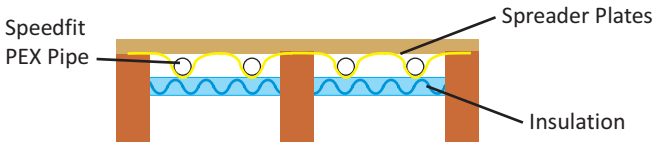
Suspended Slab

A slab is cast over floor joists.



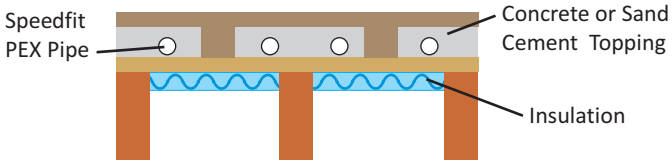
Within Joisted Floor

Spreader plates are stapled to Onto wooden joists or stapled to the underside of the floor .



Between Joisted Floor

piping is placed in the space between wooden joists. the space is filled with a sand cement topping or concrete and allows wooden flooring to be placed on top.



Design

There are a number of important issues relating to the Speedfit Underfloor Heating System, which should be considered before commencing a project.

- Heat Sources
- Manifold Location
- Heat Outputs and Floor Temperatures
- Screeds
- Floor Finishes and Coverings
- Perimeter Areas
- Controls

Heat Sources

Due to the lower flow temperatures used in underfloor heating, typically 47º - 62ºC, a variety of heat sources other than a standard wall mounted boiler can be considered. These include Solar Power, Heat Pumps or Geothermal Systems and Speedfit recommend specific advice be sought from relevant manufacturers.

Manifold Location

The installation and balancing of an underfloor heating system is easier if the manifold is located near the centre of the building. This will mean circuit loops are as equal as possible.

Heat Outputs and Floor Temperatures

Current standards maintain the maximum output from any underfloor heating system laid into a solid floor is approximately 11 Watts/m2/K, where K is the difference in temperature between surface of the floor and the desired room air temperature. This takes into account human medical limits and sensitivity to heat of the buildings occupants.

Practically, with the Speedfit underfloor heating system, an output of approx. 100 Watts/m2 can be achieved from a floor surface temperature of 29ºC with an air temperature of 20ºC. In certain cases it is possible to allow higher floor surface temperatures such as in bathrooms (33ºC), infrequently user rooms or perimeter zones (35ºC).

Concrete & Screeds

The concrete and sand cement screed is an important and integral part of the underfloor heating system and it is used to transfer the energy from the pipes to the heated area. This thermal mass, as it is referred to, will respond to the heating demand depending on its depth and make up.

Generally, the depth of pipe from the top of the floor surface should be between 65 - 75mm thick.

Seek expert guidance from flooring contractors and suppliers to ensure that the correct products are specified and used for your under floor heating system.

Floor finishes and Coverings

The Speedfit underfloor heating system is suitable for almost any floor finish including Ceramic Tiles, Carpet, Vinyl & Laminate. Since the floor covering is essentially part of the heating system, the thermal resistance or insulation ability of the floor finish will affect the output from the floor. The higher the resistance, the lower the heating effect and the longer the warm up time.

Covering Type	Carpet Underlay	Vinyl	Parquet	Ceramic Tiles	Stone
R Value m2 K/W	0.15	0.022	0.05	0.017	0.011
TOG Value	1.5	0.2	0.5	0.17	0.11

The most suitable coverings are those with low thermal resistance, normally referred to as the R-Value or TOG Value. The recommended maximum R-Value is 0.15m2K/W (1.5 TOG) and the table below gives some typical values.

Ceramic Floor Tiles

Ceramic tiles work well with UFH as they provide minimal resistance to heat transfer. To avoid cracking of the tiles flexible adhesive and edge joints should be used to accept the expansion. Check that the adhesive is suitable for use with UFH.

Carpets

Carpet and underlay represent higher levels of resistance to heat transfer. Avoid the use of felt, corks and thick rubber underlay as their insulation properties reduce the heat output of the system. If the carpet adhesive is to be used, make sure it is suitable for temperatures up to 40ºC.

