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April 2006
UF417

Underfloor Heating
Available Through Merchants

Design and Installation Guide

STANDARD UNDERFLOOR HEATING COMPONENTS FOR SMALL NEW-BUILD RESIDENTIAL PROJECTS

Intelligent Solutions for Heating Projects

About OSMA UFH

Versatility, Consistency and Reliability

A partnership of experience

OSMA Underfloor Heating combines the specialist skills and experience of two companies:

- **Wavin** is Europe's largest supplier of plastic pipe systems in terms of product range, innovation, logistical services and geographical presence
- **ThermoBoard** is one of the UK's major suppliers of underfloor heating systems. The company has pioneered the development of product-based solutions to underfloor heating for more than a decade

The UK's most advanced UFH technology

OSMA UFH technology has been developed to suit all building construction types typically used in the UK – both concrete-based floors and timber floors. It provides innovative, cost-efficient solutions for all types of environment, including residential, commercial and public buildings.

For residential projects

This publication provides guidance on the design and installation of underfloor heating using OSMA UFH components available through Merchant Stockists. These products are primarily designed for use in new-build residential applications up to four circuits.

What's different about OSMA Underfloor Heating

OSMA UFH products have been designed to provide the highest possible heating performance while using materials that will last throughout the life of the building.

The products combine easy installation with consistent performance. They ensure that the power output from the floor is determined by the product rather than by the skills or experience of the installer.

OSMA innovation

OSMA UFH products are as easy to use as conventional radiators. They require little or no previous underfloor heating experience. No specialist tools are needed for successful installation. They enable any installer to work more quickly to achieve a high quality result.

OSMA UFH systems for domestic applications include **plumbed** systems for all types of floor construction, including:

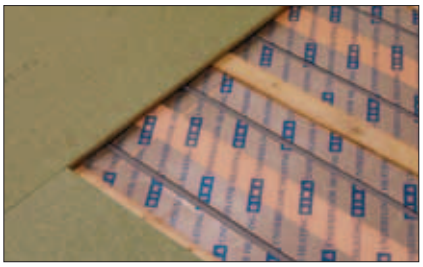
- Sand/cement and liquid screeds
- Timber battens and timber joists
- Fully floating timber floors

The range available through Merchants is specifically designed to offer efficient and effective solutions for small and medium sized heating projects. These may include: extensions, refurbishment of individual rooms, conservatories or single dwelling installations.

Giving you a choice

OSMA plumbed systems offer you a product choice including floor panels with pre-cut channels in the insulation to indicate the positioning and spacing for installation of the pipe on site

Alternatively, you can opt for a basic system which allows the installer to set the pipe centres and layout during installation.



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FAX
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EMAIL
info@osmaufh.co.uk

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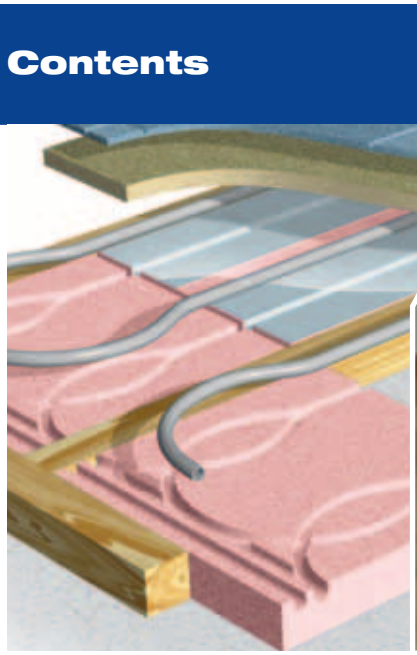

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The following related publications are available for OSMA Underfloor Heating Standard Products Range:

- **Product Guide**
- **Trade Price List**

To obtain copies, please contact:

Sales and Technical Enquiries
Tel: 01392 444122
Fax: 01392 444135

The OSMA UFH Guarantee

OSMA Underfloor Heating is the only UFH supplier in the UK which engineers and manufactures its products. Each system uses the highest specification components. All systems described in this Design and Installation Guide are directly backed by a full product guarantee *provided that* installation has been in accordance with the instructions provided. Unlike some other UFH suppliers, this guarantee is independently underwritten by insurance. *For full details/terms, contact OSMA Underfloor Heating.*

NOTE: For plumbed systems, this Guarantee presumes the use of OSMA Flexible Plumbing Pipe (OsmaGold). The Guarantee may NOT apply if pipe from another manufacturer is used.

Introduction

UNDERFLOOR HEATING

Underfloor heating is the most comfortable form of heating. It is unobtrusive, economical, safe, hygienic and virtually maintenance-free. It offers the best long-term method of heating a building because it uses low-temperature water, which in future can be provided without having to burn fossil fuels.

A UFH system is easily formed. Instead of hanging conventional radiators on the wall, you simply make the floor itself a large-surface heat emitter by incorporating warm water pipe within the floor construction.

RADIANT HEAT

As soon as the floor surface becomes warmer than the air in the room, it begins to radiate. Radiant energy emitted from the floor is absorbed by all the other surfaces in the room. These surfaces warm up and begin to radiate, thereby providing an all-round comfortable warmth in the room. The air in the room only becomes warm because it is in contact with these warm surfaces.

ENERGY EFFICIENT

Most new-build constructions can be kept warm with heating power in the range 35-75W/m^2. This power output can be achieved with floor surface temperatures of just 24-27°C.

The maximum floor temperature should not normally exceed 29°C (although 34°C is acceptable in bathrooms).

THE OSMA STANDARD PRODUCT RANGE

The OSMA Standard Product Range has been designed to enable anyone who is familiar with radiator heating to confidently design and install underfloor heating within standard concrete and screed or timber floor types.

For product range and selection, see pages 12-19.

Larger projects

For larger and more complex underfloor heating (and cooling) projects, OSMA UFH has a range of alternative products available. OSMA UFH has extensive experience of partnering with the largest contractors on the most technically demanding projects and can provide a bespoke design service, with direct-to-site delivery.

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FAX
01392 444135
EMAIL
info@osmaufh.co.uk

Design Principles

An underfloor heating system consists of:

- In-floor components and heating pipe
- Flow controls of the water into the floor
- Room temperature control

These are very similar to the elements of any radiator system. The principle difference is that the heat emitter is built into the floor rather than hung on the wall.

The same form of Heating Primary is used to distribute warm water around the building. Where a spur would be taken off the Primary to a radiator, the same kind of spur is taken instead to a water flow controller, and through this to the pipe circuits in the floor.

The temperature of each room is controlled using a room thermostat and a valve to turn ON/OFF the flow of water into the floor.

LOWER WATER TEMPERATURE

An underfloor heating system uses water at a much lower temperature than is required by radiators.

To achieve the necessary heat output, a floor surface temperature of maximum 29°C is generally required. Depending on the conductivity of the floor and the floor finish, this may be achieved with a water temperature in the underfloor pipes of between 40°C and 60°C. Such temperatures can be easily produced from a heat pump or from solar heating.

By contrast, to generate sufficient air convection, radiators generally require water at 70-80°C, and this can only be produced easily by burning fossil fuels.

MINIMISING HEAT LOSS

With any form of underfloor heating it is important to minimise the amount of heat that is lost to the underside of the floor.

Insulating ground floors to Building Regulation standards is generally sufficient to restrict the heat transfer downwards. However, consideration should be given to installing higher levels of insulation, in line with the trend for increases in regulatory requirements.

On upper floors, Building Regulations Part E now require that acoustic insulation must be incorporated between joists or within the make up of a solid floor. This also provides effective thermal insulation.

WATER TEMPERATURE

If you are designing an underfloor heating system to heat an entire building, some modern combi and condensing boilers are able to supply water, at the required lower temperature, directly to an underfloor heating system. Such a boiler's internal pump can be used to circulate the water around the pipe circuits.

If you use a boiler designed to heat the water to a higher temperature, it is necessary to add a water mixing control unit to reduce the temperature of the water entering the underfloor heating system *(see pages 20-22)*.

Design Principles *continued*

WATER FLOW CONTROL

Whichever type of boiler is used, for projects larger than 20m² the heated water is generally distributed to separate pipe circuits via a manifold. Electrically operated actuators on each branch of the manifold, linked to a room thermostat, can be used to control the flow of water into the separate circuits/zones.

Where necessary, a Water Mixing Control Unit can be added to the front of the manifold *(see pages 20-22)*.

