

## INSTALLATION MANUAL

# eFoil



Intertek



Before you begin installing, read through these instructions carefully and check that you have all the components required.

01473 276677

[www.elementsunderfloorheating.co.uk](http://www.elementsunderfloorheating.co.uk)

# Introduction

## Important notes, please read carefully before proceeding with installation

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### The elements brand

Thank you for choosing the eFoil heating mat from the elements range of electric underfloor heating solutions.

The elements range has been manufactured to surpass all current industry standards and comes with a lifetime warranty.

### eFoil

eFoil is an ultra-thin electric radiant floor heating system primarily for use under laminate, engineered wood and glued hardwood.

The advantages of using eFoil heating mats are:

- ease of installation
- uniform heating of your laminate flooring: the specialised materials used eliminates problems due to hotspots or localised heating.
- Independently S Mark approved by Semko: visible proof of the safety of our product.

### Tools needed for installation

You will require the following items to install and test the eFoil system.

- Stanley knife or similar sharp blade, plus a pair of scissors
- Electrical housing boxes 35mm deep (minimum)
- Tape measure
- Insulation boards (underlay)
- Aluminium tape
- Resistance tester (multimeter), insulation resistance tester

You will also need the appropriate tools and materials to install your finished floor surface; these will probably include products such as self-levelling compound, insulated backer board, notched tile trowel and various other tools and materials for your specific project.

If you are using more than two cables, a junction box is recommended.

### Contents of eFoil heating

- eFoil heating mat
- Sensor tube
- Installation instructions
- Warranty

### Important Information

The eFoil heating mat is designed for installation directly under wood laminate, on top of an underlay such as insulation boards.

The minimum thickness of any covering material must be 5mm in accordance with IEC 60335-2-96 7.12.1 g.

Contact the manufacturer of your wooden/laminate floor if you are unsure about the suitability of eFoil with their product.

eFoil heating mats are not designed for installation under ceramic tiles, natural stone or similar hard floor covering, and must not be installed under nailed hardwood flooring – other products are available to heat these types of floor. For more information contact us on [sales@elementunderfloorheating.co.uk](mailto:sales@elementunderfloorheating.co.uk).

We want your installation to be trouble-free – **If you have any problems, please contact us on 01473 276677**

### Do's & Don'ts

#### Do

Carefully read this instruction manual before starting your installation and **follow the testing procedure on page 8**.

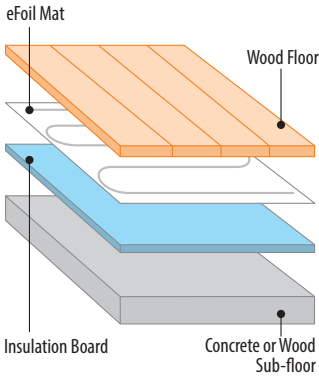
- Take time to plan your mat layout considering all obstacles e.g. kitchen cupboards, bathroom sinks etc.
- Ensure the mat will fit before laying. If the mat is too large, you must exchange it for a smaller mat size.

#### Don't

- Don't cut or shorten the foil heating cable.
- Don't cross or touch the foil heating cables together.
- Don't switch on the foil heating mat while it is rolled up or still on the drum.
- Don't fold or crease the mats at any time, always roll the mat.
- Don't install near other heat sources such as luminaries & chimneys.
- Don't install under cabinets or other fittings or furniture – including bean bags, rugs or mats – that will be permanently standing on the floor.
- Don't install eFoil below 0°C ambient temperature.
- Don't install in thin set cement, or in direct contact with a cement or concrete subfloor or slab. There must always be an underlay (insulation board) under the eFoil.
- Don't install on irregular surfaces.
- eFoil mats must not be installed on top of other in-floor radiant heating systems (for example hydronic or in-cement systems) unless the other system is permanently disconnected.

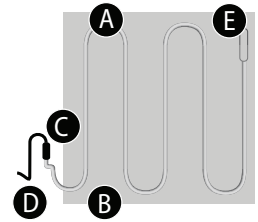
# Construction of the eFoil heating mat

Intertek Semko certified as per EN 60335-2-96 and GOST



The eFoil system is made with Fluoropolymer insulated heating cables which are sandwiched between two layers of specially reinforced aluminium foil. The uniform spacing of the heating elements, further backed by the aluminium foil, ensures even heat distribution. The heating element is connected to a power-supply cable which exits the laminate mat from one corner.

