the underfloor heating company

APPROVED BY PROFESSIONALS

Cable Mat

Kit Installation Guide

- Easy to Install
- Ultra Thin Cable
- Complies to Latest Regulations
- UKCA Approved
- Lifetime Warranty

Electric Kit

the underfloor heating company

Thank you for choosing our industry leading electric underfloor heating system.

Our electric underfloor heating kits are the perfect option for both homeowners and tradesmen looking to install a high quality underfloor heating system.

This instruction manual contains the information to ensure the safe install and operation of the cable or cables.

Please ensure you read the floor covering instruction in conjunction with this manual. If in any doubt contact the floor manufacturer or us before proceeding with the install.

Need Help? Talk to an Expert...

01625 466 258

www.theunderfloorheatingcompany.co.uk

Contents

Kit Contents

Cable Mat Kit

Included in your kit are all the components needed to build your electric underfloor heating system.

Cable Mat (or Mats)

Acrylic Floor Primer

Floor Primer Roller

Fixing Tape

Conduit for Floor Sensor

Optional Thermostat

Thermostats are NOT included in the Kit.
We have a wide range to choose from on our website.

N.B. Multiple Thermostats will be required for Multi-Room setups.

Cable Mat Kit Overview

Electric Cable Mat Kits have been designed to be installed below most floor coverings:

✅ **Tiles** ✅ **Stone** ✅ **Marble** ✅ **LVT** ✅ **Thin Carpet**

For Vinyl, Laminate and Carpets the sub-floor must be first covered with a flexible floor levelling compound (available on our website).

Always check with the floor covering manufacturer that their product is suitable for cable mat under floor heating.

Before you begin installing...

Please read through these instructions carefully and check that you have all the components required.

The Underfloor Heating Company's kits contain everything you need in one box for your project. If you need help or advice with your installation please get in touch.

We recommend using the following items to help with your installation:

- **Tape Measure**
- **Electrical Test Equipment*** ***(see note below)***
- **Marker Pen or Pencil**
- **Knee Pads**
- **Retractable Knife**
- **Scissors**

** Note:* A multi-meter will suffice for preliminary testing of the cable prior to laying of the floor finish. Final testing for completion of the guarantee must be performed by your electrician with calibrated test equipment.

⚠ Important

- **DO NOT** cut or cross the heating cable.
- **DO NOT** fit the system without testing the heating element(s).
- **DO NOT** supply power to the heating element whilst it is coiled or partially coiled Cables and Mats must be fully encapsulated in adhesive or levelling compound.

Installation Requirements

The heating mat/thermostat require a 230/240-Volt AC supply via a localized isolation point on an RCD protected circuit.

THE INSTALLATION MUST CONFORM TO THE CURRENT REGULATIONS AND MUST BE CARRIED OUT BY A SUITABLY QUALIFIED PERSON.

The mat can be either 100 /150 or 200 watts per square meter.
Refer to pg.14 for the Resistance Values for each type.

NEVER OVERLAP THE MATS (THIS WILL CAUSE THE HEATING ELEMENT TO FAIL)

The first part of the cable on the mat is the 'cold tail" (coloured black) this is a three-core cable live – neutral – earth. The live and the neutral are connected to the thermostat terminals and the earth to the incoming supply earth.

The heating element on the mat is the Red Cable, and this is a double insulated cable.

For larger areas two or more mats are supplied. Two cold tails can usually be connected at the thermostat. More than two will need to be terminated within a wall mounted accessible junction box. (NB most thermostats have a 16-Amp maximum load).

DO NOT cut or attempt to shorten the Red Heating Cable.

The joint between the cold tail and the heating cable must be below the floor covering and fully encapsulated in self smoothing compound or tile adhesive. The same applies to the end joint of the heating cable. The cold tail joint and the end joint must NOT be taped over this will cause the joint to fail and invalidate the warranty.

Varme® mat systems are suitable for installing on a sub floor which is sound and suitable for tiling.

Suitable subfloors include Concrete / Solid screeded floors (preferably overlayed with Tile backer boards or XPS boards) / Structurally sound marine ply wooden floors (preferably overlayed with Tile backer boards). **N.B. XPS boards can NOT be used on wooden subfloors.**

DO NOT use on directly onto timber floorboards, MDF or hard board because these can absorb moisture and then distort, causing the floor covering to move/dislodge or crack.

