



# Underfloor Heating Mat Installation Manual

Technical Helpline 0845 034 8272  
[www.sunstone.co.uk](http://www.sunstone.co.uk)





## DO'S & DON'TS

### ENSURE CORRECT MEASUREMENTS

Cut mats cannot be returned, so check that you have the correct room dimensions and heater size and quantities before starting on the installation.

### IMPORTANT NOTES

(To avoid damaging your new heating system)

**DO NOT CUT THE HEATING WIRE**

**DO NOT** shorten the heating wire

**DO NOT** overlap the heater with another heater or wire in case of overheating.

**DO NOT** run the sensor wire or power lead over or under the heating wire.

**DO NOT** connect mats in series, only in parallel.

**DO NOT** put built-in units or solid-based furniture on the heated floor areas.

**ALWAYS** test the system before, during and after installation.

**ALWAYS** ensure everyone involved in the installation or construction knows how to keep the system safe from damage.

**ALWAYS** keep an even spacing between heating elements.

### ENSURE YOU HAVE THE NECESSARY TOOLS

- Thermostat with floor sensor
- RCD: required as part of all installations
- Multi-meter: for testing the resistance of mats
- Electrical trunking/conduit for housing the unheated power leads
- Electrical housing, back boxes & junction boxes; back box for the thermostat must be at least 35mm deep
- Permanent marker & measuring tape
- Pair of small utility scissors for cutting the fibreglass mesh
- Tape (to secure floor sensor and loose wire)

### DO

- ✓ plan the heater layout and installation so that any drilling after tiling (e.g. for fixing sanitary ware) will not damage the wiring.
- ✓ use ceramic tile adhesives and grouts suitable for use with undertile heating (they must contain a flexible additive)
- ✓ wait at least 10 days before switching the system on for the first time in order for the tile adhesive to dry.
- ✓ ensure that the heating element including joints are completely embedded within adhesive.

### DON'T

- ✗ ever cut or shorten the heating wire at any time
- ✗ allow traffic over an installed mat. This is when damage is most likely to occur.
- ✗ store tiles or other sharp or heavy objects on the mats while tiling.
- ✗ attempt to install the heating up walls or up a set of stairs.
- ✗ install heating mats under permanent fixtures.



## BEFORE INSTALLATION

### Choice of floor covering

The SunStone system has been designed primarily for use with stone or tile floors. If you are considering using any other type of floor covering, such as carpet or wood laminate, please contact our customer services helpline for more information before starting your installation.

### Electrical Installation: a job for the professionals

As with all electrical projects governed by Part P regulations, all mains electrical connections must be undertaken by a certified electrician. All work must conform to BS 7671:2008, the current IEE Wiring Regulations.

### Installing an RCD

The SunStone undertile heating system must be wired via an RCD. You must install a dedicated RCD if one is not already present. You may wish to use a fused spur/RCD. No more than 4.8kW of heating may be connected to a single 30 milliamp RCD.

NOTE: It is possible to run the heater(s) from an existing circuit. Consult with an electrician to determine whether or not the circuit can handle the load and if it is RCD protected.

### Testing of the Heater

One of the most important steps to be taken when installing the heating system is the testing process.

The system should be tested before, during and after its installation:

**Before:** Using a multi-meter, check the resistance of each mat prior to installation to ensure that it has not been damaged whilst in transit to the installation site. Make a note of the mat resistances in the table located on page 6 of this manual.

**During:** Test the resistance of each mat again once they have been secured to the subfloor to maintain that no damage occurred during installation.

**After:** Test again after the floor covering has been laid to ensure that no damage has been done during the setting of the tiles.

### IMPORTANT!

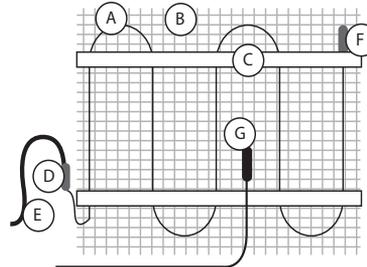
If at any point during the installation you are unsure  
of your next step,  
please call the helpline on 0845 034 8272.