COMBINED SYSTEMS

It is possible to add a section of underfloor heating to a radiator system, provided:

- the boiler has sufficient spare capacity
- the diameter of the spur from the Primary to the water mixing controller is large enough to deliver the quantity of heat required by the underfloor heating

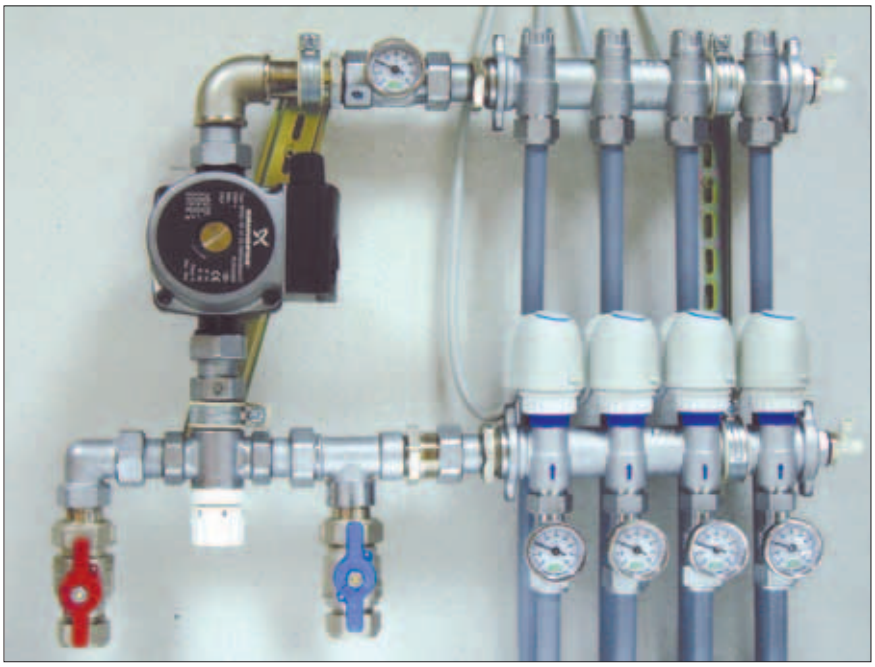
There are two ways to ensure that the high temperature water from a radiator system does not cause the floor to become too hot:

- *In small projects that involve just one zone and a maximum area of about 20m², it is possible to use Single port manifold and control pack:*

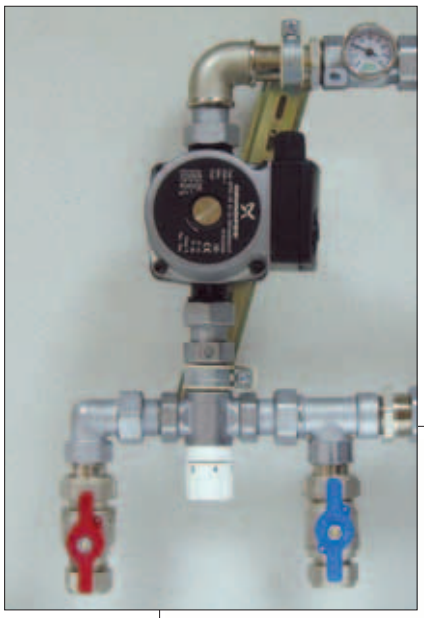
  If individual room control is required and water is to be taken from the boiler primary pipework, this unit allows a small area to be run independently of an existing central heating system. It wil require a simple by-pass and a thermostat which must be purchased separately.

- *Mixing Control is used:*
  High temperature water from the radiator Primary is mixed with water returning from the floor to produce a stream of water into the floor at a temperature that can be adjusted to a level which will not result in the floor overheating.

Control Pack with Manifold



Single Port Manifold



Water Mixing Control Unit for One or Two Circuits

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FAX
01392 444135
EMAIL
info@osmaufh.co.uk

1 How Much Heating Power Do I Need ?

Experience shows that in most new or refurbished buildings complying to April 2002 Part L Building Regulations, heating power of 35-75W/m² is sufficient to maintain internal temperature of 20ºC.

Provided the floor finish thermal resistance is not greater than 0.150m² K/W (1.5 Tog), this amount of power output can be generated by any of the forms of UFH described in this Guide, using pipe at 200mm centres. Consequently, it may not be necessary to make detailed heat loss calculations.

Where a space is to be heated that may have higher heat losses, the power requirement should be calculated, using the calculation method outlined on page 11. Use this calculation method for:

- rooms with large areas of glazing
- rooms with more than 2 external walls
- buildings constructed to pre-April 2002 Part L Building Regulations

CONSERVATORIES

Underfloor heating is an effective way of heating a conservatory. However, the high rate of heat loss through the extensive areas of glazing means a supplementary form of heating may be required to maintain an internal temperature of 20°C on occasions when the external temperature falls below 7-8°C.

2 What Heating Power Will UFH Provide ?

The power output equation for UFH is:

$$\left(\begin{matrix}\text{floor surface}\\ \text{temperature}\end{matrix} - \begin{matrix}\text{room air}\\ \text{temperature}\end{matrix}\right) \times 10.6\,\text{W/m}^2$$

As a consequence, it can be seen that with a floor surface of 29°C and air temperature of 20°C, power output will be 95W/m². In most projects, this will be sufficient.

29ºC is the maximum design surface temperature (above that the floor may become uncomfortable, although in Bathrooms the design temperature may be increased to 34°C).

Occasionally, detailed heat loss calculations – as prepared in accordance with the calculation method outlined on page 11 – show that 95W/m² power output is insufficient. This can sometimes happen in bathrooms, for example, where the available floor area is small by comparison with the heat loss. In such cases, the underfloor heating can be supplemented by installing a towel radiator perhaps plumbed in as part of the UFH circuit.

The type of floor finish – for example, tiles, timber or carpet – or the spacing of the heating pipe can affect the transfer of heat from the floor through to the floor surface.

Use these Tables not only to confirm that the power output will be sufficient but also to determine the Flow/Return temperatures that will be required.

Screeded Floors — UFH System Output (W/m²)

Floor Finish	Resistance of Floor Finish m²K/W	Flow/Return Temperatures & UFH Pipe Centres (mm)					
		65-55°C		60-50°C		55-45°C	
		200 mm	300 mm	200 mm	300 mm	200 mm	300 mm
10mm Timber	0.070	123	101	107	88	91	75
20mm Timber	0.140	90	79	78	69	66	58
10mm Carpet/Hard Tile	0.100	113	94	98	82	83	70
10mm Carpet & Underlay	0.150	91	80	79	70	67	60
4mm Vinyl – Linoleum	0.018	150	114	131	99	112	85
10mm Ceramic Tiles	0.012	151	118	132	103	112	87
25mm Marble	0.011	140	111	122	97	103	82

Floating & Battened/Joisted Floor — UFH System Output (W/m²)

Floor Finish	Resistance of Floor Finish m²K/W	Flow/Return Temperatures & UFH Pipe Centres (mm)		
		65-55°C	60-50°C	55-45°C
		200 mm	200 mm	200 mm
10mm Timber	0.070	79	75	56
20mm Timber	0.140	86	65	64
10mm Carpet/Hard Tile	0.100	75	70	52
10mm Carpet & Underlay	0.150	63	61	47
4mm Vinyl – Linoleum	0.018	86	55	64
10mm Ceramic Tiles	0.012	87	75	65
25mm Marble	0.011	79	76	59

EN1264 Theoretical Heat Output for Screed, Floating & Batten/Joisted OSMA UFH systems

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FAX
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EMAIL
info@osmaufh.co.uk

3 What Type Of Floor Do I Have?

Generally, the options include –

- Screed
- Fully-floating timber
- Timber battens
- Softwood joist
- Manufactured timber I-beams

Once the type of floor construction has been determined, the appropriate products may be selected from the Standard Product Range *(see pages 12-13)*.

SCREED

Most screeded floors are formed by laying sand/cement mix 65-75mm thick over insulation. Before the screed is laid, edge insulation should be set all round the periphery of the room to allow for thermal movement in the screed during the year.

When creating an underfloor heating system, heating pipe is fixed to the top of the insulation, just before the screed is laid, so that the heating pipe ends up within the thickness of the screed. We recommend that the heating pipe is set at 200mm spacing, which is sufficiently close to enable the full heating performance to be achieved, whilst minimising the amount of pipe used.

The Standard Product Range provides 3 different ways of securing the pipe to the top of the insulation:

1. Staples

If the insulation you purchase is firm – for example, extruded polystyrene such as Polyfoam or Styrofoam, or polyurethane such as Celotex – staples will provide a secure fix for the pipe.

2. Screw Clips

If the insulation is soft – for example, standard density or high density expanded polystyrene such as Jablite or mineral wool such as Rockwool – staples will not grip the pipe sufficiently tightly. Screw Clips should be used.

3. System Plates

These are vacuum-formed plastic panels with moulded pipe grippers that are laid over the top of whatever insulation you purchase. System Plates hold the pipe securely, and at regular spacings.

OSMA System Plates allow the pipe to be set as close as 50mm centres, which is very useful when taking pipe through corridors to several separate rooms. The pipe can also be held diagonally.

Whatever the method chosen, attention should be paid –

- where the ends of the pipe circuit(s) come together below the site of the Water Flow Controller/Manifold
- at the junction between floor and wall, where the pipe changes from running horizontally to vertically

In most underfloor heating systems, these details are the only parts that are visible. The OSMA Standard Product Range includes accessories such as Sweep Bends and Clamps to ensure that these details can be achieved neatly.

FULLY-FLOATING TIMBER FLOORS

These are floors where panels of insulation are used to support a timber floor deck that is normally formed from tongued and grooved panels of chipboard or plywood. The floor deck is held in place purely by its own weight.

The Standard Product Range includes 50mm thick Floating Floor Panels that incorporate pre-cut pipe channels with factory-fitted aluminium heat diffusers, and a polythene film fixed over the top of these. They are used in place of plain insulation panels to support a fully-floating deck.