Electrical Provision

Important Notes

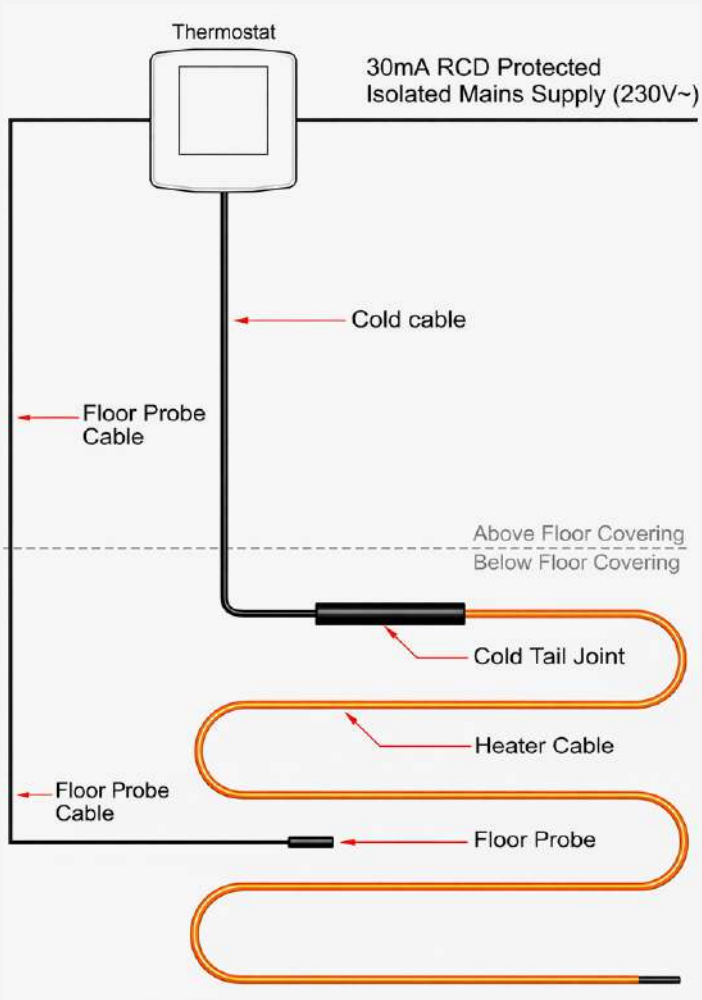
Make the electrical provision as per the diagram below. The circuit must incorporate 30mA RCD protection.

- Installations below 13Amp, a fused spur or combined spur/ RCD is recommended.
- Installations over 13Amp use a suitable isolated supply incorporating 30mA RCD protection.

The thermostat rating varies depending upon which model is being installed. Refer to the thermostat instructions to determine the maximum current that the thermostat can switch. It will be either 15 or 16 Amps (most domestic installations are within this figure). If the system supplied is over the maximum rating of the thermostat it will be subject to a more comprehensive electrical installation. (a qualified electrician will be able to advise you on this).

Note: All electrical connections should be made in compliance with building regulation Part 'P' and current wiring regulations.

Note: If installing in a bathroom or other 'wet' room the thermostat must be located OUTSIDE of the room, on the opposite side of the wall, for example in a bedroom or hallway/landing.



Installation Instructions

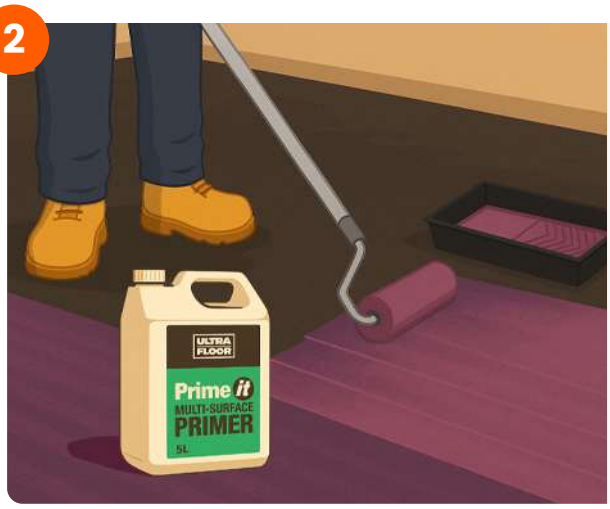
1

Ensure the sub-floor has been solidly fixed down and free of dust and debris. Timber floorboards must be covered with a suitable thickness marine ply or suitable tile backer boards. (Please contact for advice if you are insure).

DO NOT USE XPS Boards on a timber sub-floor.

Bitumen coated floors must be covered by a tile backer board or 3 to 5 mm of a self-smoothing compound that is suitable to cover bitumen. Never install a cable or mat onto a bitumen covered surface.

2

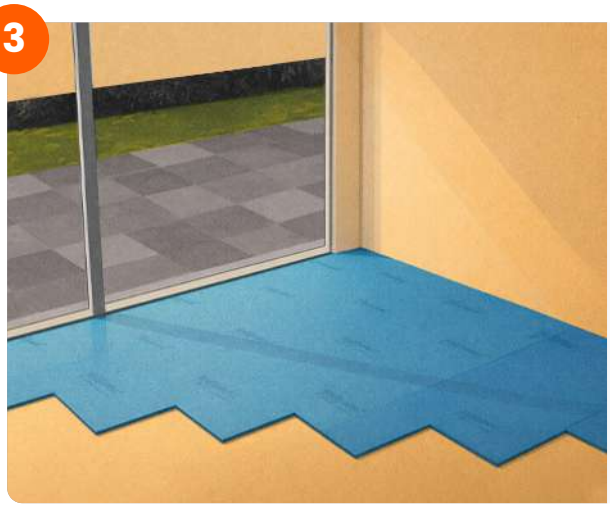


Prime the floor with the acrylic based primer (this primer is not suitable for Anhydrite screeds).