## TECHNICAL INFORMATION

### The SunStone Heating Mat

- A - Heating Element
- B - Fibreglass mesh
- C - Double-sided tape
- D - Factory-made joint
- E - Power lead (3-core)
- F - Termination joint
- G - Floor sensor (included with thermostat)



#### Floor Sensor:

**For the thermostat and heating system to work properly, installation must be correct.** Before embedding in adhesive, position the sensor at least 150mm into the heated area, exactly between two runs of heating element. Keep the sensor tip away from drafts, sunlight, radiators, hot water pipes or other sources of heat fluctuations.

## SYSTEM COMPONENTS

### The Heating Element

The heating element is constructed of PVC insulation and a metallic earth braid surrounding two heating wires. The element is attached to the fibreglass mesh (B) using a double-sided (C) and is spaced so as to give an even heat throughout the covered area. The heating element is terminated at one end with a 3m power lead (E) which supplies power to the element via the thermostat. The factory made joint (D) which connects the two must be installed under the tiles. It may be necessary to cut a small groove in the subfloor to allow for the extra thickness of the power lead.

### Separating the Heating Element from the Fibreglass Mesh

In almost all installations, it will be necessary to separate the heating element from the mesh in order to fit the mat into an irregularly shaped area.

This is most easily done using a small pair of scissors, not a utility knife. When cutting the mesh, it is crucial that the element is not nicked, cut or damaged in any way. If you believe you have cut the wire, call the helpline immediately.

### Floor sensor

Proper installation of the floor sensor (G) is critical if the thermostat and floor warming system is to work properly.

The sensor, which is embedded in the adhesive, should be installed centrally between two runs of heating element and should extend a minimum of 150mm into the heated area. It is best to avoid placing the tip of the sensor in areas prone to heat fluctuations due to drafts, sunlight, radiators or hot water pipes. You may wish to cut a groove in the floor to accept the sensor cable and tip in order to keep them at the same height as the heating element.



## TECHNICAL INFORMATION CONT'D

### 150W/m<sup>2</sup> Undertile Heater

Model	Dimensions	Area Covered	Wattage @ 230Vac	Amperage @ 230Vac
SSMat 1.0	0.5 x 2.0m	1.0sqm	150 W	0.7 A
SSMat 1.5	0.5 x 3.0m	1.5sqm	225 W	1.0 A
SSMat 2.0	0.5 x 4.0m	2.0sqm	300 W	1.3 A
SSMat 2.5	0.5 x 5.0m	2.5sqm	375 W	1.6 A
SSMat 3.0	0.5 x 6.0m	3.0sqm	450 W	2.0 A
SSMat 3.5	0.5 x 7.0m	3.5sqm	525 W	2.3 A
SSMat 4.0	0.5 x 8.0m	4.0sqm	600 W	2.6 A
SSMat 4.5	0.5 x 9.0m	4.5sqm	675 W	2.9 A
SSMat 5.0	0.5 x 10.0m	5.0sqm	750 W	3.3 A
SSMat 6.0	0.5 x 12.0m	6.0sqm	900 W	3.9 A
SSMat 7.0	0.5 x 14.0m	7.0sqm	1050 W	4.6 A
SSMat 8.0	0.5 x 16.0m	8.0sqm	1200 W	5.2 A
SSMat 9.0	0.5 x 18.0m	9.0sqm	1350 W	5.9 A
SSMat 10.0	0.5 x 20.0m	10.0sqm	1500 W	6.5 A
SSMat 12.0	0.5 x 24.0m	12.0sqm	1800 W	7.8 A
SSMat 15.0	0.5 x 30.0m	15.0sqm	2250 W	9.8 A