The conductivity of OSMA Floating Floor Panels is much lower than expanded polystyrene, and this helps minimise downward heat loss.

Timber Battens, Joists and I-Beams

Battens are used either where the floor loadings are to be higher than can be supported by a fully-floating floor or where the floor deck is to be formed from planks that must be nailed down to a support, rather than be allowed to fully float.

Softwood joists are commonly used in Intermediate Floors although manufactured I-Beams are often used instead because they can be stronger and are more stable dimensionally.

The Standard Product Range includes 50mm thick Batten/Joist panels, similar to Floating Floor Panels but 340mm wide, which are intended to fit between 50mm thick battens and automatically space these at nominal 400mm centres, or to be fitted between softwood joists at similar centres, either from above or below, or to be fitted up from below between I-Beams.

For Product Range, see pages 12–13

4 Pressure Testing

Underfloor heating pipe is arranged in separate pipe circuits within the floor construction and terminated at the water flow controller. Prior to connection to the water flow controller, each pipe circuit should be pressure-tested, using an OsmaGold Pressure-Tester. The pressure test should be dated and recorded as a permanent record *(see pages 23-24)*.

CONTINUOUS PIPE LENGTHS

If the pipe circuit is a continuous pipe length, the test pressure should be 3 bar. This will be sufficient to determine whether the pipe has been punctured during installation, by a nail for example.

PIPE LENGTHS WITH FITTINGS

If the circuit includes OsmaGold fittings, as it may when Chipboard Modules are used or Heating Panels have been installed in an I-Beam joisted floor, each circuit should be tested to at least 18 bar.

After each pipe circuit has been pressure-tested, connect the pipe ends to the Water Flow Controller. Do not pressure test pipe circuits AFTER connection to the Water Flow Controller.

5 Water Flow Control

SMALL PROJECTS

In small projects, covering areas less than 20m², either Single Port Manifold and Control Pack, or Water Mixing Control can be used.

AREAS GREATER THAN 20m²

In larger projects a manifold should be used up to a maximum of four ports.

Or:

It is recommended that the supply to the Water Mixing Controller should be taken from the heating Primary, either before or after any timed Diverter Valve, which controls the supply to radiators for example, as required. The electrical supply to the Water Mixing Controller can be timed or otherwise, as required, although in general the wiring should be arranged so that it cannot operate if there is no heated water in the Primary. The pipe providing water to the Controller should have sufficient capacity to supply the quantity of heat required by the section of UFH attached to it.

6 Room Temperature Control

Either standard or programmable room thermostats may be used (purchased separately).

In small projects, where there is a single zone, the electrical feed that is used to enable/disable the Water Mixing Controller (generally the Boiler Live) is fed through the room thermostat to the controller.

In projects having more than one temperature zone, the flow of water into each circuit is controlled by a 2 Wire Actuator on each circuit branch, which is opened/closed under the control of its associated room thermostat. The OSMA UH1-M Wiring Centre connects each room thermostat to the appropriate actuator. The operation of any one actuator will turn on the Water Mixing Controller and boiler and initiate the flow of heated water to it.

7 Project Design

Once the most appropriate products have been selected, a dimensioned design/installation drawing should be produced. A Design Planning Grid is produced on page 30 of this brochure to help with project design.

The drawing should show where each floor component and the Water Mixing Controller is to be sited. This will also assist in producing a full schedule of the materials required.

INSTALLATION PROCEDURES

Generally, products should be installed in the following stages:

1. Clear the space to be heated
2. Install Floor Components and Pipe
3. Conduct pressure-test
4. Install Water Mixing Controls and connect circuits
5. Connect up Electrics
6. Commission

Important Notes

- Never bend 15mm OsmaGold pipe more tightly than a radius of 120mm. If you have bent the pipe too tightly and it has kinked the pipe needs to be replaced
- Always cut OsmaGold pipe using an OsmaGold cutter or sharp secateurs. Never use a saw blade
- Always use pipe inserts whenever a joint is formed
- Never use joints in pipe if pipe is going to be placed in screed
- Always allow screeds to dry naturally. Don't use UFH pipe as a way of speeding up the drying process

GENERAL CONSIDERATIONS

Response times:

- Setting pipe within a 65-75mm screed will form an underfloor heating system with quite high thermal mass. From cold, it will have to warm up the mass of the screed before the top surface can begin to radiate. Once warm, it will continue to produce heat for several hours even after the boiler has turned off
- Underfloor heating in a timber floor has a smaller thermal mass to warm up before it starts to work but it will cool down more quickly after the boiler has turned off

Additives:

- Generally, the additives that the boiler or radiator manufacturers specify will have no effect on the OsmaGold pipe. If in doubt contact OSMA UFH

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01392 444122
FAX
01392 444135
EMAIL
info@osmaufh.co.uk

Project Design *continued*

HEAT LOSS CALCULATION

To calculate the actual heat losses from a room do the following sum:

Area of surface (m²)
x
Temperature difference between the two sides of the surface (°C)
x
U-value for the surface
=
Surface Loss (Watts)

Add up the amounts for each surface

Total Surface Loss (Watts)

Add to this figure the energy needed to heat any incoming cold air as follows:

Volume of room (m³)
x
Difference between design internal and external temperatures
x
U-value equivalent
=
Air Change Loss (Watts)

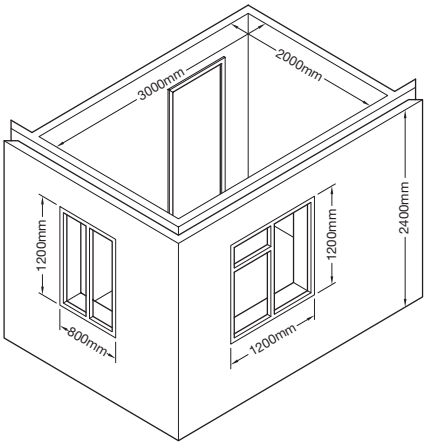
The U-value equivalent to use is:

AC/hr	U-value	Typical for
1.0	0.33	Bedrooms
1.5	0.50	Living Rooms
2.0	0.66	Bathrooms

Next sum together Surface Loss and Air Change Loss
=
Total Loss (Watts)

Next, calculate the area (m²) of the exposed floor space that may be heated.

Divide total heat required (Watts) by available floor area (m²) to calculate Power required (W/m²) *(see example below)*.



Example

INPUT DATA		
Room	STUDY	
Floor Area	6.00	m²
Height	2.40	m
Exterior Wall	9.60	m²
Interior Wall	12.00	m²
Glazing	2.40	m²

SURFACE	U-value
Exterior Walls	0.30
Windows & Doors	2.30
Internal Walls	0.90
Ceiling/Roof	0.50
Air Changes per Hour	1.50

DESIRED ROOM TEMPERATURE	20	°C
SUBTRACT		
OUTSIDE TEMPERATURE	-2	°C
EQUALS		
TEMPERATURE DIFFERENCE	22	°C

ROOM TEMPERATURE	20	°C
SUBTRACT		
AVERAGE INTERNAL ROOM TEMP	15	°C
EQUALS		
INTERIOR ROOM DIFFERENCE	5	°C

EXTERNAL WALL

Area (Minus) Glazing			U-value		Temp Diff			Watts Loss
9.60	m²	MULTIPLY	0.30	MULTIPLY	22	°C	EQUALS	63.36

WINDOW & DOOR

Area			U-value		Temp Diff			Watts Loss
2.40	m²	MULTIPLY	2.30	MULTIPLY	22	°C	EQUALS	121.44

INTERNAL WALL

Area			U-value		Temp Diff			Watts Loss
12.00	m²	MULTIPLY	0.90	MULTIPLY	5	°C	EQUALS	54.00

CEILING/ROOF

Area			U-value		Temp Diff			Watts Loss
6.00	m²	MULTIPLY	0.50	MULTIPLY	22	°C	EQUALS	66.00

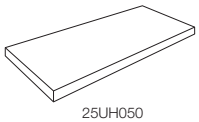
AIR CHANGE LOSSES

Volume			Temp Diff			Per Hour		Watts Loss
14.40	m³	MULTIPLY	22	°C	MULTIPLY	0.50	EQUALS	158.40

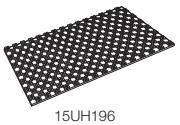
TOTAL LOSSES	463.20
DIVIDE BY	
USABLE AREA	6
EQUALS	
TOTAL REQUIRED OUTPUT W/m² (USEABLE AREA ONLY)	**77.20**

This figure may now be checked against the Power Output tables on page 8

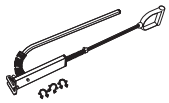
Screed Floors


25UH050


15UH153


15UH196


15UH230


15UH323

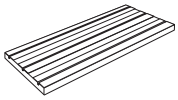

15UH400


15UH235

	PART CODE	PACK QUANTITY
1200 x 600 x 50mm Plain Insulation	**25UH050**	1
25m x 150mm Multi Height Edge Expansion Foam	**15UH153**	8
1500 x 800mm System Plate	**15UH196**	18
Screw Clips *(Bag of 50)*	**15UH233**	1
Staples for 15mm OsmaGold Pipe *(Box of 300)*	**15UH230**	1
Staple Gun	**15UH323**	1
Insulation Joint Tape	**15UH400**	1
OSMA Plate Clips *(Pack of 25)*	**15UH234**	1
OSMA Plate Tack Clips *(Pack of 25)*	**15UH235**	1

