

Warmup[®]

UNDERFLOOR HEATING MADE **SIMPLE & AFFORDABLE**[™]

Installation Manual: Undertile Heating Loose Wire System



TECHNICAL HELPLINE
0845 345 2288

SAFETY Net[™]
INSTALLATION
GUARANTEE

IMPORTANT

Read this manual before attempting to install your undertile heater. Incorrect installation could damage the heater and will invalidate your warranty.

GET YOUR
**FREE
GIFT**

by filling in your Guarantee
information online at
warmup.com

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Your Warmup® Undertile Heater has been designed so that installation is quick and straight forward, but as with all electrical systems, certain procedures must be strictly followed.

Please check the sizing guide at the back of this manual to ensure that you have the correct heater(s) for the area you wish to heat.

Warmup plc, the manufacturer of the Warmup® Undertile Heating System, accepts no liability, expressed or implied, for any loss or consequential damage suffered as a result of installations which in any way contravene the instructions that follow.

If these instructions are followed you should have no problems. However, if you do require help at any stage, please call our FREE helpline:

Warmup Technical Helpline 0845 345 2288

You can also find a copy of this manual, wiring instructions, a list of frequently asked questions and more helpful information on our website: **www.warmup.co.uk**

Do's and don'ts

- DO** carefully read this installation manual before commencing installation.
- DO** ensure the floor surface is smooth, clean and dry before priming the floor with Warmup® primer.
- DO** ensure good ventilation during application and drying of the primer.
- DO** lay the wires whilst the primer is still “tacky” to ensure the greatest level of adhesion.
- DO** plan the heater layout and installation so that any drilling after tiling (e.g. for fixing sanitary ware) will not damage the wiring.
- DO** maintain a gap between heating wire runs of at least 50mm (2 inches) at all times.
- DO** make sure that ALL heating wire, including joints, are positioned under the tiles in the installation.
- DO** protect the heating wire with cardboard or hardboard between installation and tiling.
- DO** use ceramic tile adhesives and grouts suitable for use with underfloor heating.
- DO** check that the heater is working immediately before commencing tiling.
- DO** take particular care when tiling not to dislodge or damage the heating wire.
- DO** ensure that each tile is solidly bedded in tile adhesive, with no gaps or voids beneath.
- DO** ensure that the heating elements are installed at least 50mm from conductive parts of the building, such as water pipes.

DON'T install the Warmup® Undertile Heating System heater under any floor other than ceramic, quarry or natural stone tiles.

- DON'T** commence installation on a concrete floor that has not been fully dried.
- DON'T** allow traffic over the primed floor or the installed heating wire before tiling.
- DON'T** cut or shorten the heating wire at any time.
- DON'T** allow the heating wires to cross over or touch each other at any point.
- DON'T** store tiles, sharp or heavy objects on any of the wiring whilst tiling.
- DON'T** commence tiling before testing the Warmup® Undertile Heating System.
- DON'T** switch on the installed heating system until tile adhesive has fully dried (7 days minimum).
- DON'T** install the heating wire on stairways or up the walls.
- DON'T** install the mat in temperatures less than +5°C.
- DON'T** bend the heating cable under a 25mm radius.

The heating must be separated from other heat sources such as luminaires and chimneys.

WARNING

During the course of the installation care must be taken to ensure that no damage is caused by, for example, falling objects, sharp objects, walking on the heating element. Once the heating wire has been installed avoid all traffic over the wire until the floor has been tiled and the adhesive has set. Do not install the heating wire until the floor is ready to be tiled. If the floor is not being tiled immediately, all heating wires must be protected with two layers of cardboard or hardboard to prevent damage. Immediately prior to tiling, test the heating wires as specified on page 14 to check it has not been damaged. If you are in any doubt call the Warmup® Undertile Heating helpline on **0845 345 2288**.

Heater information

The heaters consist of a fixed length of heating wire terminated at one end by a sealed joint and the other end by a 3m power supply cable (cold tail).

The cores and earth braid are spliced in a waterproof joint assembly to the supply conductors and the earth conductor of the cold tail.

Heater Model	Wire Colour	kW	Wire Length (m)	Amps Resistive (@230 volts)	Resistance (ohms-cold)
DWS300	BLUE	0.300	22	1.3	176.0
DWS400	SILVER	0.400	34	1.7	136.0
DWS600	GREY	0.600	44	2.6	88.0
DWS800	RED	0.800	64	3.6	64.0

As with all electrical projects which are subject to Part P Building Regulations, all electrical work should be carried out by a certified/qualified electrician. All work must conform to BS 7671:2008 and the current IEE Wiring Regulations.

Making electrical provision for the heater

Install the RCD

The electrician must install a dedicated RCD or use an existing RCD. The electrician may wish to use a combination 'double pole switched' fused-spur/RCD. No more than 4.8kW of heating may be connected to each 30 milliamp RCD. For larger loads, use multiple RCD's.

Note: It is possible to run the heater(s) from an existing circuit. The electrician will be able to determine whether or not the circuit can handle the load and if it is RCD protected.