### 200W/m<sup>2</sup> Undertile Heater

Model	Dimensions	Area Covered	Wattage @ 230Vac	Amperage @ 230Vac
2-SSMat 1.0	0.5 x 2.0m	1.0sqm	200 W	0.9 A
2-SSMat 1.5	0.5 x 3.0m	1.5sqm	300 W	1.3 A
2-SSMat 2.0	0.5 x 4.0m	2.0sqm	400 W	1.7 A
2-SSMat 2.5	0.5 x 5.0m	2.5sqm	500 W	2.2 A
2-SSMat 3.0	0.5 x 6.0m	3.0sqm	600 W	2.6 A
2-SSMat 3.5	0.5 x 7.0m	3.5sqm	700 W	3.0 A
2-SSMat 4.0	0.5 x 8.0m	4.0sqm	800 W	3.5 A
2-SSMat 4.5	0.5 x 9.0m	4.5sqm	900 W	3.9 A
2-SSMat 5.0	0.5 x 10.0m	5.0sqm	1000 W	4.3 A
2-SSMat 6.0	0.5 x 12.0m	6.0sqm	1200 W	5.2 A
2-SSMat 7.0	0.5 x 14.0m	7.0sqm	1400 W	6.1 A
2-SSMat 8.0	0.5 x 16.0m	8.0sqm	1600 W	7.0 A
2-SSMat 9.0	0.5 x 18.0m	9.0sqm	1800 W	7.8 A
2-SSMat 10.0	0.5 x 20.0m	10.0sqm	2000 W	8.7 A
2-SSMat 15.0	0.5 x 30.0m	15.0sqm	3000 W	13.0 A





## TESTING YOUR HEATING SYSTEM

We recommend that you test your heating system at least three times during the installation process to ensure that you do not install a damaged heating mat:

- before installation
- during the mat fixing process
- immediately prior to tiling

### Testing with a multi-meter:

The resistance (ohms) of each mat should be measured from the live (brown) wire to the neutral (blue) wire. We recommend the use of a digital multi-meter set to a range of 0-20k ohms for testing.

Please note that due to the high resistance of the wire, it may not be possible to get a continuity reading from a mat and as such, continuity testers are not recommended. Take a moment to note the readings you get from the multi-meter in the table below. The readings should be +/- 5% of these measurements. Also test for resistance between Earth and Live/Neutral. The result of this test should be negative. If you get a reading, then the heater is damaged and must be replaced. Call the technical helpline on 0845 034 8272.

150W/m <sup>2</sup> Undertile Heater	
1 sqm mat	352.7 ohms
1.5 sqm mat	235.1 ohms
2 sqm mat	176.3 ohms
2.5 sqm mat	141.1 ohms
3 sqm mat	117.6 ohms
3.5 sqm mat	100.8 ohms
4 sqm mat	88.2 ohms
4.5 sqm mat	78.4 ohms
5 sqm mat	70.5 ohms
6 sqm mat	58.8 ohms
7 sqm mat	50.4 ohms
8 sqm mat	44.1 ohms
9 sqm mat	39.2 ohms
10 sqm mat	35.3 ohms
12 sqm mat	29.4 ohms
15 sqm mat	23.5 ohms

200W/m <sup>2</sup> Undertile Heater	
1 sqm mat	264.5 ohms
1.5 sqm mat	176.3 ohms
2 sqm mat	132.3 ohms
2.5 sqm mat	105.8 ohms
3 sqm mat	88.2 ohms
3.5 sqm mat	75.6 ohms
4 sqm mat	66.1 ohms
4.5 sqm mat	58.8 ohms
5 sqm mat	52.9 ohms
6 sqm mat	44.1 ohms
7 sqm mat	37.8 ohms
8 sqm mat	33.1 ohms
9 sqm mat	29.4 ohms
10 sqm mat	26.5 ohms
15 sqm mat	17.6 ohms

If at any time you do not get the proper readings or suspect that there is a problem, call the helpline immediately on 0845 034 8272.

Mat no.	Mat Size	"Proper" Reading	Test 1 Reading	Test 2 Reading	Test 3 Reading





## ELECTRICAL CONSIDERATIONS

### Install the RCD

You must install a dedicated RCD if one is not already present. You may wish to use a fused spur/RCD. No more than 4.8kW of heating may be connected to a single 30 milliamp RCD.