Plastic/Vinyl Tiles

Plastic based flooring also works well with UFH as there is generally minimal resistance to heat

transfer. It is important that the covering and adhesive used is suitable for use up to temperatures of 40ºC. This reduces the risk of softening and loss of adhesion.

Timber/Wooden Floors
Timber floor coverings work well with UFH. However, as a natural material, it is important to follow up the recommendation of the floor manufacturer regarding installation and initial start up.

Timber floors should generally have a moisture content greater than 10% and when installing with a screeded floor the screed must be fully cured before the covering is installed. Following curing the system should be run for approx 2 weeks with the materials in the area before installation occurs. This reduces the moisture in the area and allows the
materials to acclimatise.

We advise that specific information should be obtained from the proposed covering supplier or manufacturer to assess the suitability of the covering for underfloor heating.

Perimeter Areas

Under certain circumstances, it is possible to achieve higher floor temperatures and therefore higher outputs than are normally permissible. This may be in an unused living space or an area permanently covered by furniture. This is achieved by reducing the pipe spacing to approx 100mm along the perimeter of the room approx 1m wide. For example, the perimeter pipe spacing could be used where the external wall of the room has a high proportion of windows, which may give a higher local heat loss.

Controls

As with all heating systems, suitable controls are required to achieve comfort condition and maintain economic operation. Underfloor heating systems can be used as the sole heating system or linked to other appliances such as radiators.

There are many ways to control an underfloor heating system and almost any boiler can be used including combination and condensing types. Manufacturers installation advice should be sought on specific boilers.

Whilst UFH has many advantages over traditional systems they are not quite as responsive. As they are most efficient in constant operation, it is good practice to provide controls which can “set-back” the temperature in an area by 4-5ºC during periods low demand such as at night time rather than turning the system completely off.

Design

Normally, room thermostats are used to control the actuator valves on the Speedfit manifold, these in turn control the flow of water in each loop.

Controls can be split into 3 main categories.

1. Flow Temperature Controls
Unless a condensing boiler with a low temperature control is being used, for most underfloor heating systems the water temperature from the boiler, normally 82ºC, is reduced to the required temperature using a mixing valve.

More advanced controllers, called weather compensators, use an external sensor and programmer to adjust flow and temperature to compensate for outside conditions.

It is important to have a device to control the boiler and pump to prevent flow temperature exceeding safety limits. The Speedfit Pump Pack is fitted with an integral limit thermostat.

2. Comfort Controls
Room thermostats are used to control the air temperature in a room or area and are wired back to the control centre to enable individual pipe circuits to be open or closed and to turn the pump/boiler on/off as required. Rooms can be controlled individually or in zones of 2 or more rooms.

There are a wide variety of room thermostats suitable for underfloor heating systems. These include electro mechanical, digital and programmable. Models can be hard-wired or controlled by radio frequency.

All types of controls are suitable for connection to the Speedfit Control Centre.

Programmable Room Thermostats offer total control of the UFH system. Each zone or room can be set with its own requirement and individual occupation patterns can be taken into account. These types of stats also offer the ability to use a “set-back” mode for maximum efficiency.

As most control systems operate with 240v power, for control in a wet area such as a shower or bathroom we recommend the use of a remote sensor or slaving from another room.

3. Boiler and Pump Controls
The Speedfit Controller has provision to create a link between the control systems
and the boiler to ensure that the boiler does not operate when no heat has been demanded from the system.

Design

Design Guide

The design of Speedfit Underfloor Heating System is a straightforward process consisting of 6 main steps:

- Calculate heatloss and heat requirements
- Check need for additional heat
- Determine water flow temperature and pipe spacing
- Determine manifold location
- Calculate number of circuits required
- Plan pipe layout

Heatloss Calculations

To establish the amount of heat required for each room or area, heatloss calculations must be undertaken. It may be possible on certain projects for an Amuheat Engineer to assist in this process.

For the purposes of an underfloor heating system the heatloss through the ground floor is generally ignored, as the floor will be warmer than the room temperature.

Practically, there will be some heatloss through the floor and therefore a 10% margin is added to the total when calculating the boiler load.
The actual heat output needed for the room is calculated by dividing the heat requirement obtained from the heatloss calculations by the total floor area.

In areas such as under kitchen units or permanent fixtures pipework is not generally required and should be excluded from the calculation.