Install electrical boxes and trunking

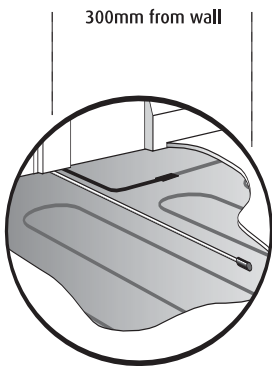
You will require a deep (35mm) back box for the Warmup® Thermostat. If you are installing more than two heaters, a junction box will also be necessary. The wiring to the thermostat should be chased into the wall and protected by conduit or plastic trunking.

Connecting the Warmup® Thermostat

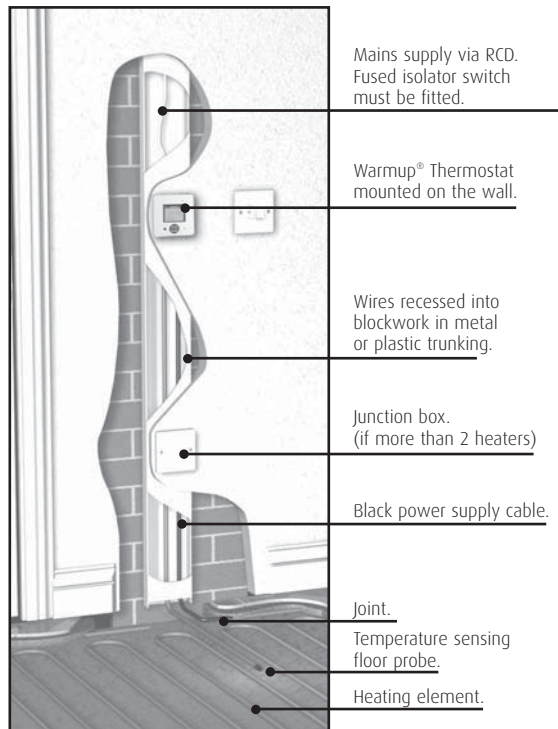
The thermostat should be connected to the main electrical supply via a fuse or circuit breaker, 'double pole isolator' in accordance with the wiring regulations.

The thermostat should be installed within the rooms or area to be heated. In the case of bathroom installations, electrical regulations prohibit the installation of the thermostat within the bathroom itself. In such cases, the thermostat should be fitted to the outside of an internal wall of the bathroom, as close to the undertile heating as possible, for example in an adjacent airing cupboard.

Note: The floor probe wire can be extended up to 50m.



Place probe tip between two runs of heating element. Probe wire must NOT cross any other wire.



Technical notes

To fully utilise the long-term durability of ceramic tiling, whether heated or not, it is important that the design, construction and preparation of the subfloor is carried out correctly.

It is essential that the subfloor be sufficiently rigid to support the ultimate weight that it will have to bear without movement or deflection.

The choice of products for subfloor preparation and tile will vary depending on the existing subfloor, preferred tiling system and choice of tile. This document is only intended to be an outline guide to laying ceramic floor tiles. Further help regarding floor preparation and tile application is available from the tile adhesive manufacturers.

Comprehensive information can be found in the following British Standards with which all installations should comply:

BS 7671: "The IEE Wiring Regulations" (latest edition)

BS 8204: "Concrete bases and screed to receive in-situ flooring" 1987

BS 5385: "Wall and floor tiling" Part3: 1989 and Part 4: 1992

BS 8000: "Workmanship" Section 11.1:1989 and section 11.2:1990

Copies can be obtained from: British Standards Institute, 389 Chiswick High Road, London, W4 4AL Or for a token fee, may be viewed at most Public Libraries. Ensure the most up-to-date versions are seen. Alternatively, you may wish to seek professional advice; e.g. an architect.

Subfloor Preparation

Prior to installation, it is important that the subfloor is properly prepared.

Timber subfloor: boards must be overboarded by a suitable tile-backer board or overboarded with WBP plywood (18mm thickness minimum) screwed down at 200mm centres.

Insulated concrete floor: This must be completely dry (can take 8 weeks), smooth and level.

Subfloor previously covered in vinyl, cork or carpeting: all old flooring and adhesive must be removed.

If bitumen asphalt is present as adhesive residues it must be removed. If the bitumen is a damp proofing layer, it must be covered with a minimum 50mm of sand/cement screed, taking care not to puncture the bitumen coating. The screed must be fully dry (6 weeks) before priming.

If using other damp proofing or tanking systems, contact the manufacturer for advice.

Note: Chipboard, M.D.F. and O.S.B. boards (flake boards) are not suitable bases for ceramic floor tiling.

Preparation of timber or concrete subfloor

Using WBP plywood

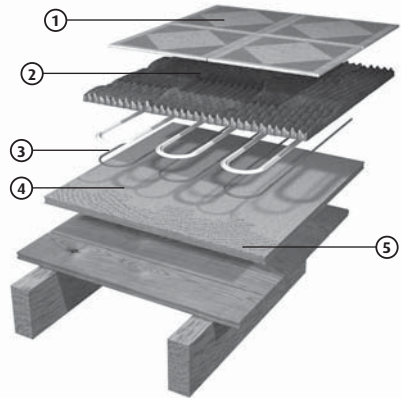
Ensure adequate underfloor ventilation.

Securely fix existing floorboards and if necessary, pre-level with a latex/cement self-levelling compound to give a flush fit for the subsequently applied WBP plywood.

Refer to BS 5385: Part 3, clause 14.4 regarding sealing the backs and edges of the WB plywood before fixing.