**NOTE:** It is possible to run the heater(s) from an existing circuit. Consult with an electrician to determine whether or not the circuit can handle the load and if it is RCD protected.

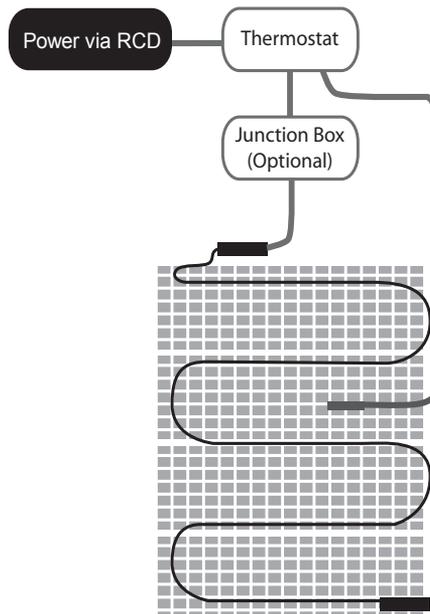
### Install electrical boxes and trunking

You will require a deep (35-40mm) back box for the thermostat. If you are installing more than two heaters, a junction box will also be required. The wiring from the heater to the thermostat should be chased into the wall and protected by conduit or plastic trunking.

### Connecting the thermostat

The thermostat should be connected to the main electrical supply via a fuse or circuit breaker in accordance with wiring regulations. The thermostat should be installed within the room or area to be heated. In the case of bathroom installations where electrical regulations may prohibit the installation of the thermostat within the bathroom itself, the thermostat should be fitted to the outside of an internal wall of the bathroom, as close as possible to the heating power supply wires.

### Wiring Overview





## GETTING THE SUBFLOOR READY

### Wooden Subfloors

Make sure that there is enough underfloor ventilation.

Secure existing floorboards and if need be, make them even first with a latex/cement self-levelling compound to give a flush fit for the subsequently applied WBP plywood or tile backer board.

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

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

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

### Concrete Subfloors

For best results and ease of installation, the use of a "tile backer board" with cement-based facing, such as the Sunstone Insulation Board, is recommended. Fixing of the board should be as per the manufacturer's instructions.

After attaching the board to the subfloor, the undertile heating system may be laid directly on top of the 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.

If uncoated insulation boards have been specified, a thin layer of latex screed must be used to cover the boards. The use of a self-levelling layer (minimum 8mm) over the board will help to reduce the risk of lagging and overheating.

## INSTALLING THE MAT

### 1. Make Indications on the Subfloor

Use a permanent marker to mark out the areas on the subfloor where units and fixtures will be located. Do not install the heating mat in any of these areas.

Next, mark the positions and planned route of the power lead cables as well as the position of the floor sensor. Indicate on the subfloor the locations where the mats will need to be flipped or turned or where loose wire (detached from mesh) will need to be laid.

Please refer to page 10 to see how mats can be modified to for various areas.

### 2 Make References on the Mat

Mark the location of any cuts, flips or turns on the mat itself. Double-check once more that you have the proper number and size of mats for your area.

### 3. Test the heating Mats

Perform a resistance test as shown on page 6 for each mat(s).

### 4. Trial fit the mat(s)

Laying the mats out according to your plan. At this stage, it is still possible to make any last minute adjustments in the mat layout before securing them. Take care not to step on or kink the mat as this could fracture the wire and damage it.

### 5. Fit the Mats

Beginning with the mat furthest from the thermostat location, secure the mats to the subfloor using the double-sided tape on the mat.

Any loose wires (wire cut away from mesh) should be no closer than 50mm from each other or from any other wires still attached to the mesh.

Once the mats are in place, check that there are no loose sections, paying close attention to the ends of the mats and any section which has been modified by flipping or turning.