Leave to dry, typically 1 to 2 hours dependent of air temperature. Avoid excess foot traffic on primed surface.

Always check that the self-smoothing compound and tile adhesive are compatible with the primer (most are) but if in doubt check with the manufacturer of the self-smoothing compound and adhesive.

3



If using tile backer boards or XPS insulation boards, please follow the manufacturer's instructions.

Fix the boards in a brick bond fashion. Either fix the boards with a cement- based tile adhesive or screws and washers. Fix the screws at a maximum 300mm centres dependent on the sub floor.

DO NOT USE XPS Insulations Boards on to a timber sub floor, use tile backer boards to give a stable sub floor.

Installation Instructions (continued)

4

Refer to the testing procedure below.

It is very important the testing is carried out.

Testing The Heating System

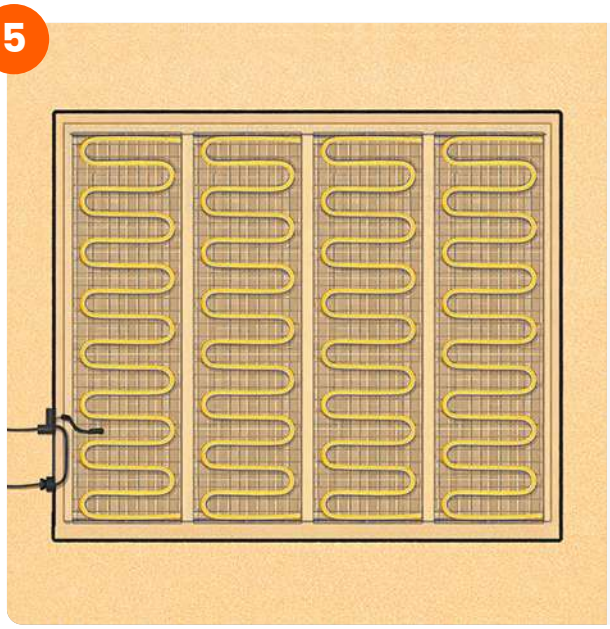
The Varme® Cable Mat System is tested prior to shipping but it must be tested as follows:

1. After unpacking and prior to installation (record the readings)
2. At this point installing electrician must carry out a 500 Volt DC insulation resistance test (record the readings)
3. Once you have installed it on the sub floor (record the readings).
4. If a smooth levelling compound has been used test again prior to the final floor covering (record the readings).

The test is a reading in Ohms and can be within 10% plus or minus of the value shown on the table on pg.14 (measured at a room temperature of 20 degrees.)

N.B. hot or cold conditions can cause the resistance to alter.

5



Prepare floor plan of the area to be heated and identify suitable location of the fused spur and thermostat position.

Mark the layout of the underfloor heating mat on the floor plan.

This is an important step and must be carried out correctly to ensure that all the mat is used up.

Planning a Floor Layout

If you need guidance on preparing a Cable Mat floor plan for various room types, we have illustrated a range of typical layouts to refer to on **pages 15-16.**

Installation Instructions (continued)

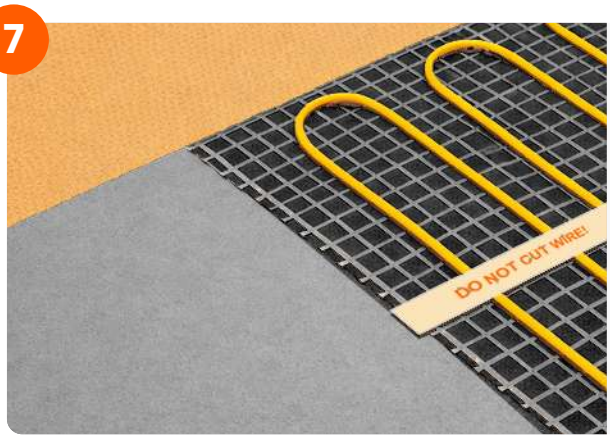
6

Now start installing the floor heating mat from the thermostat position. Roll out and secure the mat to the floor. The heating mat has a sticky mesh, simply press this down onto the floor and it will hold in place. If you need to turn the mat 90 degrees upside down you can use the double sided adhesive strips to hold the mat in place. A small amount of additional cloth tape is provided to ensure the mat is flat to the floor in places where it is uneven.

DO NOT use excessive long strips of tape along the edges of the heating mat /s as this can cause problems with adhesive/latex bonds, please ensure any tape used is primed with suitable primer before applying adhesives/latex.

The floor heating mat should be between 50-100mm from the wall perimeter. Note: when installing around awkward shapes like a toilet or sink the cable can be removed from the mesh matting and placed loose on the floor to suit the shape (fix with minimal duct tape to hold in place), at no point must the cable be spaced closer than 50mm between any 2 loops of cable.

7



When you reach the end of the room the mat can be cut as shown here.

DO NOT cut the cables.