Fixing ply directly to the joists will not provide a sufficiently stable floor finish to accept tiles; fitting tongue and groove flooring and then over-boarding with ply or a tile backer board is recommended. A rigid base is essential.

The above recommendations apply to floors of small areas as advised in clause 14.4 of BS 5385: Part 3: 1999.



- ① Tiles
- ② Flexible tile adhesive
- ③ Heating wire
- ④ Primer
- ⑤ 18mm WBP plywood or Warmup® Insulation Board

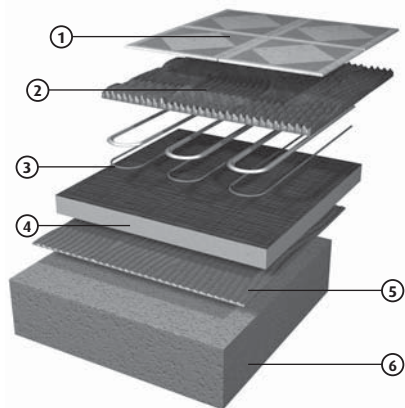
Using insulated tile backer board

Fix the tile backer board as per manufacturer's instructions.

For best results and for ease of installation, Warmup recommends the use of an extruded polystyrene building or insulated tile backer board with a cement-based facing, such as Warmup® Insulation Board.

After attaching the board to the subfloor, the Warmup® Undertile Heating System may be laid directly on top of the tile backer/building board, and then tiled over. It is important to ensure that the tile adhesive and grout used are flexible and that the tile backer/building board has been fitted as per the manufacturer's instructions. High quality, cement-based adhesives with their flexible additives are most suitable.

NOTE: Do not use the green Warmup® primer when installing on insulated tile backer board.



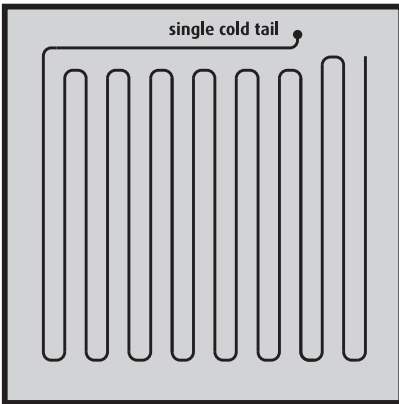
- ① Tiles
- ② Flexible tile adhesive
- ③ Heating wire
- ④ Warmup® Insulation board
- ⑤ Insulation board adhesive
- ⑥ Subfloor (concrete or timber)

Wiring configurations

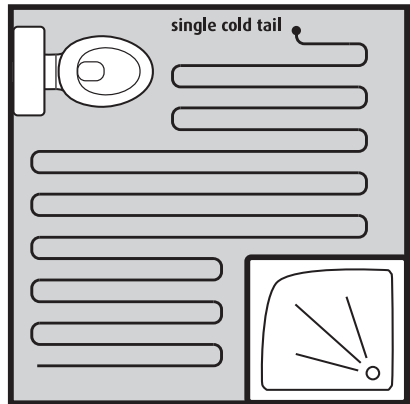
Whilst the installation instructions only make provision for the wiring to be installed in a set configuration, there are many instances where departure from this configuration may be desirable. Below are a few drawings illustrating the versatility of the Warmup® Undertile Heating System.

In each of the examples the floor space is heated using different wire configurations to suit the particular layout of the room. It should be noted that whilst the sizing chart provided in this booklet is a useful guide to heater layout, it may be necessary to slightly alter the heating wire spacing to suit your particular installation. However, at no time should the spacing between the wires be less than 50mm.