The power lead is a flat thin two core flexible cord, consisting of two insulated conductors with a metal sheath/solid earth cable and an outer sheath.



- A Heating element
- B Aluminium foil
- C Factory made cold tail joint
- D Cold tail power lead
- E End termination joint

## Electrical Requirements

Always consult an electrician regarding your requirements

Please follow these instructions carefully.  
If you require assistance prior to or during your installation, please call our helpline on 01473 276677

### ⚡ Important Notes

When designing your electrical installation, you should always consult an electrician regarding your requirements. Before installing the eFoil system you should make allowance for the electrical connections.

For safety reasons a fused spur which has a contact separation in all poles, providing full disconnection under overvoltage category III conditions, must be used.

The eFoil system requires a mains voltage 230V. Due to Part P regulations, only a qualified electrician can make the final connections to the electrical supply and test the installation.

For all areas up to 20m<sup>2</sup> power connection can be provided through a 13A switched fuse spur outlet/combined RCD spur outlet. For areas larger than 20m<sup>2</sup>, a dedicated circuit should be installed from the local consumer unit.

### List of accessories required in addition to the foil heating mat:

- Floor sensing programmable thermostat (*see below*)
- Main switch
- Residual current device (RCD)

#### Note:

Details of the thermostat installation will be available in the installation manual provided with the thermostat.

#### Controls

- Thermostat: OJ Electronics OCC2

eFoil mats should be connected to the electrical system through a Ground Fault Circuit Interrupter (GFCI)/Residual Current Device (RCD), equivalent to having a rated residual operating current not exceeding 30mA, only by a qualified electrician. If possible, incorporate a dedicated GFCI in each circuit supplying power to your mats. This is critical to the safe operation of your eFoil mat.



This symbol means **Direct Floor Heating**

# Pre-Installation Instructions

Ensure the sub floor is structurally sound, clean and dry



Ensure your eFoil is the correct size before you unpack the product.  
Call 01473 276677 if you have any questions.

## ⚡ Important Notes

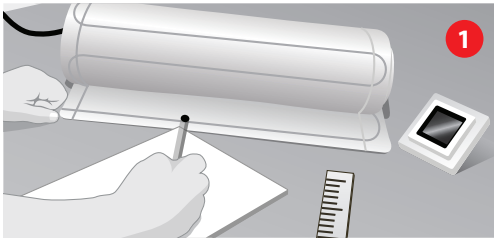
Keep an accurate record of where the mats are installed to assist you for future reference, (eg, during renovation work).

**Part P wiring regulations state that a diagram must be placed next to your fuseboard showing where underfloor heating is installed.**

## Step 1: Plan your mat layout

Draw a layout of your room including all obstacles e.g. toilet, sink etc, (use the floor plan grid on page 10) then determine the required floor area to be heated.

Decide on a suitable position for the thermostat (start point) then sketch the proposed eFoil layout to ensure the heated area is completely covered whilst using all of your mat (see mat planner notes on page 7).



## Step 2: Prepare electrical & clean the floor

Carry out any electrical prep work needed for the install: chase walls, and install back boxes for fused spurs and thermostat position.

Make sure the sub-floor is clean and dry. It is crucial that there are no sharp objects protruding from or left on the floor that could damage/pierce the eFoil mat.

Nails, screws or staples must not be installed close to the mats or power cables. Permanent fixtures, including built-in furniture, must **never** be placed over the mats.

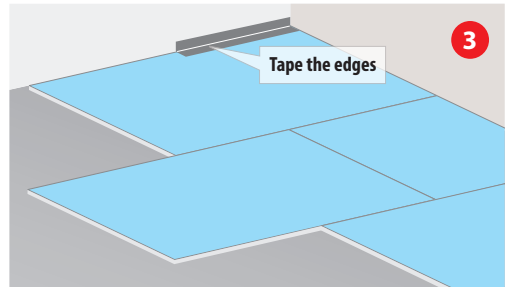
## Step 3: Install underlay/insulation boards

Most types of underlay/insulation board can be used as long as they have a density of 6lbs per cubic foot. Underlayments such as 6mm thick cork or 6–10mm of expanded polystyrene (EPS) are recommended for eFoil heating mats.