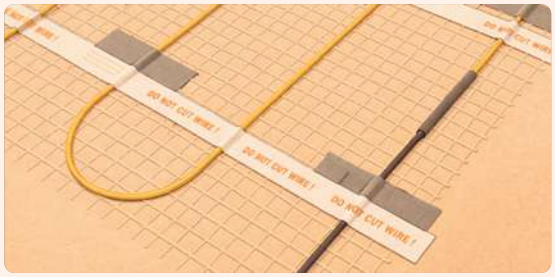
Installation Instructions (continued)

Cold Tail & End Joint Installation

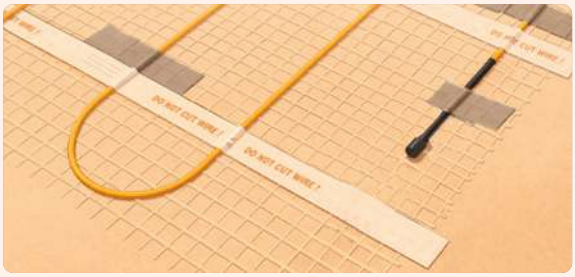
When installing the heating mat you need to be careful with how you install the end joint and cold tail joint (the join between the supply lead and the heating mat). They can potentially overheat if the following steps are not taken.

As the joints on the heating mats are a much larger diameter than the heating element it is inevitable that you will need to cut a small channel or groove for them to sit into the subfloor or the insulation board.

Once they have been installed in this groove it is important that you do not cover them with tape as this will create an air void preventing the joint from dispersing its heat, this can lead to a potential failure in the future.



The cold tail joint can be secured in place by taping the cable either side of the joint, a small piece on the heating cable and a small piece on the cold tail. This will ensure the joint is NOT covered with tape.

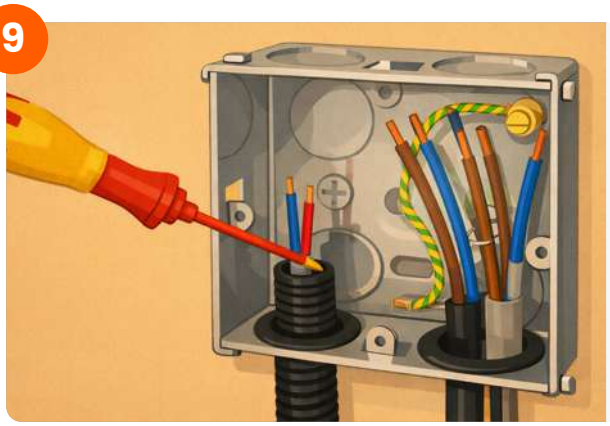


The end joint can be secured in place by taping the red heating element just before the joint to help secure it in place. This will ensure the joint is NOT covered with tape. Both these heating joints MUST now be fully encapsulated within levelling compound and/ or tile adhesive.

8

Check and record the insulation resistance value and the cable resistance value.

9



The cold tail from the cable has an earth which is a braided wire. If it is necessary to shorten the cold tail, at the thermostat, then the earth braid must be 'unpicked' with a small screwdriver or similar tool.

IT MUST NOT BE CUT ALONG ITS LENGTH as this will cause it to become unravelled. It should then be twisted back together and connected to the incoming earth on the power supply.

Installation Instructions (continued)

10

Position the sensor in the black conduit supplied from the thermostat position down in between two runs of cable (not overlapping the heating cable) and tape into position. If using insulation boards, these can be cut to allow the conduit to be placed inside. If installing directly onto plywood then a groove can be cut using a sharp chisel (beware of pipes).

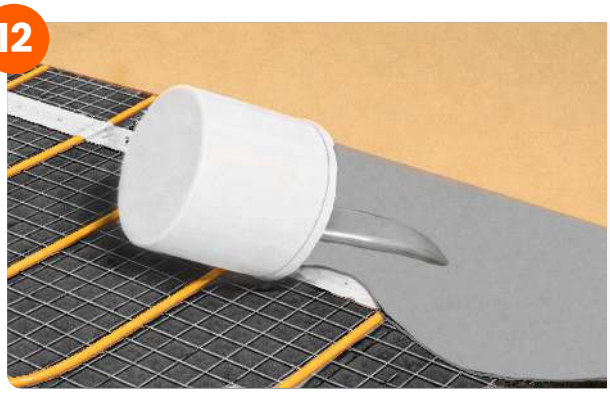
The joint between the heating cable and the cold tail can also be placed inside a groove in the floor as this can be bulky and difficult to tile over. The sensor wire can be shortened or lengthened. If you need to cut the sensor wire you must only cut the end with the exposed wires.

DO NOT cut the end which contains the plastic sensor. The connections to the thermostat can now be made.

11

Test the heating cable as before.

12



If possible cover the cables with a thin layer of latex based levelling compound (5-6mm).

This will help protect the cables when tiling. You may tile directly over the cables, however extra care must be taken not to dislodge the cables or to damage the cable in anyway.

Floor Coverings

You can now lay your flooring according to your floor manufacturer's instructions.