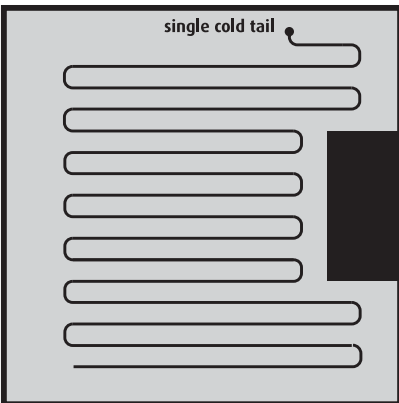
Standard room



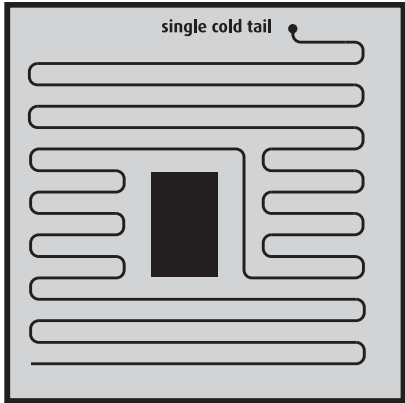
Bathroom



Room with recesses



Room with central obstacle

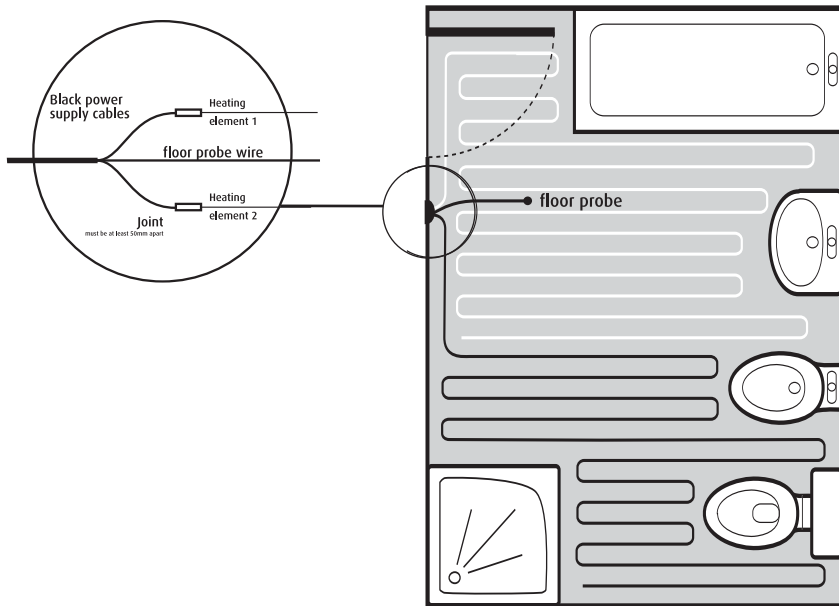


Installing multiple undertile heaters

When installing two or more heaters, begin by reading the sizing guide at the back of this booklet to ensure that you have the proper number and size of heaters for the area you wish to heat. The sizing guide will also tell you the perimeter and heating wire spacing required for your particular room size.

After you have primed the subfloor, mark the subfloor as per the instructions on page 11 and lay the first heater. Do not cover the first heater with tape at this point as you may wish to slightly alter the spacings later on.

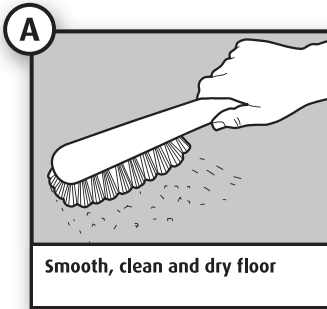
Lay the second heater in the remaining area using the same perimeter and heating wire spacings as the first heater. Please note that all heaters will start in the same area next to the Warmup® Thermostat location.



When laying more than one heater, it is important to keep these points in mind:

- 1** The heating wires may not touch or cross at any point.
- 2** The heaters are joined in parallel only at the Thermostat or in a junction box. Do not attach one heater to another in series.
- 3** The heating wire spacings for all heaters in an area should be approximately equal.

Installation step 1



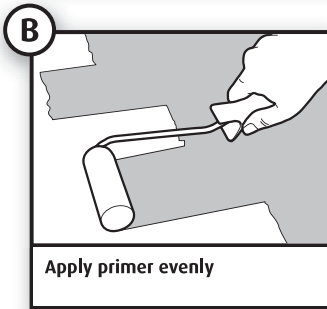
Paint the subfloor with Warmup® primer.

NOTE: It is not necessary to use the primer if you are installing the heaters on an insulated tile backer board.

If the heater is being fitted to a wooden floor, the floor should be boarded over with tile backer board or plywood as specified in the technical notes section.

Before applying the primer ensure that the floor surface is smooth, dry and free from dust or grease.

If necessary, an appropriate smoothing compound should be applied and allowed to cure.

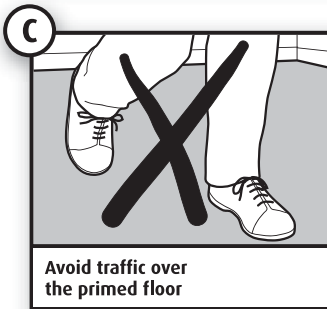


If the heater is being fitted to a solid floor it is essential that the concrete has been allowed to dry before the primer is applied. This can take 8 weeks or more.

If tiling on existing ceramic or quarry floor tiles, clean the floor with an appropriate floor-cleaning compound.

Do not then apply the green Warmup® primer, go to step 2.

Using the roller supplied, apply the primer evenly to the entire surface to be heated.



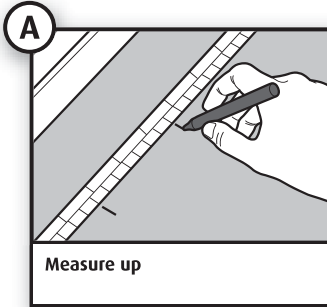
The primer must be allowed to dry for a minimum of 3 hours. The light green colour of the primer will change to a darker green once dry.

Good ventilation must be provided, which along with a higher ambient air temperature, will accelerate the drying process.

Avoid traffic over the subfloor once the primer has been applied.

*If any sort of sealant has been used on the base **DO NOT** use the primer contained in the kit.

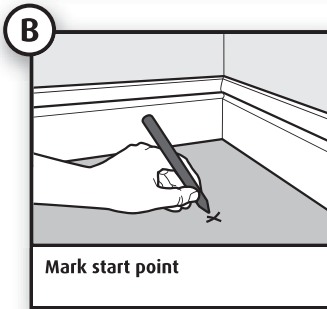
Installation step 2



Mark the heater position on the floor.

Calculate in square metres the size of the area to be heated. Then, using the sizing guide on the back of the manual, read off the wire spacing and perimeter distances to correctly fit your heating wire into the space available.