If installing insulated tile backing boards, you must comply with the manufacturer's instructions.

Install the boards in a brick pattern and tape the edges to prevent movement of the underlay during installation (See image 3).

**Note:** A vapour barrier, such as a plastic sheet, can also be placed below the underlayment, although underlayment papers are not suitable.



## Step 4: Install the floor sensor probe

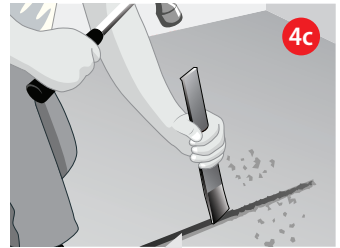
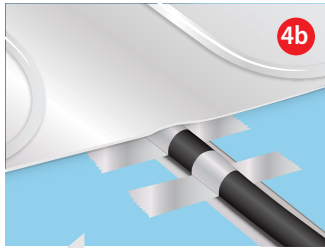
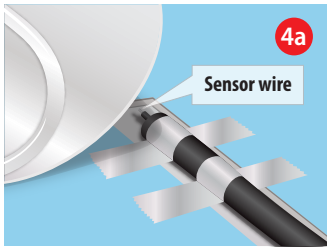
If you are using a thermostat with a floor sensor (recommended for wooden floors), install the black conduit in the wall chase and at least 150mm into the heated area. Run the probe wire down inside the conduit until it just appears from the end of the conduit (See image 4a).

Tape the sensor within a channel cut into the insulation (See images 4a & 4b) directly underneath the mat, centred between two heater wires. You may have to channel a groove into the sub-floor (See image 4c).

Run the sensor cable back up to the thermostat then connect the 2-core cable to the thermostat in the correct terminals.

# Installation Instructions

Read through these instructions carefully before laying your mat



## ⚡ Important Note

Make sure the sensor probe is positioned between two heating elements – **the sensor wire must not cross over the foil heater wires.**

**Note:** You may have to channel a 6mm wide groove to allow the flexible tube to remain flush with the existing floor.



## Step 5: Lay the mat

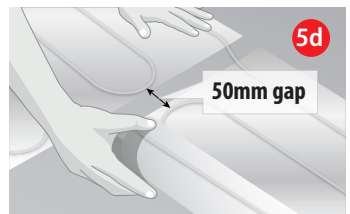
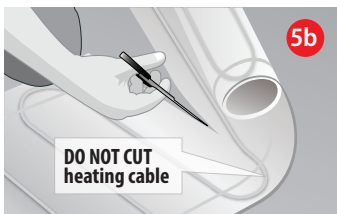
Remove your eFoil mat from the packaging box, unroll it completely (See image 5a) and place it in the required position for your first run on top of the underlayment.

Make sure that heating mats are laid with the side marked "THIS SIDE UP" facing upwards.

⚡ **Now check the resistance of the mat (see page 8 for details) BEFORE you begin to lay out the mat.**

When positioning the eFoil mat on the underlayment, be aware of the following:

- Keep it at least 300mm from any edge of the area to be laminated (to prevent the spikes of the power stretcher damaging the mat when the laminate is being fitted).
- Ensure the power supply cables can reach the thermostat point to which they will be connected.
- Wherever possible, run the power supply cables parallel or at right angles to the walls, and avoid high-traffic areas.
- Wherever possible, keep the corner where the power supply cable enters the mat away from high traffic areas.
- **Never** run the power supply cables under or over the mats.
- The mat can be cut and turned at 90° or 180° while laying to cover the total area – the heating cable must **not** be cut (See image 5c). Ensure the heating cables are kept a minimum of 50mm apart
- The mats must not be used folded. Do not fold or crease the mats at any time during installation. If the mat needs to be moved at a later stage, it must be rolled not folded. For these reasons eFoil mat is not suitable for stairs.