Floating/Batten/Joisted Floor


30UH059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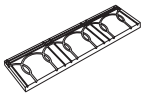
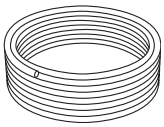
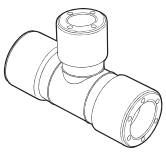

25UH056


15UH700

	PART CODE	PACK QUANTITY
1200 x 340 x 50mm Straight Joist Panel	**30UH059**	20
1200 x 600 x 50mm Straight Batten Panel	**25UH053**	5
1200 x 340 x 50mm (3) Loop Return Panel	**25UH056**	10
1200 x 50 x 50mm Plastic 'L' Bracket	**15UH700**	30

OsmaGold Pipe & Fittings*


15HC160
15HC180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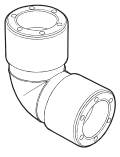
15HC530


15HC740


15HC510

	PART CODE	PACK QUANTITY
15mm x 50m Coil	**15HC160**	1
15mm x 100m Coil	**15HC180**	1
15mm x 15mm Straight Connector	**15HC510**	5
Branch Tee *15 x 15 x 15mm*	**15HC542**	5
Elbow 90° *15mm*	**15HC530**	10
Blanking Caps *15mm*	**15HC740**	10

***** *OsmaGold Pipe & Fittings are available from your local OsmaGold stockist*

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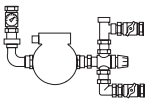
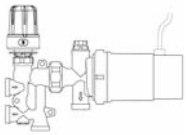
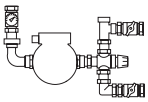
Single Room Controls

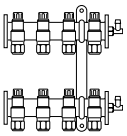

48UH585


48UH550

	PART CODE	PACK QUANTITY
1-2 Circuit Control Pack (For Connection to Heating Primary)	**48UH585**	1
1-2 Circuit Control Pack (For Connection to Radiator Branch)	**48UH550**	1

System Controls


48UH580


67UH874


47UH888


47UH585


52UH802

UH1-M

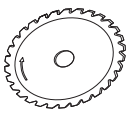

PRT-M
PRT/HW-M

	PART CODE	PACK QUANTITY
Manifold Mixing Unit *(inc. Pump)*	**48UH580**	1
2 Port Manifold	**67UH872**	1
3 Port Manifold	**67UH873**	1
4 Port Manifold	**67UH874**	1
Port Thermometer	**47UH888**	1
1" Isolation Ball Valve	**47UH585**	2
2 Wire Actuator (240V)	**52UH802**	1
Wiring Centre	**UH1-M**	1
Programmable LCD Thermostat (240V)	**PRT-M**	1
Programmable LCD Thermostat with Domestic Hot Water Timer (240V)	**PRT/HW-M**	1

Accessories


15UH236

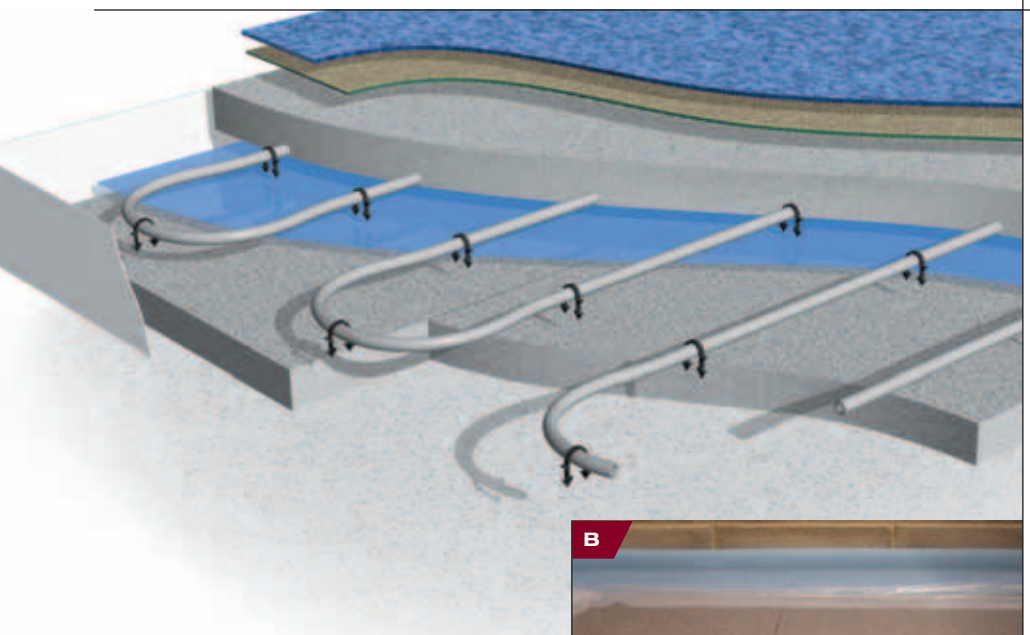

15UH239


15UH305

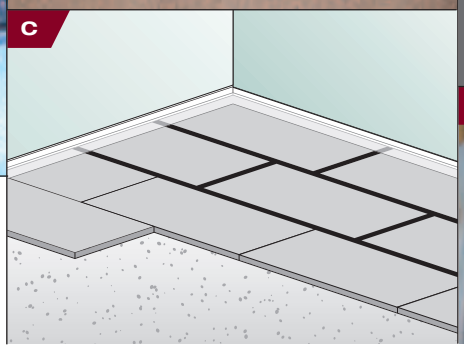

47UH555

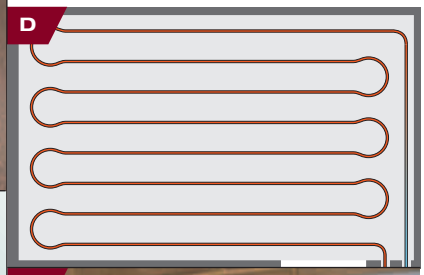
	PART CODE	PACK QUANTITY
Pipe Clamps	**15UH236**	2
Curved Pipe Supports	**15UH239**	2
Y Connectors for 48UH550	**47UH550**	2
1/2" Isolation Ball Valve for 48UH550	**47UH555**	2
Circular Saw Blade	**15UH305**	1
OSMA Infrared Thermometer	**15UH500**	1
OSMA Installation/Service Pack	**15UH691**	1

Basic Products For Screeded Floors



Supplied as:	Part Number
either:	
▮ OSMA Screw Clips	**15UH233**
option	
Screw Clip Handle	**15UH300**
or:	
▮ OSMA Staples	**15UH230**
with	
Staple Gun	**15UH323**
Also required:	
▮ Edge Insulation Multi-Height 25m x 125mm	**15UH153**
▮ OSMA 15mm Heating Pipe (OsmaGold)	*see page 12*
▮ Control Unit, Manifold and Room Thermostat or Single Room Controller	*see page 13*
▮ Sand/cement screed	–
▮ Insulation	–





Procedure

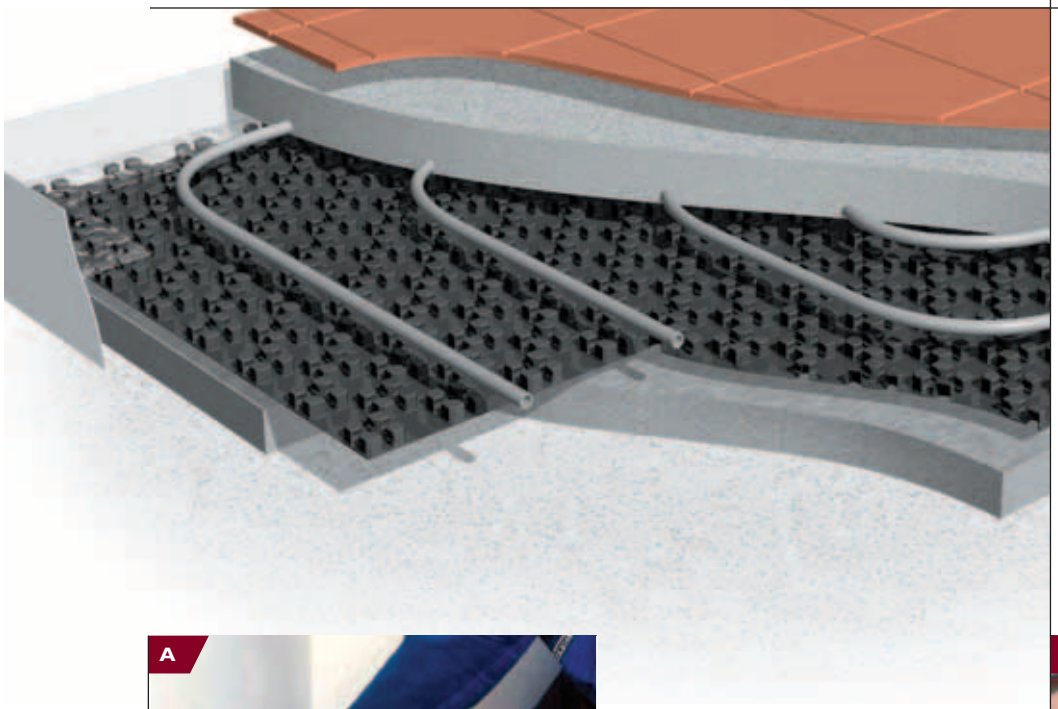
1. Ensure flat and level sub-floor.
2. Place edge insulation around the perimeter of the room *(see A)*.
3. Lay plain insulation, with staggered joints, to cover the required area *Recommendation:* tape joints between insulation panels to prevent ingress of screed *(see C)*.
4. Mark out proposed pipe layout on the surface of the insulation panels 200mm in from the wall. *Recommendation:* follow a serpentine pattern, with pipe at 200mm centres, preferably running in the longest direction of the room *(see D)*. Alternatively, follow a spiral pattern at 200mm centres. This will put less force onto the staples *(see page 16, image F)*.
5. Feed the pipe from the centre of the coil. DO NOT REMOVE THE PACKAGING FROM THE PIPE COIL.
6. Secure the pipe to the insulation in accordance with the layout design, using Staples or Screw Clips as appropriate *(see above)*.