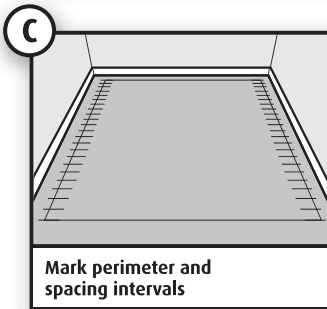
Using a fibre tipped pen, mark a start point as close as possible to the power supply, but no further than 2.5m from it.



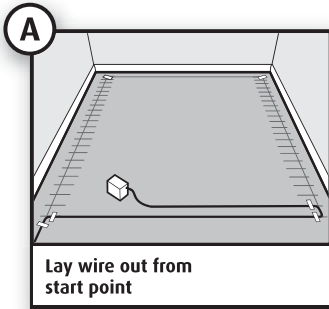
Mark all the outer corners of the heated area observing the perimeter distances previously read off the sizing guide and join the corners up to form a marked out perimeter.

Mark up the spacing intervals for the heating wire following the sizing guide.

The spacing must be a minimum of 50mm and at no time should the heating wire be less than 40mm from the wall.



Installation step 3

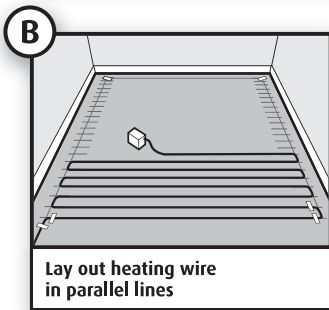


Lay out heating wire and secure with fixing tape.

Once the floor has been marked up, the heating wire can be laid out.

Gently pull the power supply cable from the box. Do not remove the spool from the box as this will cause the heating wire to twist.

After 3 metres of cable have been removed, you will reach the point at which the power supply cable joins the heating wire.



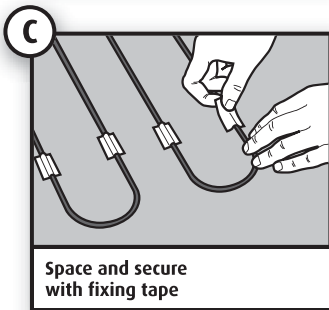
The joint should be taped to the floor at the start point.

The wire should be laid in parallel lines back and forth across the main body of the area to be heated.

Using the wire spacing markings as tape down points, secure the heating wire to the floor with strips of adhesive tape supplied.

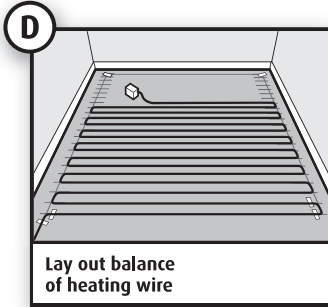
The strips should be about 25mm (1 inch) long.

In order to achieve even coverage of the balance of the area to be heated, you may at this stage need to adjust some of the wire spacing that you previously secured.



You may wish to alter the wire layout to fit your particular room.

Where there are irregularities of room shape you can manually lay out the heating wire, e.g. to provide warmth around the basins, toilets, etc.



This is quite acceptable providing that:

The heating wires are spaced at least 50mm apart at all times.

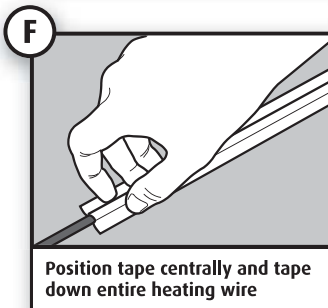
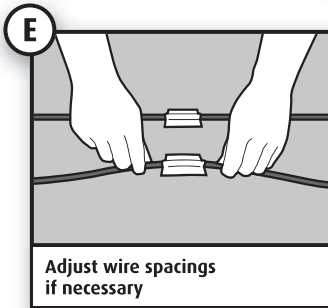
The heating wires never cross.

Once the heating wire layout has been completed, the entire length of the heating wire should be taped to the floor.

Ensure the greatest possible adhesion, with the minimum of trapped air space beneath the taped wire. As you apply the tape, gently tighten the heating wire from the ends to ensure it is straight.

The wire should be located in the centre of the tape to provide maximum protection from the tiler's trowel. If the tape is not completely covering the wire at any point, apply another layer of tape to provide additional protection.

After applying a length of tape, run your forefinger and thumb along the length of the wire, gently squeezing the wire to remove any air space between the wire and the tape.

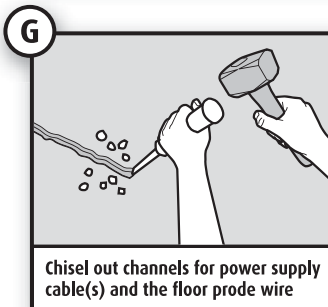


Depending on the requirements of the tiler, it may be necessary to chisel out or "chase" short channels in the subfloor to minimise the increased height presented by the power cable, the end joint and the floor probe wire.

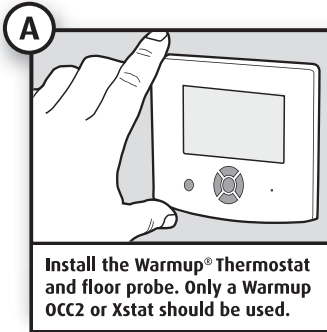
Before chiselling the area, ensure that the heating wire and power supply cable are out of the way. Fit the power supply cable into the channels and secure with fixing tape.