# Installation Instructions

Read through these instructions carefully before laying your mat

## ⚡ Important Notes

eFoil mats must never be cut or trimmed to fit into a space that is too small.

Ensure the cables are not laid in areas where fixed appliances will be positioned e.g. underneath sink basins or toilet pans.

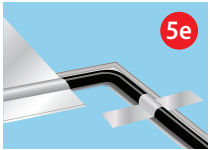
Care should be taken to avoid damage during installation, such as dropping heavy or sharp objects, stepping too heavily on the heating unit or careless pouring of the adhesive.

Do not walk on the mats unless absolutely necessary during installation.

Do not place heavy articles on the mats.

## Step 5: Lay the mat (continued)

Following your previously drawn mat layout, decide on the route for your cold tail (power cable) from the mat to the point of supply then cut a 6mm wide channel in the insulation along this route. Place the



cold tail into this channel and tape securely into position.

You may also need to remove a small section of insulation from under the mat at the point where the power

supply cord enters the mat, to prevent an unsightly lump on the laminate surface and excessive wear on that part of the mat (See image 5e).

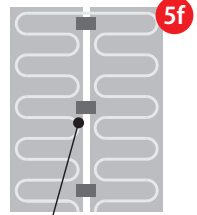
When you have reached the end of the mat run, carefully cut the grey backing mat in-between the two heating cables (do not cut the heating cable) and turn the mat to its new position. Ensure the heating cable remains a minimum of 50mm apart (See images 5b, 5c & 5d on page 5).

Once the mat is turned and secured, continue this process until all of the mat is used. Then check the complete matting area is securely fixed to the floor.

If installing two or more heating mats next to each other make sure the heating wires in adjacent mats do not overlap (See image 5f). Use adhesive tape to ensure that they do not overlap over time.

⚡ **Check the resistance of the mat again (see page 8 for details) to make sure damage hasn't occurred during the installation process.**

When fitting more than one mat in a room or when you cut the mat to cover the total area, affix aluminium tape to adjacent mats in 3–4 places on both sides to give proper continuity/earthing to the mats. **The mats must not overlap, as overheating will result.**

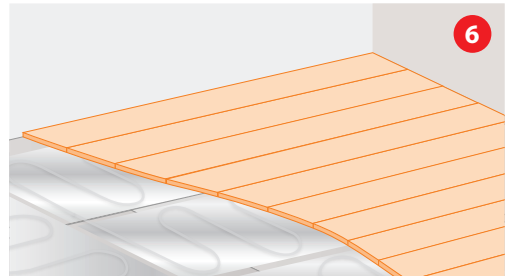


Aluminium tape on both sides

## Step 6: Lay the laminate

Once you have completed the installation of the mat and checked the resistance, the laminate floor covering can be laid.

Take care not to damage the heating mat when laying the laminate.



## ⚡ Important Note

The maximum thermal resistance recommended between heater and the room is 0.15m<sup>2</sup> K/W (1.5 tog).

**After the finished floor covering has been laid, perform the following tests again (see page 8):**

- Insulation resistance test
- Heating cable resistance test
- Thermostat floor sensor resistance test

The findings must be recorded on the *Commissioning Record* enclosed in the mat box or your warranty will be invalidated.

# Mat Planning Examples

## Using one & two mats

### Planning your mat

When planning your eFoil, ensure you cover as much of your free floor area as possible:

- never install your heating cables any less than 50mm apart.
- never cut your heating cable.
- never remove any pre-manufactured cable joints or end seal joints.

When installing two or more mats within the same area always ensure the cold tail (power cables) are returned to the thermostat power connection and are wired in parallel. Never wire eFoil in series, and always check the eFoil mats are thoroughly adhered to the floor before tiling.

Timber substrates should be prepared as required by tiling guide lines, for example bracing of a timber floor with WBP or tile backer board.