## ELECTRICAL CONSIDERATIONS

### 6. Install Floor Sensor

The floor sensor that comes with the thermostat should now be placed below the fibreglass mesh, centred between 2 heating elements. It should be secured in place using the double-sided tape. It is also wise at this point to check the resistance of the floor sensor using your multi-meter. You should get a reading of approximately 10,000 - 12,000 ohms, depending on the room temperature. You may need to change the setting on your meter in order to accommodate the higher readings. If you do not get a reading, your sensor may be damaged. If so, call the helpline to obtain a replacement.

NOTE: Do not cover the tip of the sensor with tape. Air pockets may result in incorrect temperature reading.

### 7. Fit the Power Leads

Each mat is fitted with a single power lead for connecting the heating mat to the thermostat. In order to keep the power leads at the same height as the heating element, you may wish to cut or chisel a channel in the subfloor. Take care not to damage the heating element. Secure the leads in place using tape.

The power leads will go into the conduit or trunking that leads from the floor to the thermostat. The power leads may be shortened or extended as needed. However, you must not cut the factory made joint and you must make certain that the joint will be covered with both adhesive and tiles.

### 8. Test the Heating Mats

Perform another resistance test on the mat(s) as shown on page 6.

NOTE: Ensure that all of the heating element including the joints are covered in adhesive and tiled over. Do not tape over the joints as this will create air pockets that can cause the heater to fail.

## LAYING TILES OVER THE HEATING MAT

When all your mats are installed and the power leads and floor sensor have been secured, it is time to begin laying your tiles.

### Single-step method:

Apply a thick layer (5-10mm) of tile adhesive directly onto the heating mats.  
Lay the tiles directly onto the adhesive layer.

### Dual-step method

1. Completely cover the heating mats with a smooth layer of flexible adhesive or latex self-levelling compound and allow to dry. Allow this level to dry; it will normally take 1 day per mm.
2. Apply a thin layer (3mm) of flexible adhesive and tile as normal.

### Tips for choosing a method:

- It is easier to lay mosaic tiles using the dual-step method
- If this is your first installation, you may find it easier using the dual-step method
- If the floor will not be tiled straight away, it is better to use the dual-step method for protecting the wire
- The single-step method is more typically used by experienced installers of this heating system

### Test the heating mats

Perform a final resistance test on the mat(s) as shown on page 6.

### Waiting Period

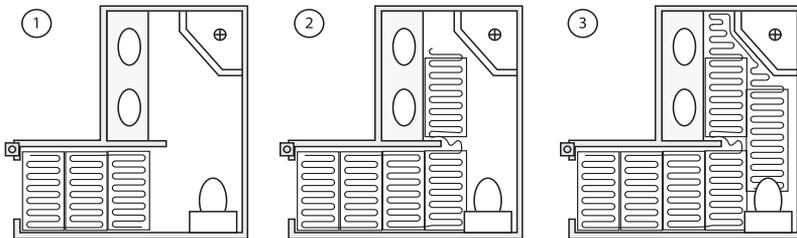
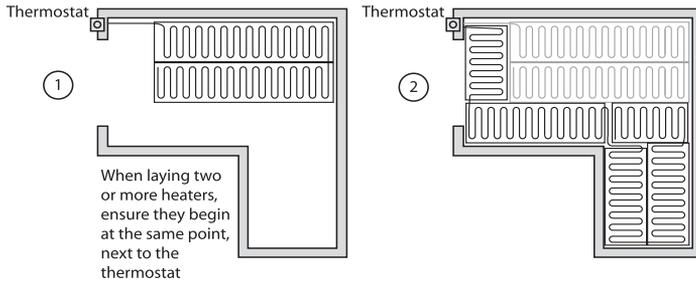
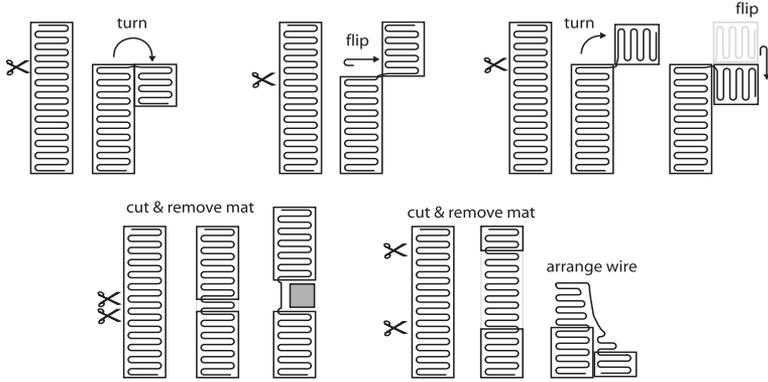
You must allow the tile adhesive and any self-levelling used to set before powering-up the system. This can take 10 to 14 days depending on the amount of material used. Failure to wait the proper amount of time will result in damage to the system as well as cause the adhesive and grout to dry too quickly, thereby becoming brittle, leading to tiles lifting and/or cracking.



