





more than underfloor

UNDERFLOOR HEATING AND HEAT PUMPS





HEAT PUMPS THE PERFECT PARTNER FOR UNDERFLOOR HEATING

Heat pumps produce lower water temperatures for heating than traditional boilers. This makes them the perfect partner for underfloor heating systems. UFH uses warm water to produce efficient radiant heating in the room. With a heat pump supplying the required low temperature water we can have a heating system that is renewable and provides the ultimate comfort.













MITSUBISHI ELECTRIC ECODAN AIR-SOURCE HEAT PUMPS

Heating UK homes with Ecodan air source heat pumps is now a viable and credible alternative to traditional methods and can help to combat rising energy bills through greater efficiency.

As perhaps the single most important renewable solution, heat pumps are an established, proven technology, supported by Government incentives, economically viable and flexible in their application for domestic heating.

Ecodan uses inverter-driven heat pump technology to harvest and upgrade free, renewable energy from the outdoor air to deliver heating and hot water, even in temperatures as low as -25°C.

For every 1KW of electrical input energy, Ecodan harvests and upgrades renewable heat from the outdoor air to provide the home with an average of at least 3.2KW of heat output.

1KW
Electrical energy input



2.2KW

Low temperature renewable heat energy taken from the environment



3.2KW
Heat energy output

3





HEAT PUMPS AND UFH THE DESIGN PROCESS

The most important thing is that any parameters specified by the heat pump manufacturer are incorporated into the UFH design. The design of a UFH system is based around four main input parameters:

- The size of the pipework installed
- The spacing between each 'run' of pipework installed
- The flow temperature provided by the heat source
- The room design temperature (the target temperature we are trying to achieve)

There are also other assumed parameters such as the floor construction type and the external weather conditions, but these are taken as 'fixed' parameters rather than the above which can vary.

The most accurate way to make sure that UFH will adequately heat a room, is to work back from the heat loss figure – this is the actual heat loading that will satisfy the heat loss, at worst-case external weather conditions. This is normally calculated by a mechanical consultant, and can then be used to make sure that the UFH is providing adequate heating to the area.











SCREEDED SYSTEMS

Screeded systems are the most popular and effective type of underfloor heating. Pipes are clipped or stapled onto an insulation layer, then the screed is laid on top. The warm pipes effectively heat up the whole slab, giving even and consistent heat output.

SUSPENDED SYSTEMS

We have a range of UFH for joisted or battened floors, the most common method being to use an aluminium spreader plate, fixed to either side of the joists.

ambiente[®]

UNDERFLOOR HEATING BE INSTALLED INTO ANY FLOOR CONSTRUCTION?





♣ FLOATING SYSTEMS

Floating floor systems consist of UFH pipes laid directly into pre-grooved and foiled insulation boards, which can be laid directly onto the floor surface below.

• LOW PROFILE SYSTEMS

Low Profile systems are ever increasing in popularity as more people see the benefits of underfloor heating and want to add it to their property. These systems can be laid onto solid floor surfaces to provide an even heat output with minimal floor build-up.



OTHER/BESPOKE SYSTEMS

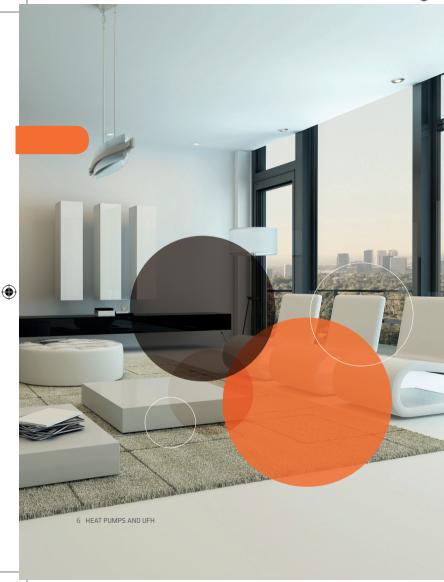
Ambiente has developed some specialist systems to cater for specific requirements such as structural floor areas and raised access floor systems, as well as adapting systems to meet bespoke client requirements.



Please note that this list is only an example and not in any way exhaustive – Ambiente can assist with questions surrounding floor construction and specifying the correct UFH system to suit. Also note that the effectiveness of each of these systems types when coupled with a heat pump should be considered at design stage.







WHAT ARE THE MAIN ADVANTAGES OF UNDERFLOOR HEATING?