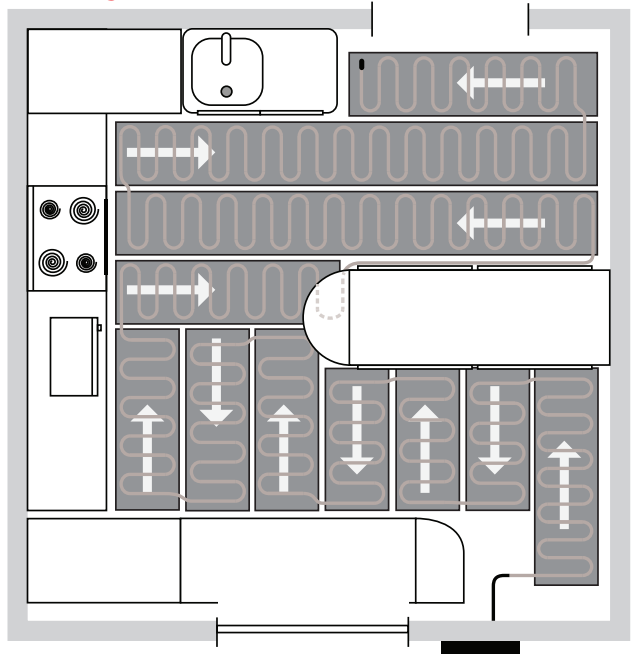
**Please follow these instructions carefully. If you require assistance prior to or during your installation please call our helpline on 01473 276677.**

### Note

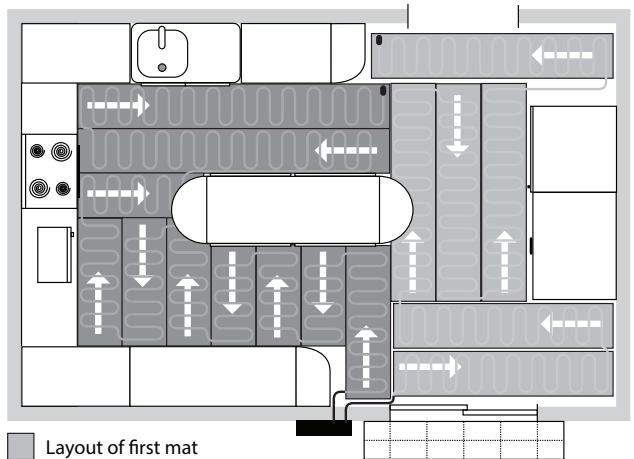
- Sketch your floor plan using the grid on pages 10 & 11
- Calculate your Total Load on page 9



### Plan using one mat



### Plan using two mats



- Layout of first mat
- Layout of second mat

# Testing & Commissioning

The Warranty Validation Procedure must be carried out to validate the warranty



## Warranty Validation

To validate your lifetime warranty registration you must perform the insulation resistance test, the heating cable resistance test and the sensor resistance test three times during the installation process.

1. Before you lay the eFoil.
2. After you have laid your eFoil and before you cover your eFoil.
3. After your finished floor has been laid.

This information must then be recorded on your commissioning record form (enclosed in the box), otherwise the warranty will be invalidated.

## Heating Cable Resistance Test

This test is carried out to prove continuity of the heating element. A low resistance ohm meter should be used (ie Multimeter on ohm setting), connect your meter on to the brown and blue mains lead and confirm resistance value matches that quoted on your specification label on the cable cold lead joint.

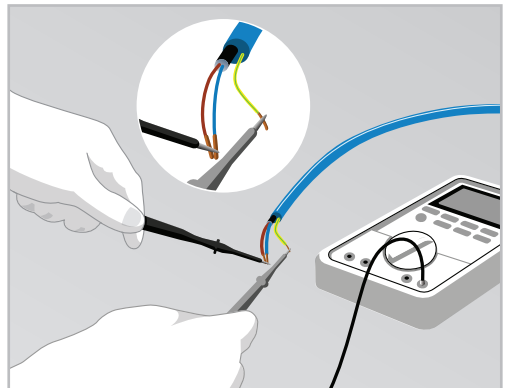
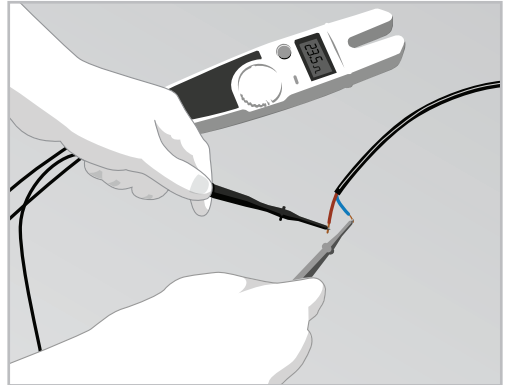
## Floor Cable Resistance Test

See *Heating Cable Resistance Test* above and repeat with floor sensor cable.