# HOW TO TURN & FLIP YOUR MATTING SYSTEM

The heating mats can be modified by cutting the fiberglass mesh (NOT THE WIRE) and either flipping or turning the mat as needed. Examples of turns and flips can be found below. It may not be necessary to completely remove the heating wire from the mesh in order to fit the system into small or odd-shaped areas. It is essential that care is taken during this process not to nick the wires with your scissors.

## Examples of mat modifications & room layouts:





## WARRANTY

This SunStone undertile heater is backed up by Warmup's team of engineers and is guaranteed against any fault caused by manufacturing defect for a period of 10 years from date of purchase. There is no other warranty, express or implied. No claim can be brought against the manufacturer or its agents for any consequential damages whatsoever. This warranty covers the cost of replacement or repair of the SunStone undertile heater only, subject to the discretion of the manufacturer.

This is the sole warranty, express or implied. The manufacturer or its agents cannot be held liable for any resultant damages. Send the completed form back to: SunStone Warranty, BCR House, 3 Bredbury Business Park, Stockport, SK62SN

Proof of purchase is needed in the event of a claim, so keep your invoice with this warranty

**This warranty is subject to the following conditions:**

1. To qualify for your 10-year warranty, please register your product by completing and returning the attached "Warranty Registration" form.
2. In the event of a claim, proof of purchase will be required, so keep your warranty with the installation manual.
3. The heater has been installed and used in full compliance with the installation manual.
4. The heater has been earthed and protected by the RCD at all times.
5. The heater is used in conjunction with a thermostat or control system approved by SunStone.
6. The warranty is returned to SunStone within 1 month of purchase of the heater(s).
7. If SunStone or its agents carry out diagnostic or remedial work as a result of a claim being made, and evidence of incorrect installation or usage of the heater becomes apparent, SunStone or its agents shall have the right to levy reasonable charges for the work undertaken by them.