   At point below where the Water Mixing Controller is to be installed, use Curved Pipe Supports and Pipe Clamps to hold the pipe neatly in place.
7. Once the pipe is installed, pressure test PRIOR to screeding. Keep pipe under pressure, while screed is being laid (so that, if the pipe is damaged during screeding, any fault can be detected immediately and rectified).

Requirements

- Insulation type and thickness should be chosen to satisfy Part L Building Regulations
- Staples or Screw Clips to secure pipe to insulation. Use Staples for rigid insulation, Screw Clips for soft insulation

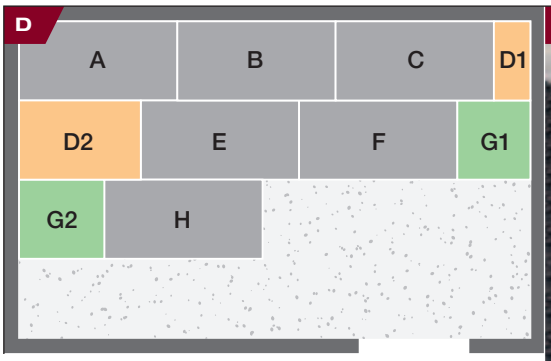
System Plates



Supplied as:	Part Number
Individual OSMA System Plates: – 1500 x 800mm = 1.2m²	**15UH196**
Also required:	
▮ Edge Insulation Multi-Height 25m x 125mm	**15UH153**
▮ OSMA 15mm Heating Pipe (OsmaGold)	*see page 12*
▮ Control Unit, Manifold and Room Thermostat or Single Room Controller	*see page 13*
▮ Sand/cement screed	–
▮ Building adhesive	–

Procedure

1. Ensure flat and level sub-floor.
2. Place edge insulation around the perimeter of the room *(see A)*.
3. Lay plain insulation over the sub-floor.
4. Position first System Plate so that the square corner of the plate with a single nodule is placed into the corner of the room *(see B)*.
5. Lay and fix subsequent plates in the same orientation, locking neighbouring plates together by overlapping one row of castellations *(see C)*.
   NOTE: Locking the Plates together prevents movement and ingress of screed between joints.
6. Follow the laying sequence guide above to minimise cutting & wastage *(see D)*.



7. Once the System Plates are in place, fix them down locally to the top of the insulation, in each corner and in the centre of the room, using either Plate Anchor Clips 15UH234 or Plate Tacks 15UH235, as this helps to keep the System Plates from lifting after the heating pipe has been inserted *(see F)*.

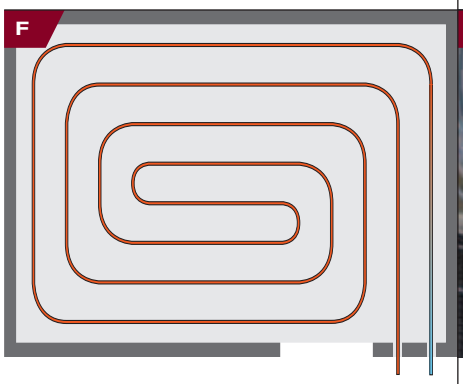
System Plates *continued*

8 Install the heating pipe in a spiral pattern at centres to achieve required output (usually 200mm centres is adequate). Initially install pipe at 400mm centres into the centre of the room, then reverse out to achieve overall pipe layout at 200mm centres *(see F).*

9 Along the straight runs, pipe may be unrolled from a standing position *(see G).*

10 Where a bend or loop is required, insert the pipe carefully between nodules *(see H).*
IMPORTANT: Do NOT damage System Plate nodules or kink the pipe.

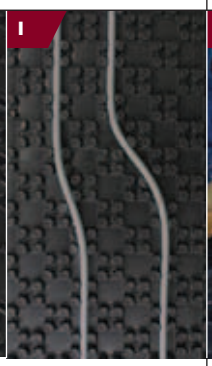
F



G

H

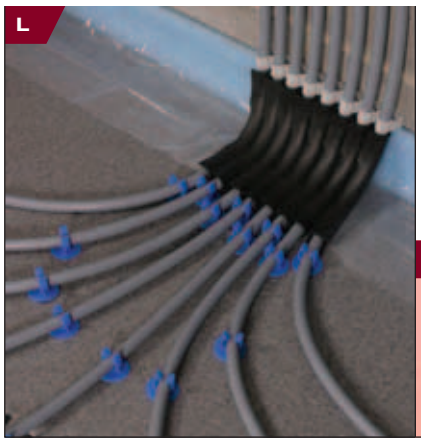
I



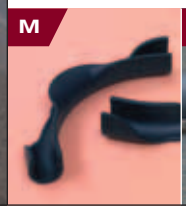
J

K

L

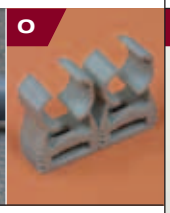


M



N

O



P

The multiplicity of the Plate castellations means 90° bends, loops and offsets can be easily created. Where a loop is required (at the centre of a room for example), the diameter should be min. 300mm to relieve pipe stress *(see H, I, J & K).*

11 Where the UFH pipework converges at the manifold, the pipe may be run off the Plate and screw-fixed using Screw Clips Accessory Part No: **15UH233** x 50, Curved Pipe Supports **15UH239** x 2 & Pipe Clamps **15UH236** x 2 can also be used to protect and secure pipe against the wall as the pipe exits the screed *(see L, M, N & O).*

12 Once the pipe is installed, pressure test PRIOR to and DURING screeding.

13 If a liquid screed is to be used, use 15mm pipe off-cuts to hold down the edge insulation gaiter *(see P).*

14 The installed heating circuit is now ready for the screed. Within the System Plates, the pipe is well protected from foot traffic & evenly distributed loads *(see Q).*

Q

Requirements

- Insulation type and thickness should be chosen to satisfy Part L Building Regulations

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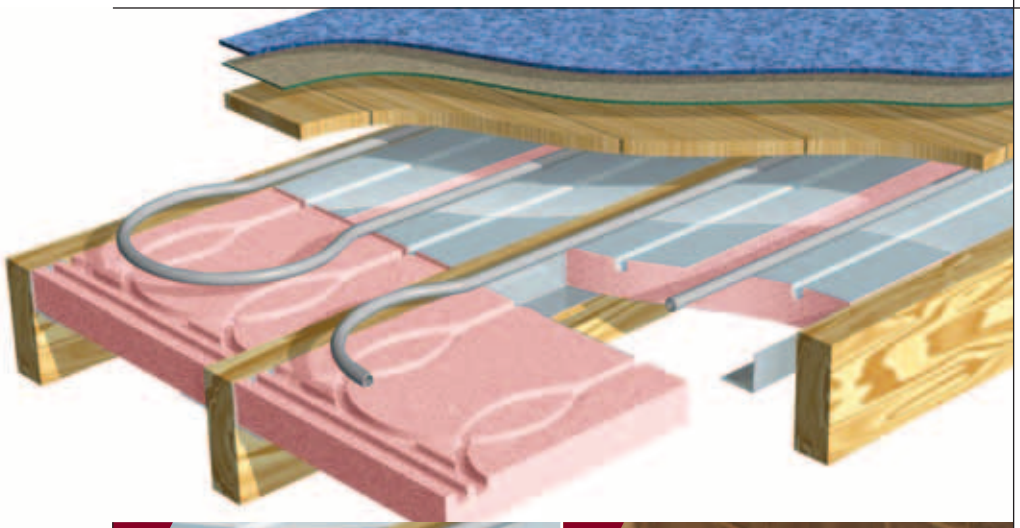
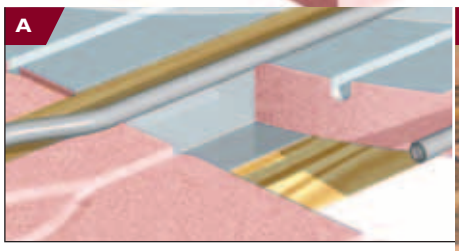
Timber Joist Products



Supplied as:	Part Number
OSMA Batten/Joist Panels (50mm insulation – pre-cut channels): 1200 x 340mm	30UH059
OSMA End Panels: (50mm insulation – pre-cut channels): 1200 x 340mm = 0.41m² [approx.]	25UH056
Plastic 'L' Brackets [OR (for installation from below) small battens]	15UH700