## Insulation Resistance Test

This test is performed to measure the insulation resistance between conductors and ensures the cable insulation is not damaged. A low resistance reading indicates a damaged cable and must be repaired or replaced.

The insulation resistance tester should be connected between the conductors (blue and brown cables) and the earth (yellow/green cable). The meter should record a high resistance value e.g. above 100 Meg ohms.



## ⚡ Important Note

The Commissioning Record must be placed adjacent to the distribution board and must contain the location of the installed underfloor heating





# Product Specifications

140 watt

## 140W

Quick Find	Part Code	Coverage (Area)	Length	Width	Wattage	Current	Resistance @20°C (-5/+10%)
13154	eFoil 140-1.0	1.0m <sup>2</sup>	2.0m	0.5m	140w	0.61A	378 Ω
13155	eFoil 140-1.5	1.5m <sup>2</sup>	3.0m	0.5m	210w	0.91A	252 Ω
13156	eFoil 140-2.0	2.0m <sup>2</sup>	4.0m	0.5m	280w	1.22A	189 Ω
13157	eFoil 140-2.5	2.5m <sup>2</sup>	5.0m	0.5m	350w	1.52A	151 Ω
13158	eFoil 140-3.0	3.0m <sup>2</sup>	6.0m	0.5m	420w	1.83A	126 Ω
13159	eFoil 140-3.5	3.5m <sup>2</sup>	7.0m	0.5m	490w	2.13A	108 Ω
13160	eFoil 140-4.0	4.0m <sup>2</sup>	8.0m	0.5m	560w	2.43A	95 Ω
13161	eFoil 140-5.0	5.0m <sup>2</sup>	10.0m	0.5m	700w	3.04A	76 Ω
13162	eFoil 140-6.0	6.0m <sup>2</sup>	12.0m	0.5m	840w	3.65A	63 Ω
13163	eFoil 140-7.0	7.0m <sup>2</sup>	14.0m	0.5m	980w	4.26A	54 Ω
13164	eFoil 140-8.0	8.0m <sup>2</sup>	16.0m	0.5m	1120w	4.87A	47 Ω
13165	eFoil 140-9.0	9.0m <sup>2</sup>	18.0m	0.5m	1260w	5.48A	42 Ω
13166	eFoil 140-10.0	10.0m <sup>2</sup>	20.0m	0.5m	1400w	6.09A	38 Ω
13167	eFoil 140-12.0	12.0m <sup>2</sup>	24.0m	0.5m	1680w	7.30A	31.5 Ω