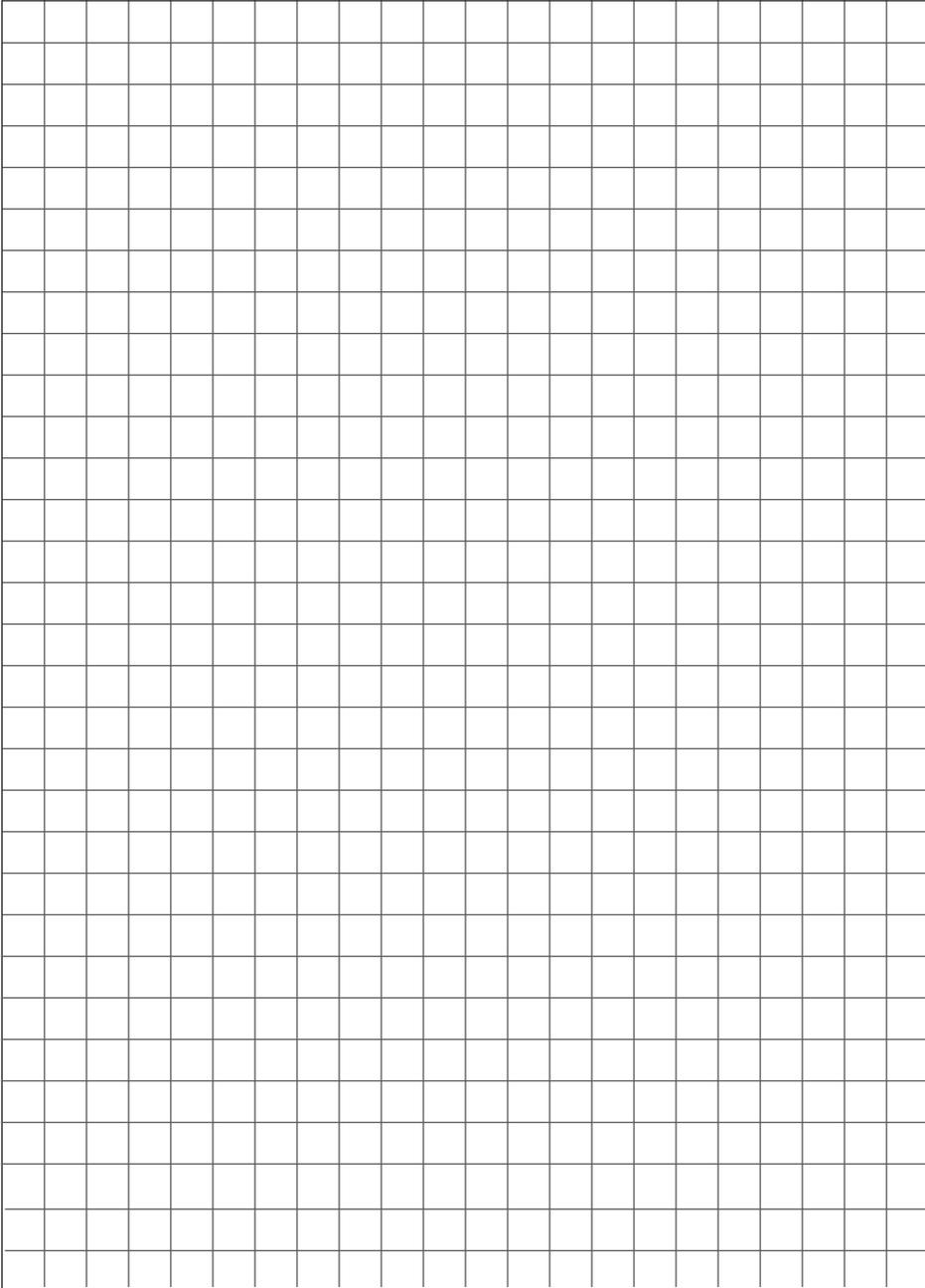
**This warranty does not cover heater failure due to incorrect installation or tiling. Please check that the heater is working (as laid out in the installation manual) prior to tiling.**

Name	
Address	
Postcode	Telephone
Email	
Installer	Electrician
Date of purchase	
Room the heating system is installed: _____	
Subfloor type (Concrete/Wood/Tile Backer Boards etc): _____	
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: _____





# MAT LAYOUT GRID





# PROJECT SUMMARY

**Place this card in a visible spot close to the consumer unit.**

**Please Note:**

1. A 30mA RCD must be used in conjunction with the heating system.
2. Never cut or shorten the heating element
3. Ensure all parts of the heating element (including joints) are installed beneath the tiles.
4. For the guarantee to be valid, this form must be completed.
5. Check that the values match the ones in the instruction manual.
6. Draw a plan showing the layout of the heater

**Warning!**

- Risk of electric shock
- Electric wiring and heating panels contained below the floor.
- Do not penetrate with nails, screws, or similar devices.
- Do not restrict the thermal emission of the heated floor.

Heater Location

<p><u>Resistance Value</u></p> <p><b>Before Installation:</b> _____ ohms</p> <p><b>After Installation:</b> _____ ohms</p>	<p><u>Attach label with heater description here</u></p>          
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\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Electrician's Part P registration no.

\_\_\_\_\_  
Company stamp/name







**SunStone Underfloor Heating**  
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