This generates a heat requirement figure in Watts per m2, which can then be referred to the Speedfit System Output tables when selecting pipe spacing and flow temperatures.

Example:
From the drawing plans, a heatloss for a room has been calculated at 1200 W and the area of floor has been measured at 20m2. The UFH System performance required is therefore:

Heat Loss (W) / Floor Area (m2) = Required Output (W/m2)
1200W/20m2 = 60W/m2

It should be noted, if a heatloss of greater than 100 W/m2 is calculated, it may be necessary to provide supplementary heating to achieve comfort levels. This can for example be the case in a space with a high level of glazing such as a sunroom.

Water Flow Temperature & Pipe Spacing

The JG Pump Pack, connected to the manifold, has an integral proportional blending valve to regulate the water temperature from the primary supply.

Normally this is set between 47º-62ºC depending on the requirements of the system and the flow temperature would remain the same for each circuit.

Having calculated the required heat loss above, select the appropriate Speedfit output table based on the floor covering being used.

Select a flow temperature and pipe spacing, based on the desired room temperature and a maximum floor temperature of 26º-29ºC.

Example:- From above, a minimum performance requirement of 60W/m2 is required from the UFH system.

Using Table 1 - Textile Floor Covering, the following can be determined.

At 50ºC flow, 20ºC Room Temp and a 200mm pipe spacing the output of the system is 80W/m2 at a floor temp of 27ºC, which is within the acceptable performance limits. (It is normal not to exceed 200mm pipe centres for domestic applications in living rooms and a floor temperature of 29ºC should not be exceeded.)

If coverings are specified which are not covered by the tables specific calculations may need to be carried out. Resistance details for specific floor coverings should be obtained from the manufacturer prior to installation of the UFH system.

Manifold Position & Circuit Lengths

The Unique Speedfit Manifold is available in a 4, 6, 8, 10 or 12 port configuration and Speedfit UFH pipe is supplied in 100 & 120m coiled lengths to allow for the flow and return connections to the manifold.

The choice of manifold configuration will depend upon the number of circuit loops and temperature zones you require. For example you may wish to have a different temperature in the kitchen to the lounge area.

The number of circuits in each area will depend upon the size of the area and the pipe centres chosen from the tables.

Design

To avoid excessive pressure drops in the pipework, the maximum loop length is limited to 100m and the amount of pipe required can be calculated from the table below:

Speedfit UFH Pipe Requirements

Spacing (mm)	Max Area m/m²	Max Circuit m
100	8.5	100
200	5	100

Example: If a 18sqm lounge is to be heated at 200mm pipe centres the length of pipe required would be approximately 90m. However, if the distance to the manifold is 11m, giving and additional requirement 22m, then 2 loops would be required. eg 90m + 22m = 112m.

Having determined the number of loops and therefore, manifold configuration, the pipe layout can be planned. The circuit loop length must include the tails to connect to the manifold.

Pipe Layout

UFH piping layouts are based on two main considerations that must be effectively balanced.

The pipe should be laid out in such a way as to provide an even spread of heat and a relatively even surface temperature across the area.

Pipes should be laid in a continuous length, connections must not be made in the area to be concreted or screeded.

The layout needs to allow for the increased heat required against colder exterior surfaces.