## Calculator

Calculate your total load

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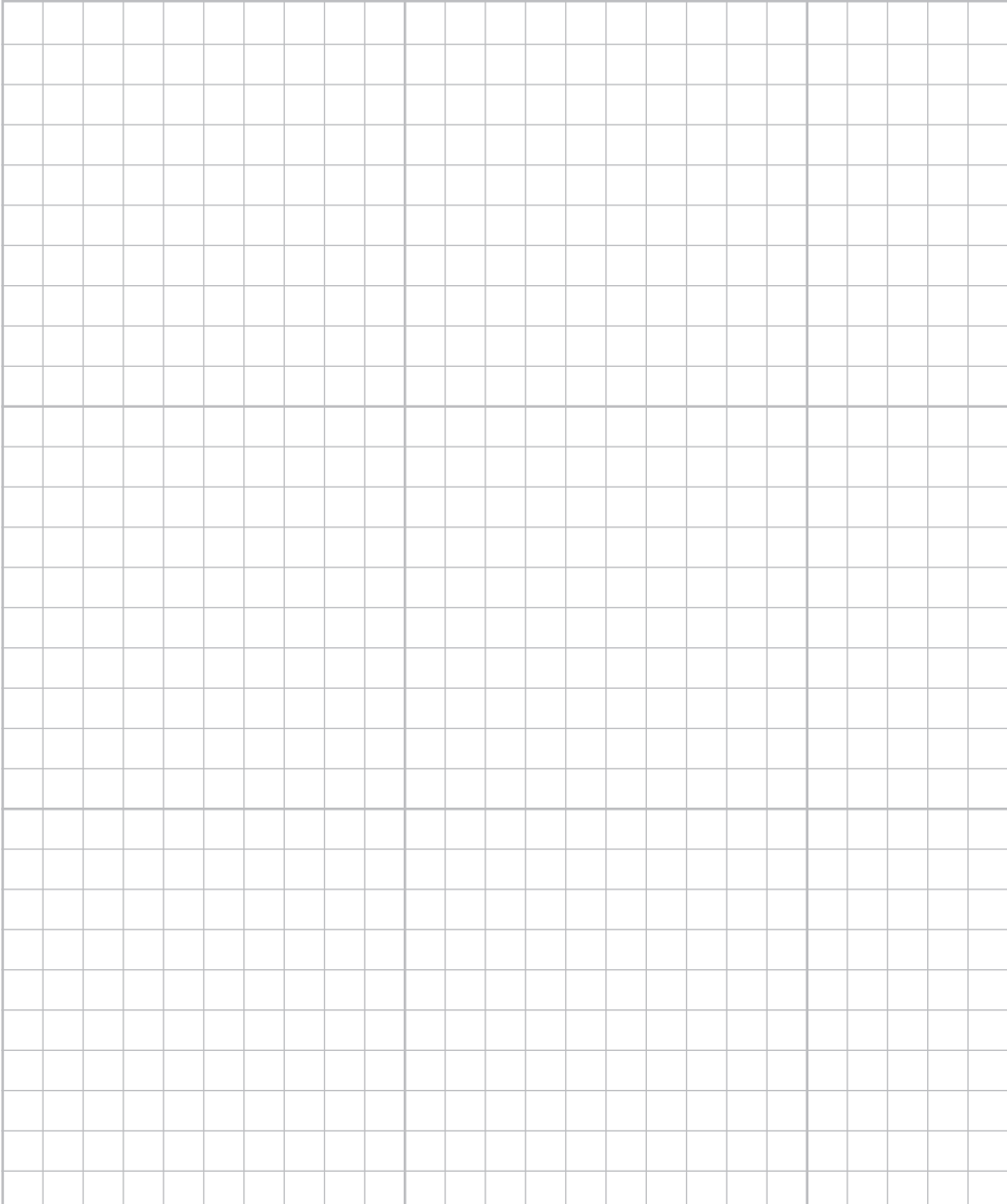
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Total Load .....

# Floor plan Sketch

Calculate your total heat area

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# Floor Plan Sketch

Calculate your total heat area

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Scale approx 1:18 (56mm = 1m)  
When sketching your floor plan, please work around any permanent / fixed furniture items as these will block the heated areas

# Troubleshooting

## 140 watt

Symptom	Probable Causes	Corrective Action
Floor does not heat	No power at controller	Check power supply
	RCD/MCB tripped	Check the circuit is not overloaded
	Thermostat not set correctly	Refer to thermostat instructions
	Cable not correctly connected with thermostat	Refer to thermostat instructions
	Floor temperature sensor not connected	Refer to thermostat instructions
	Faulty sensor/thermostat	Contact the elements Helpdesk 01473 276677
Floor warming all the time	Heating element cut or damaged	Contact the elements Helpdesk 01473 276677
	Thermostat not set correctly	Refer to thermostat instructions
Floor not getting warm enough	Floor temperature sensor not connected	Refer to thermostat instructions
	Thermostat not set correctly	Refer to thermostat instructions
	Floor sensor too close to heating element	Contact the elements Helpdesk 01473 276677

Contact the elements Helpdesk with any questions on 01473 276677

## Notes

Use this space to make notes for reference

### elements

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