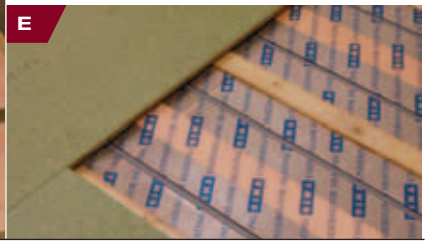
Also required:

- OSMA Heating Pipe (OsmaGold) *see page 12*
- Control Unit, Manifold and Room Thermostat or Single Room Controller *see page 13*



Procedure

1. Measure and cut the 'L' Brackets to fit.
2. Nail 'L' Brackets to the inside of the joists. Position so that the top vertical edge of the Brackets is flush with the top of the joists *(see A).*
   NOTE: When on a suspended floor, lay some boards to stand on.
3. Lay the pre-cut Insulation Panels and End Panels onto the Brackets. Take care not to stand on the panels *(see B).*
4. Notch the joists as necessary to provide pipe route from bay to bay *(see C).*
5. Lay pipe by pressing down carefully into the pre-cut grooves. Again, take care not to stand on the panels *(see D).*
6. Pressure test pipe when layout is complete.
7. Chipboard or solid floor may now be laid *(see E).*



Requirements

- When working on suspended floors, always follow required safety procedures, in accordance with Safety at Work Act, and use necessary safety equipment

NOTE:

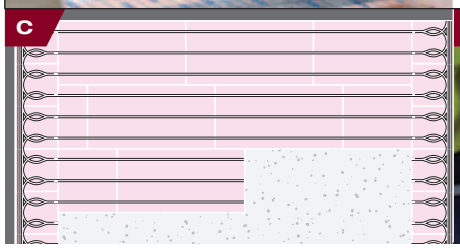
- Notches must be cut in accordance with building regulation requirements
- Do NOT cut notches into the top of a manufactured I beam

Floating Floor Products

Supplied as:	Part Number
OSMA Floating Floor Panel (50mm insulation – pre-cut channels): 1200 x 600mm = 0.72m²	25UH053
OSMA End Panel: (50mm insulation – pre-cut channels): 1200 x 340mm = 0.41m² [approx.]	25UH056

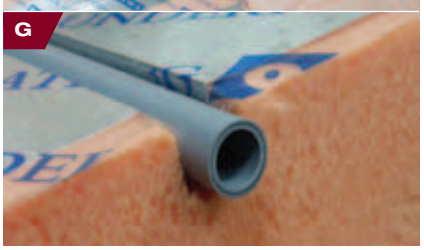
Also required:

- OSMA Heating Pipe (OsmaGold) *see page 12*
- Control Unit, Manifold and Room Thermostat or Single Room Controller *see page 13*



Procedure

1. Lay loop return End Panels along each of the 'short' ends of the room *(see A).*
2. Lay Floating Floor Panels between the loop return End Panels, ensuring the pre-cut channel line up *(see B).*
3. Follow the laying sequence above to minimise cutting and wastage. Use plain insulation panels in areas that will fall under fixtures/fittings *(see C).*
4. Once all the panels are in place, install pipe by pressing carefully into pre-cut grooves *(see D).*
5. Ensure the pipe is held securely when fitting into the loop return End Panels. Along the straight lengths, the pipe can be installed standing up, using a press of the foot *(see E & F).*
6. Installed within the pre-cut grooves, the pipe is well protected from foot traffic and evenly distributed loads *(see G).*
7. Pressure test pipe when layout is complete, prior to installing floor deck.



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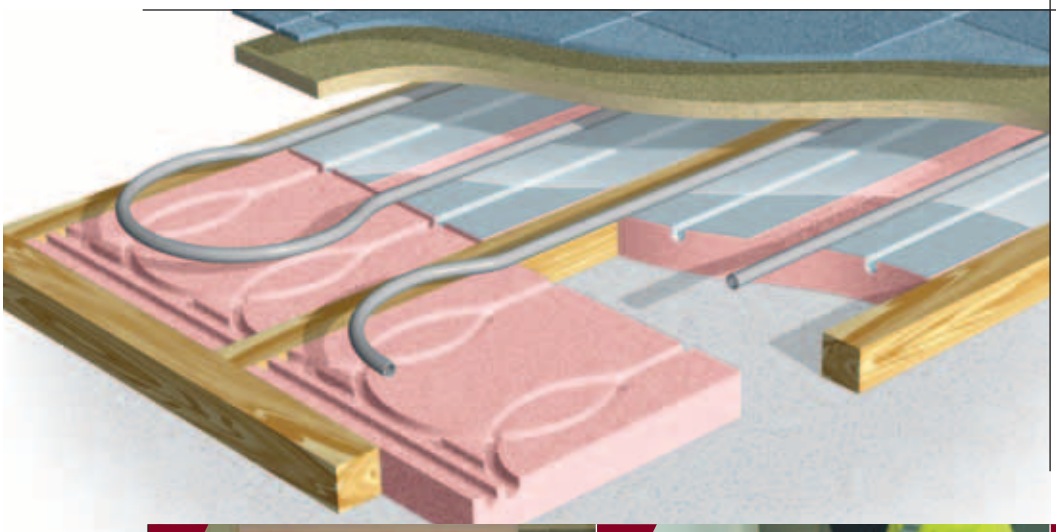
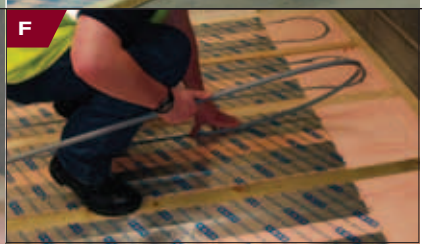
Timber Batten Floor Products



Supplied as:	Part Number
OSMA Batten/Joist Panels (50mm insulation – pre-cut channels): 1200 x 340mm	**30UH059**
OSMA End Panels (50mm insulation – pre-cut channels): 1200 x 340mm = 0.41m² [approx.]	**25UH056**

Also required:

- OSMA Heating Pipe (OsmaGold) *see page 12*
- Control Unit, Manifold and Room Thermostat or Single Room Controller *see page 13*
- 50 x 50mm timber battens



Procedure

1 Lay 50mm batten against the wall.

2 Lay a loop return end panel *(see A)* at each end of the batten space.

3 Fill Batten/Joist Panels to complete the first row of insulation against the edge batten *(see B).*

4 Butt the next batten up against the side of the first row of insulation *(see C).*

5 Then continue across the floor, with battens between panels of insulation *(see D).*

If secret nailed floor finish is to be installed:

6 Nail or screw-fix battens securely to the sub-floor *(optional).*

7 Once all Insulation Panels are in place, notch battens to provide pipe route from bay to bay *(see E).*

8 Install pipe within the pre-cut grooves *(see F).*

9 Pressure test pipe when layout is complete, prior to installing T&G floor deck.

If the floor finish is to be a wooden floor: It may be possible to lay this directly over the UFH Panels, omitting T&G deck (Consult supplier of floor deck).

For ceramic or stone floor finishes: Battened floor construction with T&G plywood deck will provide suitably rigid base (Consult floor finish supplier).

Requirements

- OSMA UHF Batten/Joist Floor Panels **30UH059**, these have been designed to provide a UFH system between 50 x 50mm battens at 400mm centres
- Circular Saw Blade **15UH305**. Foiled panels can be cut using a handsaw and sharp knife. However, we recommend use of a circular saw with this specially designed blade for cutting through insulation and foil

Mixing Control Units

2–4 Port Manifold

(Part No's: **67UH872 – 67UH874**)

- 25mm internal diameter plated brass body with integrated regulation valves. Manifold distribution arms form 2–4 heating circuits
- 2 x connections to the rest of the system with 1" union nuts (female flat connection for 1" Isolation Ball Valves (available from OSMA UFH), or for connecting an OSMA UFH Control Pack
- Integral air release and filling/draining point
- Each port equipped with a "Euroconus" pipe adaptor to receive 15mm OsmaGold pipe
- Supplied complete with wall brackets and screw fixings

Flow distribution arm

Regulating valves to regulate and isolate the water flow for each circuit.

Return distribution arm

Control valves for operation by 2-Wire Actuators (available from OSMA UFH).

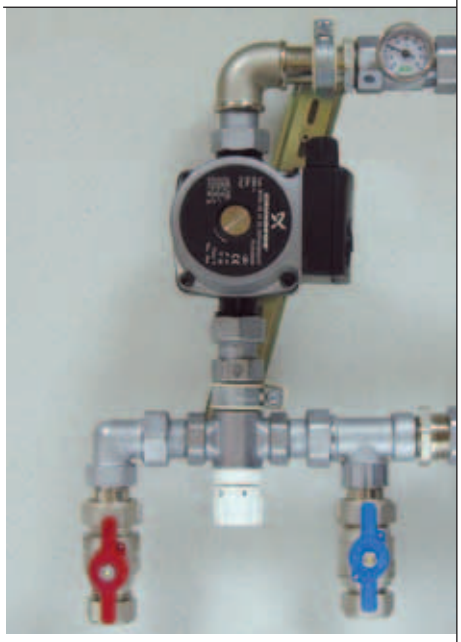
Control Pack (Incl. Pump)

(Part No: **48UH580**)

Water mixing valve for use with UFH systems connected to a boiler that produces water at temperatures higher than 65°C. The Control Pack simply screws into the OSMA UFH Manifold distribution arms.