Efficiency

UFH is the most energy efficient way of transferring heat into any room since it works by radiation from the floor surface - this is a more natural form of heating and requires lower flow temperatures due to its increased surface area.

Comfort

It is recognised that UFH is the most comfortable form of heating, creating a consistent temperature with no draughts or cold spots.

Control

UFH offers the benefit of customisable and flexible heating control, from small, individual heating zones to multiple areas controlled from a single controller. Heat pumps perform most efficiently when connected to larger heating zones.

Interior Design

As UFH is completely hidden from view, there is nothing to hinder interior design – no unsightly radiators on the wall means all wall space is maximised for furniture positions.

Health & Safety

With no radiators mounted on the wall, UFH is considered an ideal heating solution for areas where this could be a safety hazard – for example schools and nursing homes.



HOW DOES UNDERFLOOR HEATING WORK?

Underfloor heating works by circulating warm water through a series of continuous loops that are fitted underneath your floor, creating a large radiant surface that heats your room from the floor upwards.

This radiant form of heating is much more comfortable than the convected heat provided by radiators which draws cold air across the floor, heating it and then convecting it upwards towards the ceiling.













EXAMPLE 1 MITSUBISHI ELECTRIC ECODAN PUHZ-W85VHA2 HEAT PUMP

UFH System AmbiClip

Mitsubishi Electric Ecodan PUHZ-W85VHA2 unit, coupled with ground floor UFH system in residential property.

This scenario illustrates a typical residential application, with a ground floor underfloor heating system within a screed, coupled with a Mitsubishi Electric PUHZ air-source heat pump.

- UFH Heating Output required: 5.8 KW
- Size of area heated: 78m²
- Flow/Return temperature 40/35 degrees





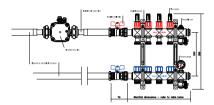


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PUMPED UFH MANIFOLD (4 port manifold used for example purposes only)

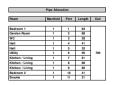


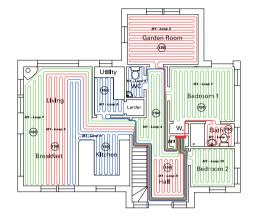
Note: It is recommended that a 2 port motorised zone valve be Installed on the primary flow before each manifold to prevent excess water

No. of ports	2	3	4	5	6	7	8	9	10	11	12
Length (mm)	192	242	292	342	392	442	492	542	592	642	692
	MANIFOLD DIMENSIONS TABLE										

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		Total Output (w)		6274	Flow temp "C	40	
		Total Tube Length	1(m)	651	Return temp "C	25	
	MANIFOLD 1	Max Head Loss (k	Pai	19.8	#*C	5	
		Total Water Volum	te (Er)	97.3	Pipe diameter (mm)	17	
		Total Flow Rate (I	Ani)	20.0	Total Flow Rate (kg/s)	0.234	
Port	Room / Area	Pipe Spacing (mm)	Output (W)	Tube Length (m)	Flow Rate (Vm)	Head Loss (kPa)	
1	Bedroom 1	150	599	84	1.9	9.1	
2	Garden Room	150	961	99	2.0	19.8	
2	WC	150	141	29	0.4	1.8	
4	Hall	150	805	41	2.5	7.7	
s	Hall	150	629	32	2.0	4.7	
6	Utility	150	292	50	0.9	2.6	
7	Kitchen/ Living	150	864	91	2.7	17.2	
	Kitchen/Living	150	845	22	2.7	16.3	
,	Kitchen/Living	150	807	85	2.5	14.5	
10	Bedroom 2	150	286	41	0.9	2.3	

	Underfloor Heating Outputs												
Manifold	Room	Floor Detail	Pipe Dismeter (mm)	Room Area (m*)	UFH Area (m²)	Temperature (°C)		Floor Covering	Floor Covering Resistance (m*KW)	Pipe Spacing (mm)	(w)	Floor Temp(*C)	
1	Kitchen / Living	AmbiClip	17	34.4	29.6	21	40 / 35	Ceramic	0.00	150	2516	28.9	
	Utility	AmbiClio	17	4.7	2.9	18	40 / 35	Ceramic	0.00	150	293	27.4	
	Hall	AmbiClip	17	14.2	14.2	15	40 / 35	Ceranic	0.00	150	1434	27.4	
	Sedroom 2	AmbiClip	17	5.4	5.4	18	40 / 35	Timber	0.15	150	255	22.9	
	Bathroom	AmbiClip	17	3.2	1.8	22	40 / 35	Ceramic	0.00	150	144	29.4	
	Sedroom 1	AmbiClio	17	12.0	11.3	18	40 / 35	Timber	0.15	150	599	22.9	
	WC	AmbiClip	17	1.7	1.4	18	40 / 35	Ceramic	0.00	150	141	27.4	
	Garden Room	AmbiClip	17	11.3	11.3	21	40 / 35	Ceramic	0.00	150	261	25.9	
TOTAL				86.9	77.9						6374		