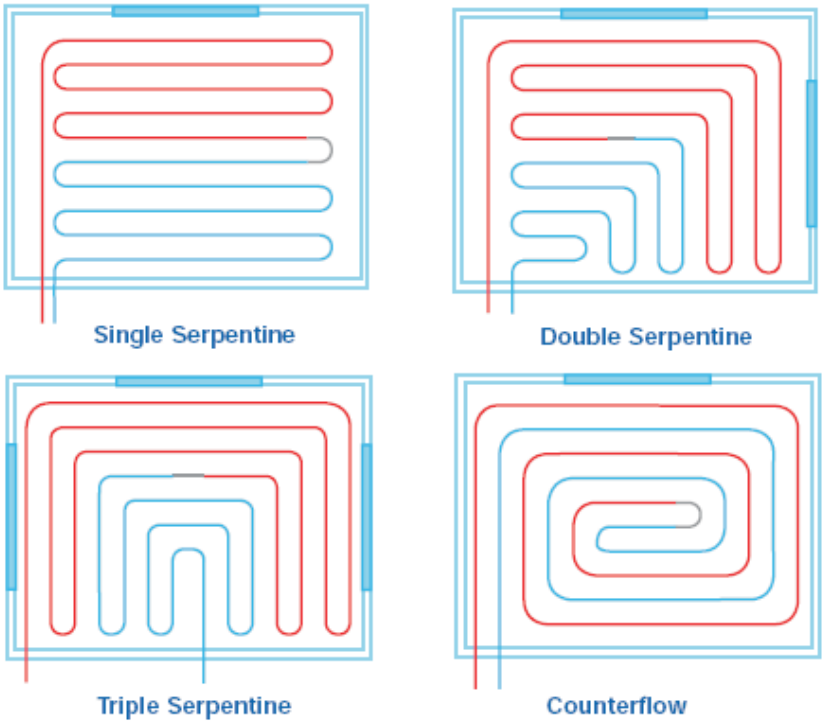
The pipes loops can be laid out in various patterns depending on the nature of the specific project, taking into account the external walls and windows where the highest heatloss will occur.

The optimum pipe layout is normally achieved by mixing the flow and return pipes so that the pipe with the highest flow temperature is adjacent to the pipe with the lowest return temperature. This is commonly referred to as a reversed return or counter spiral layout.

Whatever layout is used, pipes must not cross over in the floors and must run to the corresponding port on the manifold. Therefore, it is advisable to prepare a pipe layout drawing before installation takes place.

Some layout patterns are referred to by name as:
- Single Serpentine
- Double Serpentine
- Triple Serpentine
- Counter Flow Spiral

In practice the pipe layouts can be combined or mixed in order to meet the heat requirements. Example of these patterns can be seen below:



Serpentine Flow
Serpentine patterns allow for the hottest water to border the exterior perimeter (highest heatloss areas). The water temperature is highest at the coldest walls and will decrease as it flows through the pipe toward the centre of the room.

Counter Flow
Counter flow patterns differ from serpentine in that the supply and return pipes are laid out next to each other, creating an average temperature between them.

Design

Connection Areas

In areas close to the manifold, such as the hall, several may be in close proximity to each other as the circuit's and returns meet.

This will contribute to the heat requirement of the common to either insulate these pipes or use the pipes the area concerned.

Therefore, consider and design these areas after rooms, loops and manifolds are known.

Pressure Loss and Pump Duty

Providing the limits of circuit length and area are the total pressure loss in the system is within the the pump supplied with the Speedfit Manifold.

Speedfit Technical Data

- Speedfit B-PEX Barrier Pipe manufactured to Bs7291 an oxygen diffusion layer which meets the requirements DIN 4725 for oxygen permeability.
- Pipe dimensions 15mm OD, 100, 120m or 150m coils.
- Pipe rated to 3bar @ 92ºC.
- Mixing valve adjustable range 47º-62ºC.

Output Tables

The following 4 tables are designed to assist in the specification of the UFH system and show different sets of data depending on floor finish. The figures are for guidance only and based on specific data

Table 1 Textile Floor Covering

Max Heat Output Achievable by Flow Temperature Setting (Watts W/m²)

Room Temp (¤C)	Pipe Centres (mm)	Flow Temp 47¤C	Floor Temp (¤C)	Flow Temp 50¤C	Floor Temp (¤C)	Flow Temp 55¤C	Floor Temp (¤C)
18	100	77	25	86	26	102	27
	200	64	24	72	24	85	26
20	100	70	26	80	27	95	29
	200	59	25	67	26	80	27
22	100	64	28	74	29	89	30
	200	54	27	61	28	74	29

Notes
Based on 8¤temperature drop between flow and return
Screed thickness 45mm above pipe crown
Typical thermal resistance (R¸) = 0.15

Table 2 Tiles / Hardwood

Max Heat Output Achievable by Flow Temperature Setting (Watts W/m²)

Room Temp (¤C)	Pipe Centres (mm)	Flow Temp 47¤C	Floor Temp (¤C)	Flow Temp 50¤C	Floor Temp (¤C)	Flow Temp 55¤C	Floor Temp (¤C)
18	100	92	26	104	27	123	29
	200	75	25	84	26	100	27
20	100	85	28	86	28	115	30
	200	69	26	76	27	93	28
22	100	77	29	89	30	108	32
	200	63	28	72	28	87	30