The Control Pack incorporates:

- 2 x 1" female flat connections to the rest of the system (incl. Gaskets)
- Secondary circulator suitable to serve up to 4 x 100m heating circuits
- A water mixing valve that achieves faster warm-up times by not mixing flow water until the desired flow temperature has been reached

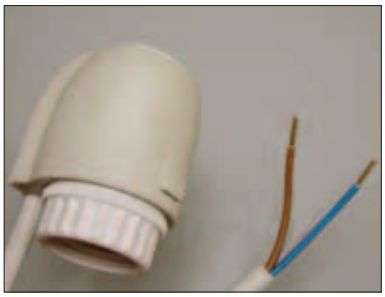


Individual items

(available from OSMA UFH)

2-Wire Actuator

(Part No. **52UH802**)



Port Thermometer

(Part No. **47UH888**)

Clamp-on Port Thermometer

(Part No. **47UH890**)

1" Isolation Ball Valve

(Part No. **47UH585**)

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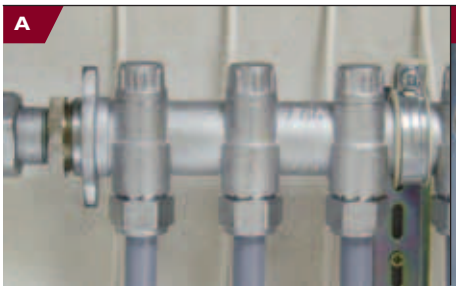
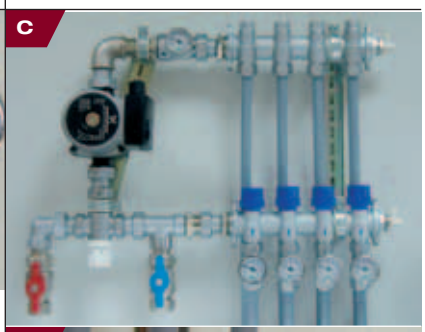
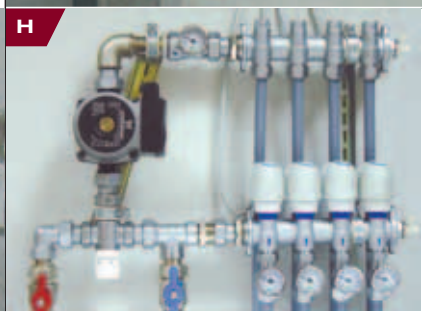
Mixing Control Units *continued*







Procedure A

Assembly of Heating Arms

1 Lightly screw a plastic pipe adaptor (self-sealing) onto each of the fitting adaptors. These are compression fittings designed to connect 15mm OsmaGold pipe *(see A).*

*If Port Thermometers (**47UH888**) are being used:*
Screw into place on the return arm and seal using PTFE tape or liquid sealant, and refit the plastic pipe adaptors *(see B).*

2 The wall brackets supplied allow for the creation of a staggered manifold assembly. Position the flow arm on the top (as shown) *(see C).*

3 Remove the blue wheel heads from the manifold return and screw on the actuator base, then carefully attach the 2-Wire Actuators **52UH802** *(see D and E).*

NOTES:

– If the Manifold has been designed to provide control for one heating zone only, a motorised valve can be installed on the feed to the Manifold instead of fitting an Actuator to each individual circuit. 15mm joiners can be supplied.

– Each manifold arm is equipped with a pre-installed dual purpose 1/2" air releasing /draining valve *(see F).*

– The valve rotates so that in the 'up' position (as shown), air can be released when filling and commissioning the UFH system. When in the 'down' position, water can be drained out of the Manifold.

Procedure B

Mixing Unit

4 Screw the Control Pack onto the Manifold arms using the gaskets supplied. This produces a watertight seal *(see H).*

5 Attach 1" Isolation Ball Valves directly to the Control Pack OR, if a Control Pack is not required, attach the Isolating Valves direct to the Manifold arms. This allows for complete isolation of the Manifold.

NOTE:

– All joints need checking prior to filling and testing on site for their integrity.

– Temperature Controller and Temperature Gauge are pre-installed *(see G).*

Requirements

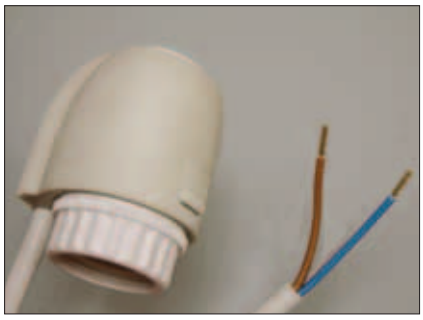
A standard by-pass should be installed just below the flow and return

Mixing Control Units *continued*

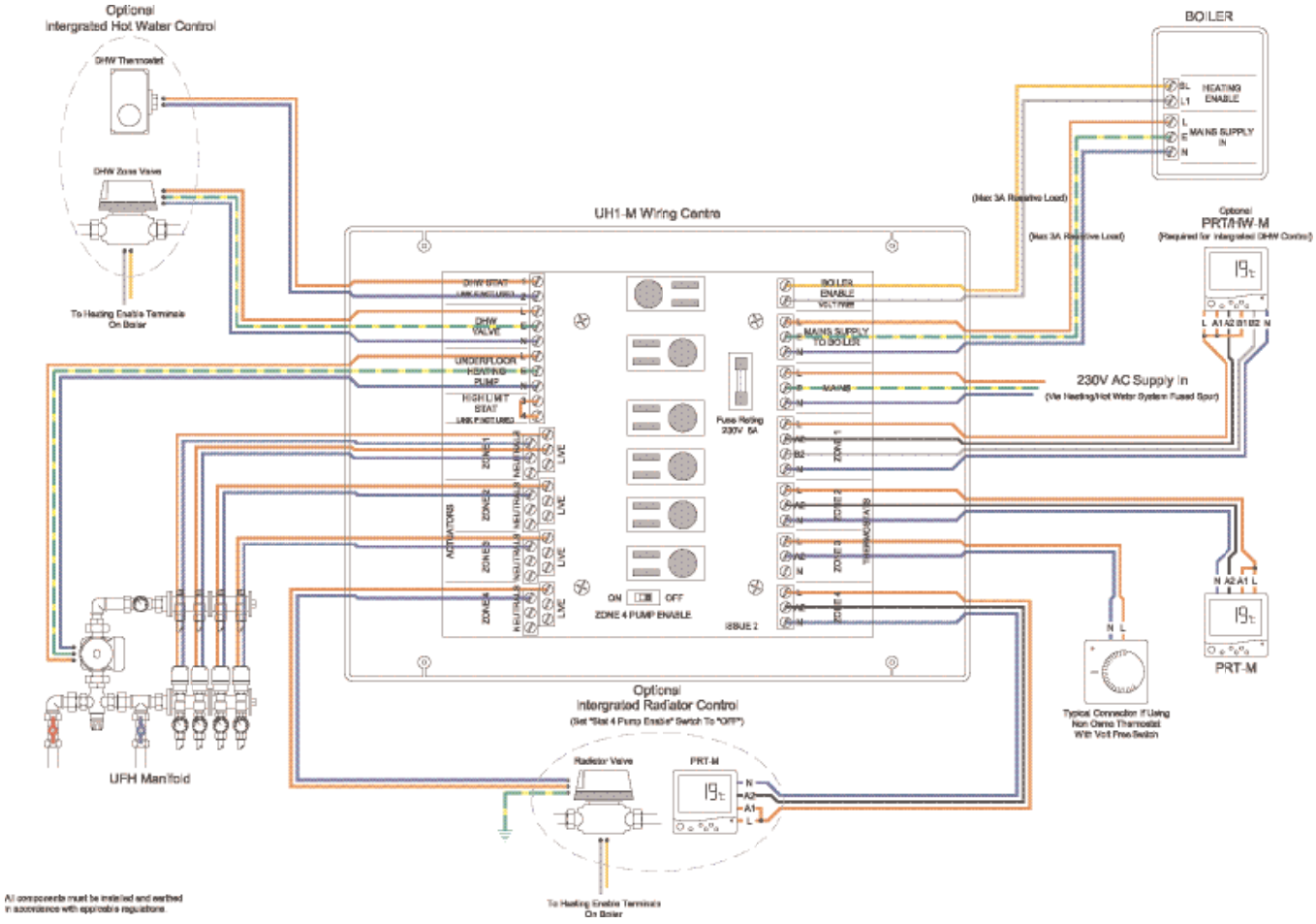
2-WIRE ACTUATOR

(Part No: **52UH802**)

- Normally closed 230V Actuator for use with OSMA UFH Self-Assembly Manifold
- No special mounting tools required. Simply screw onto return arm control valves
- 2-Wire Actuators for use with UH1-M wiring centre. (See below for wiring configuration).



Wiring Arrangement



SALES AND TECHNICAL ENQUIRIES
01392 444122
FAX
01392 444135
EMAIL
info@osmaufh.co.uk

Pressure Testing

Procedure

Once the UFH pipe has been installed, pressure test each circuit to verify the integrity of the pipework and connections.