Remove all debris and chippings from the floor. Unless the floor is being tiled immediately, cover the floor with hardboard or cardboard to protect the heating wire.

Note: the main joint and end cap must be covered by adhesive and tile. Do not tape over these joints as air pockets can occur and cause the joint to fail due to overheating.



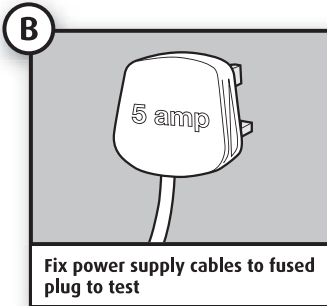
Installation step 4



Install the Warmup® Thermostat and floor probe.

Instructions for the fitting of the Warmup Thermostat can be found inside the thermostat box.

The power cable consists of conductors coloured brown (live), blue (neutral) and green/yellow (earth). These should be connected in accordance with current wiring regulations. For testing purposes, the brown and blue wires should be connected to a multimeter to obtain a resistance reading BEFORE any connections are made to the electrical supply.



Please review the information on page 5 before proceeding.

Install Warmup® Thermostat and floor probe.

Test the heater*

Before tiling, ensure that the heater is working properly.

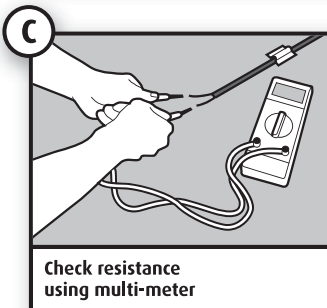
Temporarily wire **each** heater to a 5 amp fused plug via an RCD, in accordance with normal wiring regulations.

Run each heater for approximately 10 minutes to ensure that the element heats up and is warm to the touch.

In larger installations, where more than one heater is fitted, repeat the procedure for each heater.

Do not leave the heater on for more than 30 minutes. Completely disconnect the heater prior to and during tiling.

If possible, during tiling use a multi-meter set to 200 ohms to check the resistance on the heater to ensure that there is a circuit.



At 20 degrees C, the DWS300 heater should read approximately 176 ohms, the DWS400 heater should read approximately 136 ohms, the DWS600 heater should read approximately 88 ohms, and the DWS800 heater should read approximately 64 ohms.

A +/-5% ohm reading tolerance is allowed under manufacturing guidelines.

If the heater is not working call the technical helpline on 0845 345 2288.

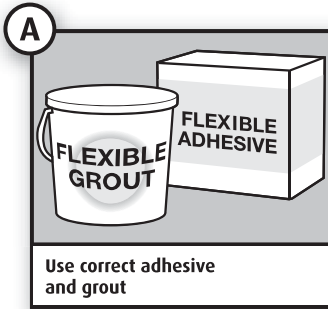
At this stage **DO NOT TILE** if the heater is not working.

***DO NOT** use a continuity tester to test the heaters.

NOTE:

DO NOT WIRE TO MAINS WHILE HEATING ELEMENT IS STILL ON THE REEL.

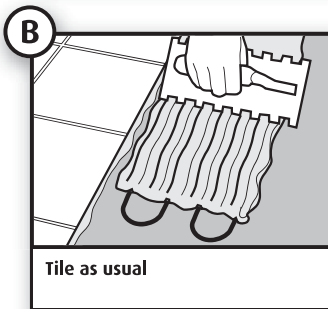
Installation step 5



Tile and grout

The tile adhesive and grout must include an additive for flexibility and be suitable for use with underfloor heating. Refer to the tile adhesive manufacturer's instructions for usage. 2 part flexible adhesive is best.

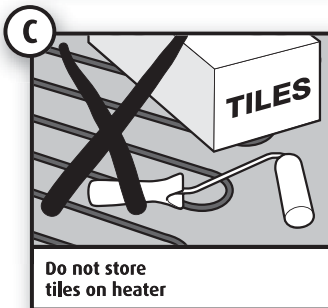
Check that the heating wire is fully taped and secure. Tile as normal, taking care not to damage or dislodge the heating wire with the trowel or with the tiles. If tiling with mosaic slate or similar tiles, it is advisable to cover the heating wire with latex self-levelling compound before tiling.



When using a notched trowel, gently comb the adhesive in straight lines in the same direction as the runs of the heating wire. The trowel should be used at an angle of approximately 45 degrees to the floor. If possible use a plastic trowel.

Do not allow the trowel to make contact with the heating wire whilst applying the adhesive. Use sufficient adhesive to ensure that there are no voids or hollows under the tile.

If a tile has been positioned incorrectly, take great care not to damage the heating wire when lifting.



Remember that tiles must not be lifted once the adhesive is dry, as this will damage the heating wire. Do not store or cut tiles on top of the heating wire. Do not allow chippings or dust to contaminate the floor during tiling.

Care must be taken not to damage the heating wire during the tiling process. Use a piece of carpet or a dustsheet as a "crawl-board" to prevent the heating wire being damaged by your feet or knees during the tiling process.