Notes
Based on 8¤temperature drop between flow and return
Screed thickness 45mm above pipe crown.
Typical thermal resistance (R¸) = 0.10

Table 3 Wood Strip/Thick Linoleum

Max Heat Output Achievable by Flow Temperature Setting (Watts W/m²)

Room Temp (¤C)	Pipe Centres (mm)	Flow Temp 47¤C	Floor Temp (¤C)	Flow Temp 50¤C	Floor Temp (¤C)	Flow Temp 55¤C	Floor Temp (¤C)
18	100	117	28	131	30	154	32
	200	91	28	102	27	121	29
20	100	107	30	121	31	145	33
	200	84	28	95	29	113	30
22	100	98	31	112	32	135	34
	200	78	29	88	30	106	32

Notes
Based on 8¤temperature drop between flow and return
Screed thickness 45mm above pipe crown.
Typical thermal resistance (R¼) = 0.05

Table 4 Bare Concrete

Max Heat Output Achievable by Flow Temperature Setting (Watts W/m²)

Room Temp (¤C)	Pipe Centres (mm)	Flow Temp 47¤C	Floor Temp (¤C)	Flow Temp 50¤C	Floor Temp (¤C)	Flow Temp 55¤C	Floor Temp (¤C)
18	100	159	32	178	34	211	37
	200	118	29	133	30	157	32
20	100	146	33	165	35	198	38
	200	109	30	123	31	147	33
22	100	133	34	152	36	184	39
	200	99	31	113	32	137	34

Notes
Based on 8¤temperature drop between flow and return
Screed thickness 45mm above pipe crown.
Typical thermal resistance (R¼) = 0.00

Temperatures indicated in red exceed maximum permissible floor temperatures. In non habitable areas or perimeter areas temperatures above 29ºC may be permitted.

Installation

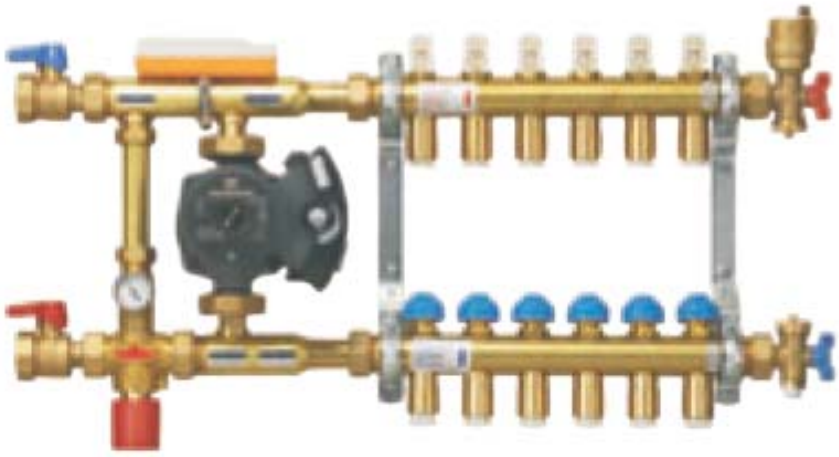
Installation Considerations

There are several requirements to be taken into account prior to installation.

- All installation work must comply with all current Building Regulations.
- All electrical work must be carried out in accordance with AU Wiring Regulations.
- A damp proof membrane must be incorporated as per relevant codes of practice.
- The area for installation must be dry and weather tight.
- An allowance for waste removal, water, power and lighting will be necessary.
- The slab must be laid level within the correct tolerances.

Speedfit Manifold

The Speedfit Manifold and Pump Pack are supplied pre-assembled and individually boxed. They are supplied complete with installation, wiring and commissioning instructions.



Balancing

To ensure the flow of water to each circuit is approximately equal, the valves on the manifold should be adjusted and balanced in accordance with instructions supplied with the Manifold Pack.