Please refer to adhesive manufacturer's guidelines for drying times before turning on your heating system, this is usually around 7 days, the floor temperature should be increased gradually by 1-2 degrees per day over a 2 week period to reduce the risk of force drying. If in any doubt please check with adhesive/latex manufacturers for advice.

Tile/Stone Covering

Tile the floor using a flexible tile adhesive and grout as per industry standards and manufacturers conditions. Finally, wait at least 1 week before turning on to allow time to dry.

N.B. The heating may be slow to react at first, especially if installed on a new screed floor or in a new building. Start by setting the floor temperature at approx 18°C - and build up by 1°C per day until your desired temperature is reached. Please see separate instructions for connection and operation of digital thermostat.

Vinyl Floor Covering

If you are using a vinyl floor covering, then a minimum **10mm** self-smoothing compound should be used to cover the cable.

N.B. **CONSULT A VINYL FLOOR INSTALLER BEFORE USING THE COMPOUND TO CHECK COMPATABILITY.**

Carpet Covering

If using carpet as a finish floor covering, then a **10mm** self-smoothing compound can be used with a suitable low tog underlay (please check with manufacturer for suitability).

N.B. **THE CARPET AND UNDERLAY MUST NOT EXCEED 2.5 TOG COMBINED.**

Resistance Values

Twin Conductor 100W / m2 / 230 Volts

Width (m)	Length (m)	Area (sq.m)	Watts (W)	Resistance (Ohms)
0.5	3	1.5	150	352.70
0.5	4	2	200	264.50
0.5	5	2.5	250	211.60
0.5	6	3	300	176.30
0.5	7	3.5	350	151.10
0.5	8	4	400	132.30
0.5	9	4.5	450	117.56
0.5	10	5	500	105.80

Width (m)	Length (m)	Area (sq.m)	Watts (W)	Resistance (Ohms)
0.5	12	6	600	88.17
0.5	14	7	700	75.60
0.5	16	8	800	66.13
0.5	18	9	900	58.80
0.5	20	10	1000	52.90
0.5	22	11	1100	48.09
0.5	24	12	1200	44.08

Twin Conductor 150W / m2 / 230 Volts

Width (m)	Length (m)	Area (sq.m)	Watts (W)	Resistance (Ohms)
0.5	1	0.5	75	705.30
0.5	2	1	150	352.70
0.5	3	1.5	225	235.10
0.5	4	2	300	176.30
0.5	5	2.5	375	141.10
0.5	6	3	450	117.60
0.5	7	3.5	525	100.80
0.5	8	4	600	88.20
0.5	9	4.5	675	78.37

Width (m)	Length (m)	Area (sq.m)	Watts (W)	Resistance (Ohms)
0.5	10	5	750	70.50
0.5	12	6	900	58.80
0.5	14	7	1050	50.40
0.5	16	8	1200	44.10
0.5	18	9	1350	39.20
0.5	20	10	1500	35.30
0.5	22	11	1650	32.06
0.5	24	12	1800	29.39

Twin Conductor 200W / m2 / 230 Volts

Width (m)	Length (m)	Area (sq.m)	Watts (W)	Resistance (Ohms)
0.5	1	0.5	100	259.00
0.5	2	1	200	264.50
0.5	3	1.5	300	176.30
0.5	4	2	400	132.30
0.5	5	2.5	500	105.80
0.5	6	3	600	88.17
0.5	7	3.5	700	75.57
0.5	8	4	800	66.13
0.5	9	4.5	900	58.79

Width (m)	Length (m)	Area (sq.m)	Watts (W)	Resistance (Ohms)
0.5	10	5	1000	52.90
0.5	12	6	1200	44.08
0.5	14	7	1400	37.79
0.5	16	8	1600	33.06
0.5	18	9	1800	29.39
0.5	20	10	2000	26.45
0.5	22	11	2200	24.05
0.5	24	12	2400	22.04

Do's & Dont's for Installation

- **DO** read through these instructions carefully before beginning work.
- **DO** use flexible adhesives and grouts.
- **DO** test the cable before tiling.
- **DO** be careful not to damage or dislodge the cable during tiling.
- **DO** ensure the cable is spaced no closer than 50mm between loops.
- **DO** wait at least 7 days before turning on the system.
- **DO** read the separate installation and operating instructions for the thermostat.
- **DO** ensure the joint between the cold tails and heating cable is beneath the tiles.

- **DON'T** attempt to cut the heating cable at any point.
- **DON'T** allow the wires to cross or touch.
- **DON'T** allow excessive foot traffic over the wire before tiling.
- **DON'T** cut tiles over the heating cable.
- **DON'T** place tools or stacks of tiles on top of cable.
- **DON'T** place any products over the floor covering with a higher tog value than 2.5.
- **DON'T** place any bean bags or fixed furniture over the floor covering.
- **DON'T** place cable closer than 100mm near any pipes.
- **DON'T** turn on the heating mat/cable while it is rolled up or still on the drum.
- **DON'T** tape over the end joint or the cold tail joint.