If possible, check the heater resistance with a multi-meter every half hour or so. If the heater goes open circuit (no reading on the multi-meter) **DO NOT CONTINUE** – call the technical helpline on 0845 345 2288

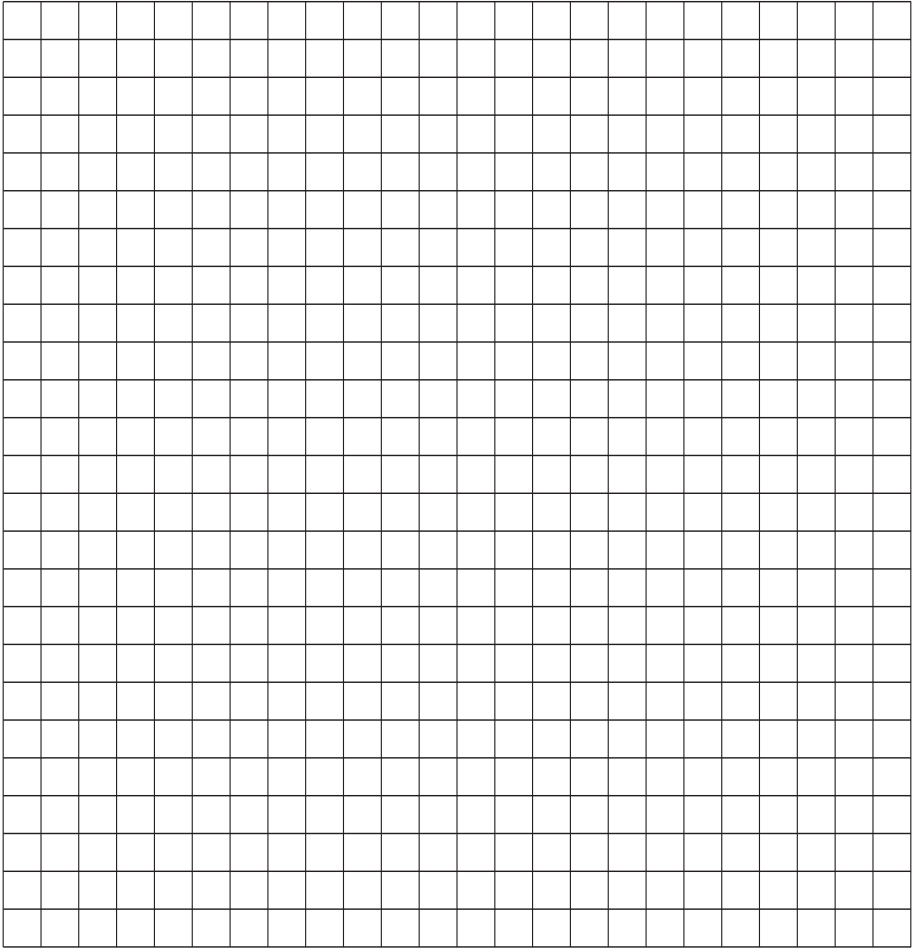
Note:

Installation of an additional earth metallic grid is NOT required, as an earth metallic sheath is already incorporated into the wire design, as per 701.753 of the BS7671:2008 wiring regulations.

Grout the floor as soon as possible as per the ceramic tile adhesive manufacturer's instructions. Do not switch on the heater until the tile adhesive has fully dried. (min. 7 days).

Notes

Note: Draw a plan showing the layout and location of the heating mat(s).



Business Reply
Licence Number
RLSL-HCUB-JXKB



Warmup PLC
702 Tudor Estate
Abbey Road
LONDON
NW10 7UW



Name _____

Address _____

Post code _____

Telephone number _____

E-mail _____

Installer name _____

Date of purchase _____

Batch No. _____

Serial No. _____

Please state which room the heater(s) is installed:

Kitchen

Bathroom

Conservatory

Hall

other _____

I hereby confirm that I have read and understand the contents of the Installation Manual, and that the heater has been installed as specified therein. I acknowledge that no claim can be brought against the manufacturer or its agents for any consequential loss or damage whatsoever. I confirm that the heater was working prior to the commencement of tiling.

Signed _____

Date _____



Terms and conditions apply
Models: DWS heaters and PFM heaters manufactured by Warmup PLC –

THE LIFETIME ELEMENT OF THIS GUARANTEE DOES NOT EXTEND TO THERMOSTATS WHICH ARE COVERED BY SEPARATE GUARANTEES. THIS GUARANTEE DOES NOT AFFECT YOUR STATUTORY RIGHTS.

Warmup® Undertile Heater is guaranteed by WARMUP PLC ("Warmup") to be free from defects in materials and workmanship under normal use and maintenance, and is guaranteed to remain so subject to the limitations and conditions described below:

The UNDERTILE HEATER is guaranteed for the LIFETIME of the floor covering under which it is fitted, except as provided below (and your attention is drawn to the exclusions listed at the end of this guarantee).

This lifetime guarantee applies:

1. only if the unit is registered with Warmup within 30 days after purchase. Registration can be completed by filling out the card accompanying this guarantee or online at www.warmup.co.uk. In the event of a claim, proof of purchase is required, so keep your invoice and receipt – such invoice and receipt should state the exact model that has been purchased; and

2. only if the heater has been earthed and protected by a Residual Current Device (RCD) at all times.

Thermostats are guaranteed for a period of 3 YEAR from the date of purchase, except as provided below.

Neither guarantee continues if the floor covering over the heater(s) is damaged, lifted, replaced, repaired or covered with subsequent layers of flooring.