Fixing Details

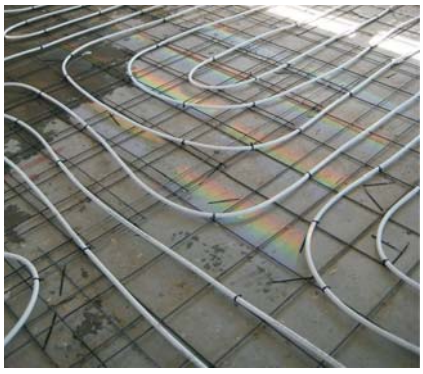
In-Concrete

The Speedfit pipe should be fastened to the steel mesh at 400mm intervals, using plastic cable ties.

In-Screed

Make sure the site floor area is clean, free from debris and free from irregularities. If required overlay the whole floor with polythene to act as a vapour barrier and lay edge insulation on all outer and inner

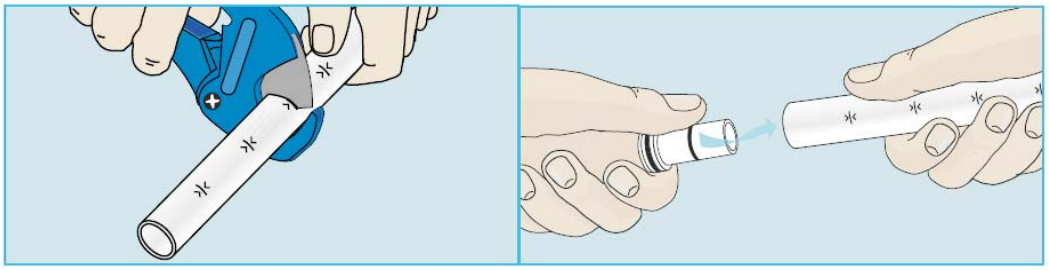
walls. Lay floor insulation panels (50mm EXP) starting close to the wall and proceeding in a brick bond fashion. If the insulation has printed gridlines ensure they are uppermost, this will assist the laying of the pipe circuits. Butt panels firmly together and tape all joints. Where necessary, carefully cut the insulation panels to fit around columns / drains etc. Where insulation is not being used onto which the pipes can be clipped to, cover the floor area with steel mesh.



Fit the Speedfit Manifold to the wall in the chosen position. Make surethe manifold is level and high enough to accept the pipe.

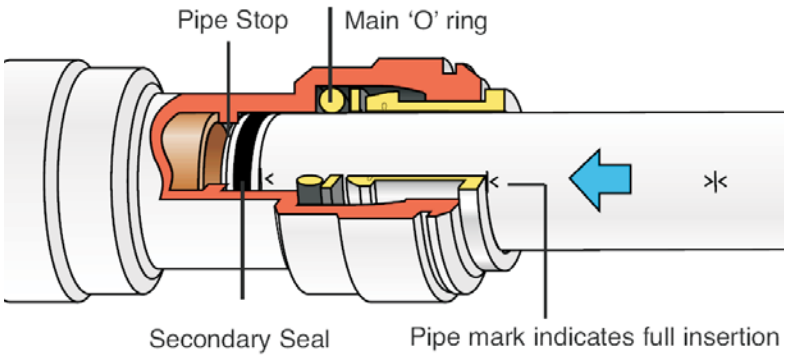
Cut a short length of conduit (min 500mm) and slide over the pipe end. This will protect the pipe where it enters the screed. Repeat this on the return pipe. Pipe may also require sleeving across contruction joints in floor and where it passes through doorways etc.

Ensure the pipe is free of score marks. Cut the pipe square using Speedfit Pipe Cutters and remove burrs and sharp edges. Use a Superseal Pipe Insert. The stem of the insert gives greater rigidity of the length of pipe within the fitting, reducing the chance of a leak if a side load is applied.



Installation

Push the pipe fully into the housing - past the collet and the main ‘O’ ring up to the pipe stop. The ‘O’ ring on the Superseal Pipe Insert provides a secondary seal against the bore of the connection. Check the joint by tugging the pipe. Connections should not be made in the area to be screeded.



From the manifold, start laying the pipe in the pre-designed configuration. The pipe is secured to the steel mesh with cable ties or to the insulation by plastic staples using the staple gun. The pipe should be secured at intervals of 400mm and fixed to maintain a minimum bend radius no tighter than 175mm.

It is important to note when installing pipe in doorframes, through holes in the construction or in areas when expansion joints are needed in the screed, the pipe should always be sleeved with a section of conduit to allow for movement.