Important

Please ensure that the cold tail joint (the join between the heating cable and flexible supply lead) is fully encapsulated in adhesive or levelling compound underneath the floor covering.

Please ensure that the end joint (the join at the end of the cable which is black) is also fully encapsulated in tile adhesive or levelling compound underneath the floor covering.

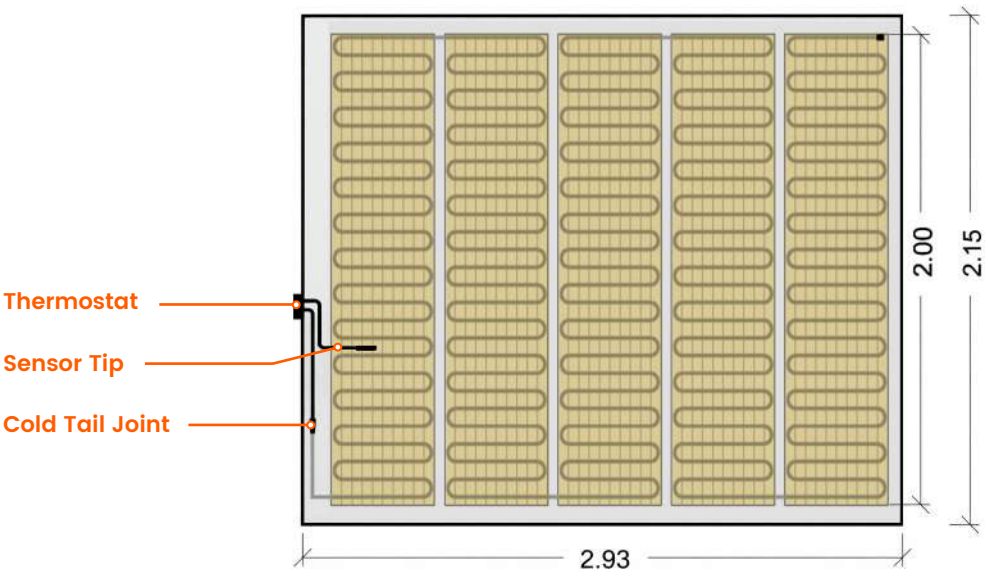
Both the cold tail joint and end joint **MUST NOT** be covered with tape, this can cause the cable to overheat and eventually fail!

DO NOT BEND THE COLD TAIL JOINT AT ANY POINT.

Typical Cable Mat Layout Examples

Rectangular Room

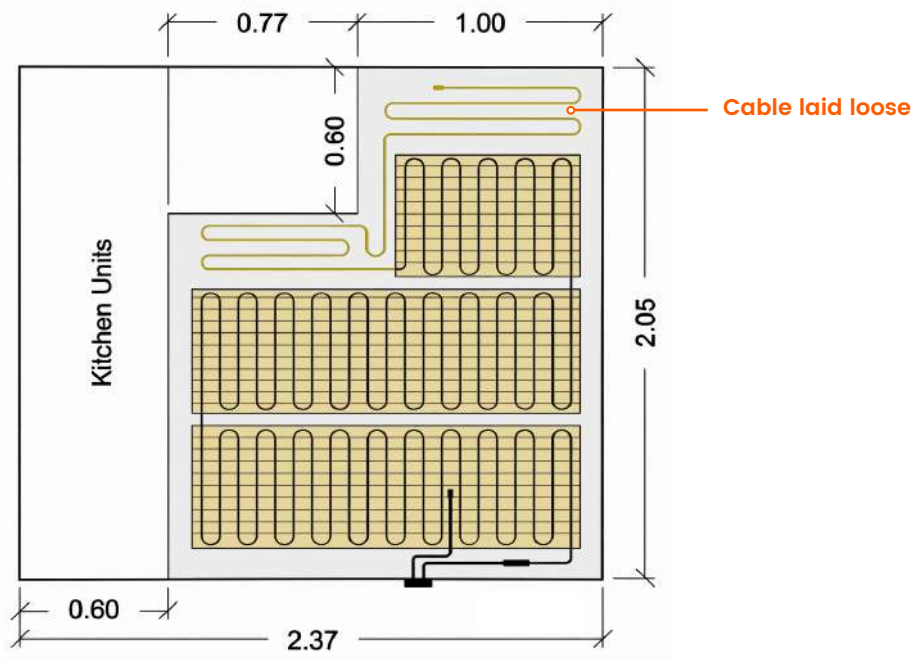
Example: **5m² cable mat (10m total length mat) divided into 5 runs of 2m lengths with a 50mm gap.**



Kitchen

Example: **2.5m² cable mat (5m total length mat) 3 full width runs each laid to maintain a 50mm gap.**