Preparation

1 Ensure the circuit is complete. Use blanking caps or blanking plugs to blank off any open ends.

2 Load water into the tank of the pressure testing unit and connect the circuit flow tube end to the outlet connector of the tank.

3 Connect the circuit return tube end to the return connector on the tank where fitted, or via a controllable valve to a bucket or similar.

Testing

4 Open both valves on the unit fully and gently pump water into the circuit using the hand pump (replenishing the water in the tank if necessary) until a steady flow WITHOUT ANY AIR BUBBLES is seen to be flowing through the circuit back into the tank.

5 At this stage, close the return line valve. Then manipulate the pump SLOWLY whilst monitoring the pressure gauge.

6 Continue pumping until a pressure of some 18 bar shows on the pressure gauge. At this stage, stop pumping and close the flow valve. This pressure should be maintained for 30 minutes.

7 After 30 minutes, check the pipework and fittings for evidence of a leak:
– If there is no sign of leakage in any of the joints, *and*

– there is no reduction in pressure

the circuit can be presumed to be secure.

8 Complete the pressure test record (see page 24), not forgetting to enter the time and date.

After the test

9 Release the return line valve, allowing the surplus water back into the reservoir.

10 Disconnect the flow and return tube ends from the Manifold, and reconnect to the relevant ports.

Requirements

- Hydraulic Pressure Tester - available from most hire shops
- 15mm straight connections for attaching OsmaGold pipe to pressure tester

NOTE: The procedure explained applies to a “Rothenburg” manual pressure-testing unit

Pressure Test Record

Tested by: _____

Date: _____

Project: _____

Project Reference: _____

Floor	Zone	Circuit	Test Notes	Pass	Signed

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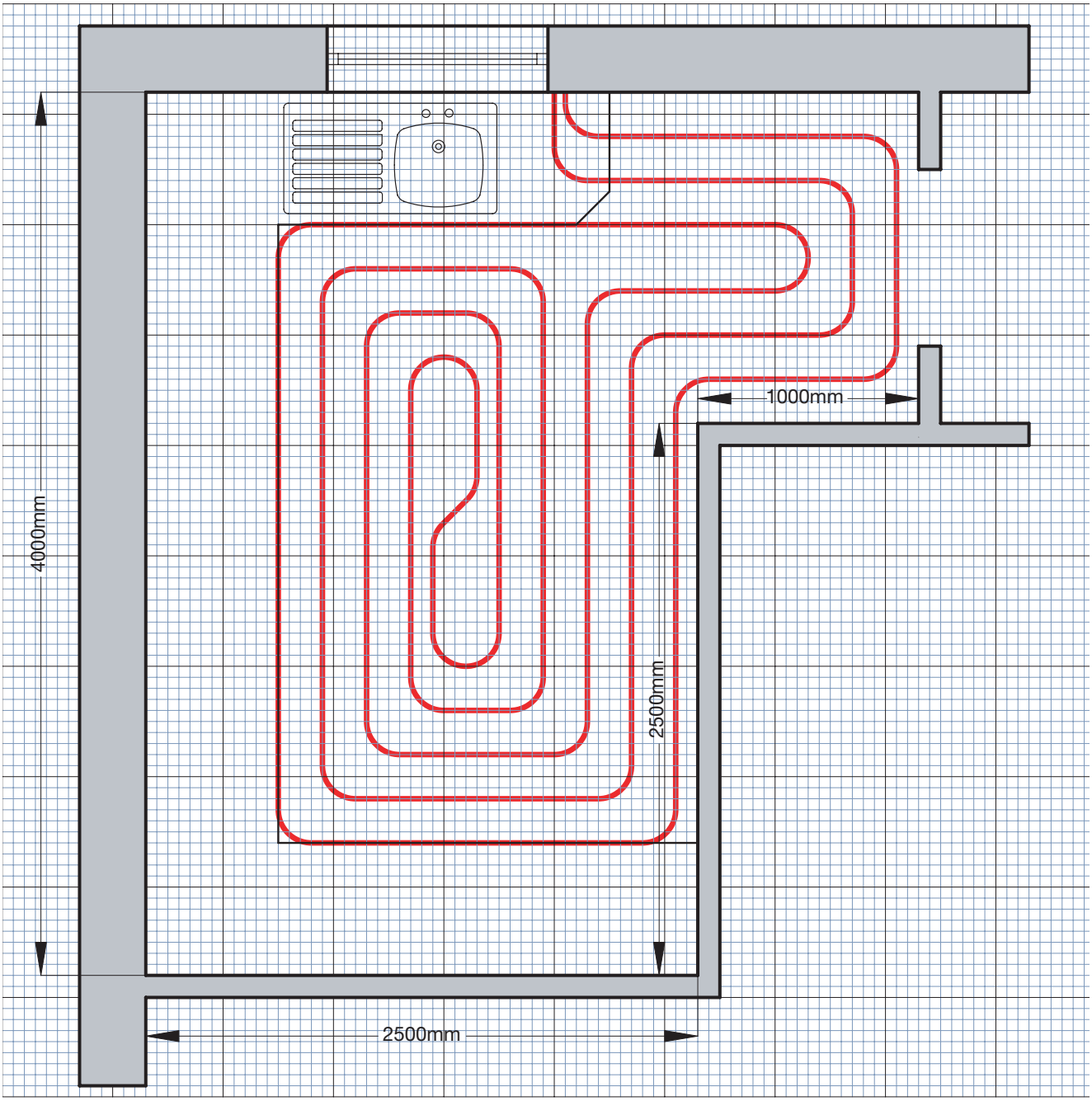
01392 444122
FAX
01392 444135
EMAIL
info@osmaufh.co.uk

Design Planner

Detailed planning and design of each UFH project is essential in order for work on site to proceed efficiently. This also helps scheduling of the components and materials required, and reliable estimation of costs.

For guidance, we provide an example below.

When creating a design, we recommend that you use a grid with a scale of each square = 50 x 50mm.



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EMAIL
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General Information and Ordering

Health and Safety

The relevant provisions of the following legislation should be adhered to on site:

- Construction (Design and Management) Regulations 1994
- Control of Substances Hazardous to Health Regulations 1988
- Health and Safety At Work Act 1974
- Management of Health and Safety At Work Regulations 1999
- Manual Handling Operations Regulations 1992

References

Reference should be made to:

- Building Regulations (England and Wales): Approved Document 'L' (Thermal)
- Building Regulations (England and Wales): Approved Document 'E' (Acoustic)

Supply

All OSMA systems described in this Design and Installation Guide are supplied through a nationwide network of Merchant Distributors. For details of your nearest stockist, contact OSMA Underfloor Heating.

Ordering

To order, be ready to quote the Product Name and relevant Part Number, together with quantities required. Part numbers are clearly indicated in **bold** type throughout this Design and Installation Guide *[EXAMPLE:* **15UH110***]*

Conditions of sale

The Company will not accept responsibility for the malfunction of any installation not designed by OSMA Underfloor Heating, which also includes using components not supplied by OSMA Underfloor Heating. Goods are sold subject to Company conditions of sale.

It is the responsibility of the Installer/ Customer to ensure that the system is correctly installed and that the boiler/heat source has sufficient capability to satisfy the demand of the UFH system, or conversely is not overly powerful.

For sales enquiries, or to place an order

Please contact
OSMA Underfloor Heating:

Sales / Orders

Tel: 01392 444122

Fax: 01392 444135

Email: info@osmaufh.co.uk

Technical Advice and Assistance

OSMA Underfloor Heating systems are backed by a comprehensive technical advisory service. This is available to provide expert assistance at every stage of a project, from planning and product selection to installation and maintenance.

Services include:

- CAD product and application details on disk
- Computer aided project design, for more complex projects for which a charge is payable
- Call-off service for efficient product scheduling

For prompt assistance, contact
OSMA Underfloor Heating:

Technical Enquiries

Tel: 01392 444122

Fax: 01392 444135

Email: info@osmaufh.co.uk

wavin

OSMA

Underfloor Heating
Available Through Merchants

Design and Installation Guide

For screeded and timber floors

This brochure provides detailed guidance on the design and installation of OSMA Underfloor Heating systems available through merchants. These systems are primarily designed for use in residential applications.

This OSMA UFH product range:

- Is designed for time-saving, easy installation – without requiring special tools or experience
- Provides consistent, controllable heat output and performance
- Enables achievement of a high quality result every time

OSMA also provide design and production of bespoke systems to meet specific application requirements or to suit specialised construction projects. These include acoustic and sprung floors, specialist screeds, high strength floating floors, and industrial floors – or for multiple unit projects requiring large numbers of identical installations (housing or flats). OSMA UFH technology can also be used for cooling. *For information, contact OSMA Underfloor Heating.*

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BSI REGISTERED ISO 9001:2000

RIBA CPD PROVIDERS NETWORK

UHMA OSMA Underfloor Heating is a member of the Underfloor Heating Manufacturers Association

OSMA Underfloor Heating
Apple Lane
Sidmouth Road
Exeter Devon EX2 5GL
Tel: 01392 444122
Fax: 01392 444135
Email: info@osmaufh.co.uk

www.wavin.co.uk

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