Once the first loop has been laid, lay the pipe back to the manifold and connect as before to the corresponding return connection.

When all loops have been installed, complete the installation of the control pack and follow the instructions for filling and pressure testing.

If added security is required, a collet clip can be fitted to each pipe connection of the manifold.

Filling and Pressure Testing

To fill the system the following procedure can be followed:

- Ensure all valves on the Manifold and Pump Pack are closed.
- Attach the hose from the mains supply to the lowest fill port. Attach a hose to the upper fill port and place the other end in a bucket, which as been half filled with water.
- Open both upper and lower fill port valves.
- Turn on the mains supply and fill the system loop by loop by opening the individual circuit valves. Watch until no more air bubbles come out of the hosepipe in the bucket
- Close circuit valve and repeat for all other circuits, closing fill ports when complete.
- The system can now be pressure tested with water before the screed is laid to ensure all joints are watertight and no damage has occurred to the pipe during installation. To do this you will need hydraulic pressure testing equipment.

The system should be pressurised at 2 BAR for 10 minutes followed by 10 BAR for 10 minutes.

After this time the pipework and fittings should be visually checked for evidence of a leak.

Once completed the system should be left pressurised throughout the concrete pour or screeding and curing process.

Concrete Pour & Screeding

The concrete or screed should be laid as soon as possible after laying the pipe circuits and completion of a pressure test.

The system should be left pressurised throughout the concrete/screeding and curing process.

Screeds must be placed so that it is in good contact with the pipes without any air pockets.

If standard sand & cement screed which is normally 65 - 75mm thick, is being used, this should be installed and allowed to dry naturally as per screed/material manufacturer's instructions.

Manufacturers' quoted drying times will vary, however, under no circumstances should the UFH system be used to speed this process along.

Installation

Initial Start Up

The Start-Up procedure following installation should be as follows:

• The screed should be allowed to cure in accordance with the manufacturers instructions.

• Set the room thermostat temperature to the desired level.

• Initial heating should commence with the flow water temperature at no more than 25°C. This should be maintained for at least 3 days. This can be achieved by use of the mixing valve and overheat thermostat in combination. Full instructions are supplied with each
Pump Pack.

• After 3 days the thermostat can be increased by 5-10°C per day until a temperature of 47°C is reached where the mixing valve will take control and automatically manage the flow water temperature at the design temperature.

• At this point the overheat thermostat should be set 10-15°C higher than the design flow water temperature and is then used as a safety device. The working temperature should be maintained for a minimum of a further 4 days.

• If using natural materials such as wood flooring, this temperature should be maintained until the moisture content of the screed has been reduced to the level specified by the floor covering supplier.

• The system should be run for a minimum of 2 weeks before any coverings are laid.

Under no circumstances should the underfloor heating be used to speed up the screed drying time in excess of this schedule.

Commissioning

Following the initial start up period, the system should be commissioned with all floor coverings laid to ensure the system could be correctly balanced.

Ensure the complete central heating system, including radiators if present, is working to required operational temperature.Each circuit can then be slowly adjusted via the valves on the manifold to ensure an even flow and heat up is achieved.

Check installation details supplied with manifold.

Electrical General Notes

The Speedfit UFH electrical control pack which includes a Manifold Controller (with or without set back time periods), room thermostats and actuators is a permanently live system operating independently and constantly 24hrs. (A stand-alone system).

It will not control the main boiler and system pump, therefore if the main boiler and system pump are not on, no heat will enter the UFH system.

In order to individually control heated water to the UFH system, a two part zone valve fitted on the supply pipework to the UFH system must be wired into a spare channel on the existing time clock programmer, if there is no facility on the clock then the two port zone valve must be wired into an additional time
clock/programme, both these are requirements under Part L of the Building Regulations.

If the existing system already has a three port zone valve (mid-position, Y plan), then this must be replaced by 2x two-port one valve (S plan), in doing this the existing system may require a pipework by-pass.

If the UFH system is installed with it's own dedicated heat source it still requires a two-port zone valve and a time clock/programme which could be a part of the boiler or remote. This clock would operate the zone valve, which in turn would turn on the heat source (boiler) and system pump if fitted. The UFH electrical system would still be operated independently and constantly 24hrs.