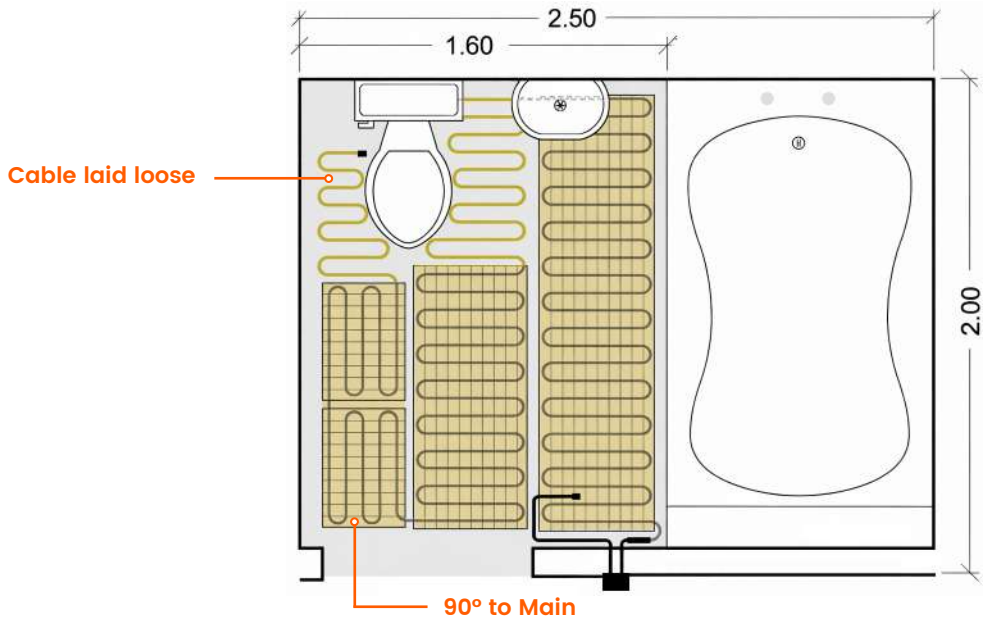
Two of the mat runs are approximately 2.2m long and the third run is 0.9m.
Remainder of the cable is removed from the mesh matting, laid loose and fixed in place with fixing tape.
When run loose, the cable should be spaced, similarly to when it is attached to the matting.



Bathroom

Example: 2.5m² cable mat (5m total length mat) 2 full width runs each laid to maintain a 50mm gap.

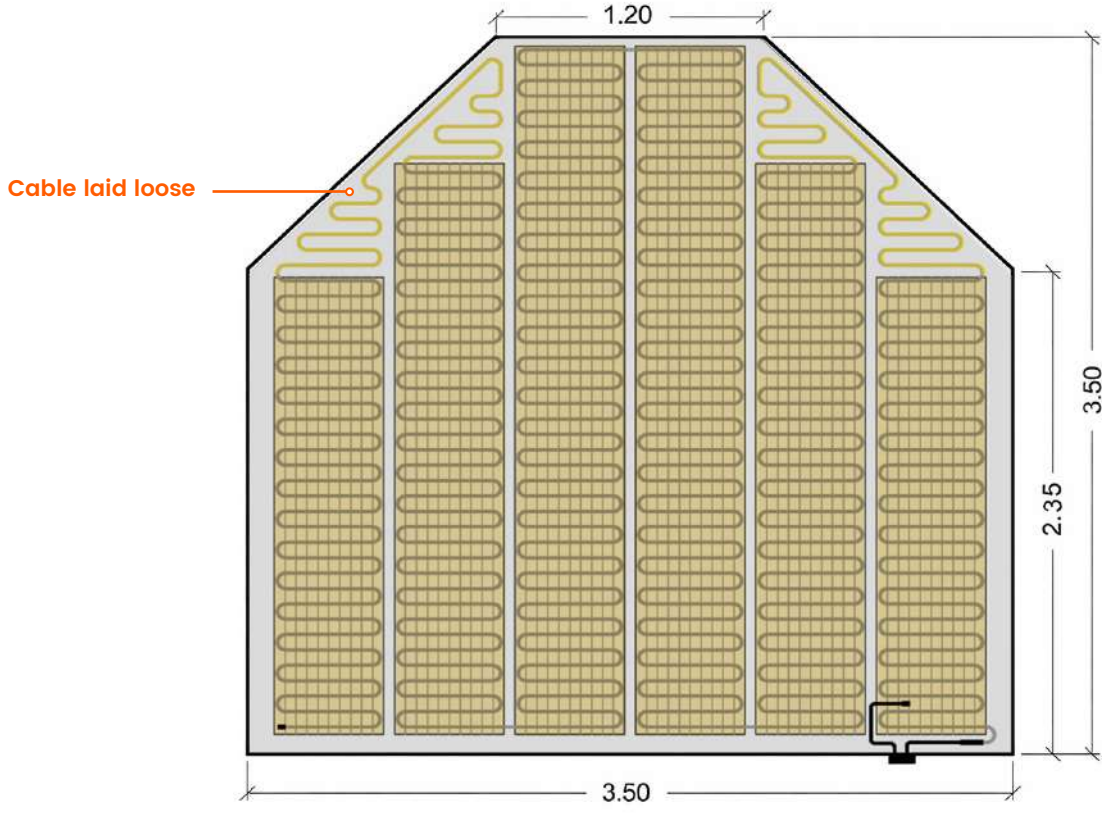
Areas where a full width of mat cannot be laid, the cable is removed from the mesh matting, laid loose and fixed in place with self adhesive cloth tape (duct tape). When run loose, the cable should be spaced, similarly to when it is attached to the matting. Matting can also be laid 90° to main runs.