now. Underfloor Heating output has been calculated based on the criteria detailed in the tables in relation to design temperature, floor covering resistance and flow / return temperatures. These outputs should be checked against the heat losses to ensure they will meet demand.

SYSTEM INFORMATION

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REV	DESCRIPTION	DATE

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Meadowside Farm

Ground Floor Proposed Underfloor Heating Layout

CONSTRUCTION
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EXAMPLE 2 MITSUBISHI ELECTRIC ECODAN QUHZ HEAT PUMP

UFH System AmbiClip

Mitsubishi Electric Ecodan QUHZ Unit coupled with UFH system in 1 bed residential bungalow.

The new QUHZ Mitsubishi air-source heat pump is the perfect partner for smaller properties with underfloor heating installed, due to its 5KW maximum loading. This scenario shows a bungalow with UFH throughout the property, coupled with a QUHZ heat pump.

 Heating Output required: 3.7 KW

• Size of area heated: 70m²

• Flow/Return temperature: 50/35 degrees





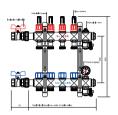




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PUMPED UFH MANIFOLD

(4 port manifold used for example purposes only)



Note: It is recommended that a 2 port motorised zone valve be installed on the primary flow before each manifold to prevent excess water pressure.

No. of ports	2	3	4	5	6	7	8	9	10	11	12
Length (mm)	192	242	292	342	392	442	492	542	592	642	692

MANIFOLD DIMENSIONS TABLE

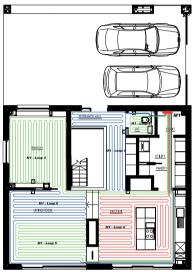
Pipe Allocation									
Room	Manifold	Port	Length	Coll					
Living Room	1	ε	96						
wc	- 1	2	15	240					
Bedroom	- 1	3	112						
Kitchen	- 1	4	94						
Living Room			90	240					

MANIFOLD 1						
		Total Tube Length	n (m)	463	Return temp °C	35
		Max Head Loss (k	Pa)	6.3	At °C	15
		Total Water Volum	ne (ltr)	61.9	Pipe diameter (mm)	17
		Total Flow Rate (I	/m)	3.9	Total Flow Rate (kg/s)	0.066
Port	Room / Area	Pipe Spacing (mm)	Output (w)	Tube Length (m)	Flow Rate (I/m)	Head Loss (kPa)
1	Entrance Hall	150	726	56	0.7	2.4
2	wc	150	176	15	0.2	1.5
3	Bedroom	150	742	112	0.7	3.4
4	Kitchen	150	1428	24	1.4	6.3

	Underfloor Heating Outputs											
Manifold	Room	Room Area (m²)	UFH Area (m²)	Room Design Temperature (°C)	Flow / Return Temperature (°C)	Floor Covering	Floor Covering Resistance (mtKW)	Pipe Spacing (mm)	Design Output (w)	Floor Temp(°C		
- 1	Entrance Hall	15.2	6.6	18	50/35	Ceramic	0.00	150	726	28.2		
	wc	2.0	1.6	18	50/35	Ceramic	0.00	150	176	28.2		
	Bedroom	12.8	12.8	21	50/35	Carpet	0.15	150	742	26.4		
	Living Room	18.4	18.4	21	50/35	Carpet	0.15	150	1067	26.4		
	Kitchen	22.1	16.6	21	50/35	Ceramic	0.00	150	1428	29.0		
TOTAL		70.5	56.0						4130			

Adds
Underfloor decenting output has been calculated based on the ortest declared in the tables to relation to design temperature, floor covering resistance and flow / nature temperatures. These outputs should be checked against the heart losses to ensure they will meet downsed.

BUNGALOW LAYOUT





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REV	DESCRIPTION	DATE



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Proposed Underfloor Heating Layout

346 Chambers Lane

CONSTRUCTION
AS INSTALLED 17680-RT/1 DRAWN CHECKED 1:50 @ A1 04 Jan 2017









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