For further advice contact your local IEE approved electrician.

Checklist

Installation Checklist

1. Floor Construction
The Speedfit Underfloor Heating System is designed for screeded floors only.

2. Heat Requirement
The system produces a maximum of 100W/m2 with 20°C air temperature and 29°C floor temperature. The system is normally suitable for new build applications. Where heatloss is more than 100W/m2 supplementary heating may be required.

3. Manifold Position
The Speedfit Pump Pack and Manifold should be located in a central position to minimise pipe wastage and maximise the heated floor area.

4. Pipe Requirement
Draw the pipe layout and calculate the total pipe required. Include the pipe tails. Remember those areas where the pipe can be placed closer together.

5. Do not join pipes in the screeded floor.

6. Boiler Sizing
The heat requirement determines the boiler sizing in the normal way. It is important to check that the boiler has sufficient capacity for the total heated area.

7. Flow & Return Pipe Sizing
The primary flow and return should be sized in the normal way. Where plumbing from an existing system, it is important to check that the existing flow and return pipework and pump are sufficient.

8. Floor Finishes
Check with the manufacturer that chosen floor covering is suitable for use with underfloor heating.

Technical Checklist - Underfloor Heating

• **Applications.** Underfloor Heating Installations in solid floors.

• **Pipes**. 15mm JG Speedfit cross-linked polyethylene (PEX) Barrier Pipe to BS 7291. Parts 1 and 3, ClassS.

• **Manifolds.** Available in 4, 6, 8, 10 & 12 port options, the manifolds are manufactured from DZR brass and pre-assembled on fixing brackets. Each manifold comes complete with flow gauges, manual valves, drain and air bleed.

• **Pump Pack.** Manufactured from DZR brass and pre-assembled, the pack includes Grundfos Alpha Pump, blending valve with temperature gauge, and flow thermostat.

• **Actuators.** Available in 24v or 240v options, these attach to the individual circuits on the manifold and can be controlled by individual room thermostats via the wiring centre.

• **Wiring Centre c/w Night Set Back.** Used to control the underfloor heating system up to 6 zones.

• Wiring Centre. Used to control the underfloor heating system up to 8 zones in conjunction with Wiring Centre c/w night set back.

• Room Thermostat. Used to control the temperature of the system in individual zone.

• **DO NOT USE SPEEDFIT UFH PRODUCTS FOR** Gas, fuel oil or compressed air applications.

• **Floor Insulation.** Should be a suitable material and thickness to comply with current regulations.

• **Minimum Bending Radii.** For Speedfit B-PEX Pipe is 175mm.

• **Expansion (PEX - Pipe).** 1% on length between 20°C and 82°C.

• **Paint and Chemicals.** Only use water or oil based paint. DO NOT ALLOW CONTACT WITH cellulose based paints, paint thinners or strippers, solder flux or acid based descalents or aggressive household cleaning products.

• **Exposure to sunlight.** Speedfit products, when used indoors, are not affected by sunlight. When used out doors protect from ultra violet light by lagging or painting.

Checklist

• **Pipe Inserts.** Must be used on all installations when using plastic pipe and should be fully inserted.

• **Electrical Continuity.** If Speedfit is used in an existing metal system which may have been used for earthing, electrical continuity should be reinstated.

• **Collet Clips.** Collet clips provide added security against pipe disconnection and are available in white or in red or blue to allow for colour coding of pipes.

• **Pre-concrete/screed System Testing.** To ensure the pipework has been installed correctly prior to the screed being laid, it is essential that the system is checked and hydraulically wet tested.

Testing should be carried out at 2 bar for 10 minutes and 10 bar for 10 minutes. This testing, combined with other relevant checks, should reveal installation problems and is regarded as good plumbing practice.

• **Pressurisation During Screed Laying & Curing.** The system should be left under pressure at a minimum of 6 bar for the duration of the laying and curing of the screed. Under NO circumstances should the UFH System be used to quicken the screed drying process.

• **System Flushing.** As is usual practice for any plumbing installation, flushing of the system prior to the use of JG Speedfit is recommended to remove any contaminants/chemical residue from elsewhere in the system.

• **Vermin.** Speedfit products should not be used in vermin infested areas.

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