The guarantee period begins on the date of purchase. Registration is confirmed only when a letter of confirmation is sent by Warmup PLC.

During the period of the guarantee Warmup will arrange for the heater to be repaired or (at its discretion) have parts replaced free of charge. The cost of repair or replacement is your only remedy under this guarantee which does not affect your statutory rights. Such cost does not extend to any cost other than direct cost of repair or replacement by Warmup and does not extend to costs of relaying replacing or repairing any floor covering or floor.

If the heater fails due to damage caused during installation or tiling, this guarantee does not apply. It is therefore important to check that the heater is working (as specified in the installation manual) prior to tiling.

WARMUP PLC SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO EXTRA UTILITY EXPENSES OR DAMAGES TO PROPERTY.

WARMUP PLC is not responsible for:

1. Damage or repairs required as a consequence of faulty installation or application.
2. Damage as a result of floods, fires, winds, lightning, accidents, corrosive atmosphere or other conditions beyond the control of Warmup PLC.
3. Use of components or accessories not compatible with this unit.
4. Products installed outside the United Kingdom.
5. Normal maintenance as described in the installation and operating manual, such as cleaning thermostat.
6. Parts not supplied or designated by Warmup.
7. Damage or repairs required as a result of any improper use, maintenance, operation or servicing.
8. Failure to start due to interruption and/or inadequate electrical service.
9. Any damage caused by frozen or broken water pipes in the event of equipment failure.
10. Changes in the appearance of the product that does not affect its performance.



SafetyNet™ Installation Guidelines:

1. Purchase a Warmup® Undertile Heating Kit, and follow all recommended installation procedures in the Installation Manual. Failure to follow the instructions will invalidate the guarantee.

2. If you make a mistake and damage the new heater before tiling, return the damaged heater, to Warmup within 30 DAYS along with your original dated sales receipt. WARMUP WILL REPLACE ANY PRE-TILED HEATER (MAXIMUM 1 HEATER) WITH ANOTHER HEATER OF THE SAME MAKE AND MODEL – FREE.

3. If you damage the new heater during tiling, contact Warmup immediately to arrange for a site visit. You will need to show our engineer your original dated sales receipt. WARMUP WILL NOT CHARGE YOU FOR THE FIRST SITE VISIT- ON THIS FIRST VISIT THE ENGINEER WILL ATTEMPT TO REPAIR THE DAMAGED HEATER (MAXIMUM 1 VISIT AND 1 HEATER PER RESIDENCE) FOR FREE.

Please note:

(i) Repaired heaters carry a 5 year warranty only. Under no circumstances is Warmup responsible for the repair or replacement of any tiles which may be removed or damaged in order to affect the repair.

(ii) The SafetyNet™ Installation Guarantee does not cover any other type of damage, misuse, or improper installation due to improper adhesive or subfloor conditions. Limit of one free replacement heater per customer or installer.

(iii) Damage to the heater that occurs after tiling, such as lifting a damaged tile once it has set, or subfloor movement causing floor damage, is not covered by the SafetyNet™ Installation Guarantee.

Sizing guide If your area is above 25m² please contact the Warmup Technical Helpline on 0845 345 2288 for assistance

The standard perimeter spacing is 50mm.

However, it may be increased to a maximum of 150mm or decreased to a minimum of 40mm.

Area m ²	Heaters required	Spacing
1.5 - 1.8	DWS300	70
1.9 - 2.4	DWS300	90
2.5 - 2.7	DWS400	70
2.8 - 3.0	DWS400	80
3.1 - 3.4	DWS400	90
3.5 - 3.8	DWS600	70
3.9 - 4.1	DWS600	80
4.2 - 4.4	DWS600	90
4.5 - 5.0	DWS800	70
5.1 - 5.6	DWS800	80
5.7 - 5.9	DWS800	90
6.0 - 6.4	DWS400 + DWS600	80
6.5 - 6.9	DWS400 + DWS600	90
7.0 - 7.7	2 x DWS600	80
7.8 - 8.4	2 x DWS600	90
8.5 - 9.2	DWS600 + DWS800	80
9.3 - 9.9	DWS600 + DWS800	90
10.0 - 11.1	2 x DWS800	80
11.2 - 11.4	2 x DWS800	90
11.5 - 12.2	DWS400 + DWS600 + DWS800	80
12.3 - 12.9	DWS400 + DWS600 + DWS800	90
13.0 - 13.7	2 x DWS800 + DWS400	80
13.8 - 14.4	2 x DWS800 + DWS400	90
14.5 - 15.2	2 x DWS800 + DWS600	80
15.3 - 15.9	2 x DWS800 + DWS600	90
16.0 - 16.7	3 x DWS800	80
16.8 - 17.4	3 x DWS800	90
17.5 - 18.9	2 x DWS800 + DWS600 + DWS400	90
19.0 - 19.7	3 x DWS800 + DWS400	80
19.8 - 20.4	3 x DWS800 + DWS400	90
20.5 - 21.2	3 x DWS800 + DWS600	80
21.3 - 21.9	3 x DWS800 + DWS600	90
22.0 - 22.3	4 x DWS800	80
22.4 - 24.6	4 x DWS800	90
24.7 - 25.0	4 x DWS800	100

NOTE: All spacing has been based on square areas for calculation purposes. Therefore, actual spacing will vary according to the shape of the area to be heated.