Conservatory

Example: 9m² cable mat (18m total length mat). 6 full width runs each laid to maintain a 50mm gap.

The angled sides of the room create irregular areas which can be filled by removing the cable from the mesh matting, laid loose and fixed in place with with fixing tape.



Troubleshooting / FAQs

Does it matter which way around the heating cables are connected to the load terminals of the thermostat?

No, There is effectively no live or neutral polarity to the heating element, therefore they can be connected either way around.

What are the silver stranded wires in the cold tail for?

This is the earth braid. The strands need to be twisted together and connected to earth.

When I perform the resistance test on the heating element I cannot get a reading or the reading shows out of range?

Check that the test equipment you are using is on the correct setting and that the tester probes are in contact with the conductors of the heating element. Some professional electrical testing equipment is designed to test low resistance electrical circuits. Electric heating elements have a high resistance, some of the small heating cables with a resistance above 200 Ohms may show as out of range on such equipment. A multi-meter is often the best device to use to check the resistance of the heating cable.

What should be used to house the thermostat?

Recommended depth 35mm, single gang socket box. Can be either surface or flush mounted.

The heating element(s) is too large for the room, can they be cut?

Under no circumstances should the heating element be cut. If you find you have too much heating element, attempt to lose the excess cable in an adjacent area or use the clearance left at the edge of the room, maintaining a minimum of 50mm clearance between cables. Failing this contact us for help.

Can the elements be overlapped?

Under no circumstances should the heating cable/cable mat be overlapped or crossed.

Can the heating system be installed onto a bitumen covered floor?

If there is only a thin residue of bitumen on the existing sub-floor, usually where the bitumen had previously been used to fix vinyl tiles or similar, then you may lay the heating system down. If the bitumen covering has been used as a damp-proof membrane and is several millimetres thick, then this layer must be covered, either with a tile backer board or a levelling compound, before the heating system can be laid.

What type of adhesive and grout should be used?

Any flexible tile adhesive and grout should be suitable. Most products will usually state on the packaging as to whether they are suitable for under floor heating. If you are in any doubt ask the supplier/manufacturer. We do not recommend using ready mixed tile adhesive.

Safety Guidelines

This installation manual has been designed for your safety.

For a successful installation please make sure you have understood the guidelines and adhered to all the instructions.

Flat bottomed furniture **MUST NOT BE** placed over areas where the heating mat/cable is installed as this can restrict airflow to the floor, causing thermal blocking, and in extreme cases may lead to the cable overheating causing a possible fire hazard. This also includes rugs, bean bags, or any item which has a tog value greater than 2.5.

The supplied Commissioning Record **MUST BE** completed, including a floor plan sketch, to indicate heated areas, which must be permanently fixed in or near the distribution/fuse board as required by the 18th Edition BS7671 amendment 3.

DO NOT cover the heating mat/cable areas with:

Mattresses

Bean Bags

Animal Beds

Thick Rugs

Flat Based Furniture

If in doubt...

Talk to an Expert...

01625 466 258

www.theunderfloorheatingcompany.co.uk

Warranty

Our Heating Mats come with a Full Lifetime Warranty.

The warranty does not cover installations made by unauthorized persons or faults caused by incorrect design by others / misuse / damage caused by others / damage in transit / incorrect installation and any other subsequent damage that may occur. Replacement will be fully chargeable if the damage is because of any of the above reasons.

Please visit website for full terms & conditions.
www.theunderfloorheatingcompany.co.uk

the underfloor heating company

Lifetime Warranty / Guarantee - Installation Test Report

Section 1

Company Name:	
Installer Name:	
Address:	
Signed:	
Reg No:	Date:

Client Name:	
Address:	
.....	
City:	
County:	
Postcode:	
	Telephone:

Section 2

	Heating Element(s)						Floor Probe	
	Cable Specification				Before Installation of Floor Covering	After Installation of Floor Covering	Actual Reading Before Fitting (Kilo Ohms)	Actual Reading After Fitting (Kilo Ohms)
	Cable Length or Mat Size (m)	Location	Total Wattage (W)	Labelled Resistance (Ohms)	Cable Resistance (Ohms)	Cable Resistance (Ohms) / Insulation Resistance (Mega Ohms)		
Cable/Mat 1								
Cable/Mat 2								
Cable/Mat 3								

the underfloor heating company

Get in touch...

01625 466 258 Mon-Fri : 9am-5pm

Drop us an email, we'll get straight back to you...
info@theunderfloorheatingcompany.co.uk

www.theunderfloorheatingcompany.co.uk

Excellent ★★★★★ Trustpilot

Oakfield House, Tytherington Business Park, Springwood Way, Macclesfield, Cheshire, SK10 2XA