

# **V**ARME

## Floor Heating Systems

### Carbon Film Installation Instructions

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## Product Overview

Thank you for selecting our electric underfloor heating system. Before you begin installing please **read through these instructions carefully** & check that you have all the components required.

The system requires a mains voltage 230V supply & must be connected in compliance with building regulation Part 'P' approved document and IEE 16th Edition

### **Important Notes:**

Due to their moisture content, solid and kiln dried wood floor coverings should be laid, but not fixed, to allow acclimatisation with the heating system energised before final fixing. Allowances should be made for expansion. Refer to manufacturers instructions.

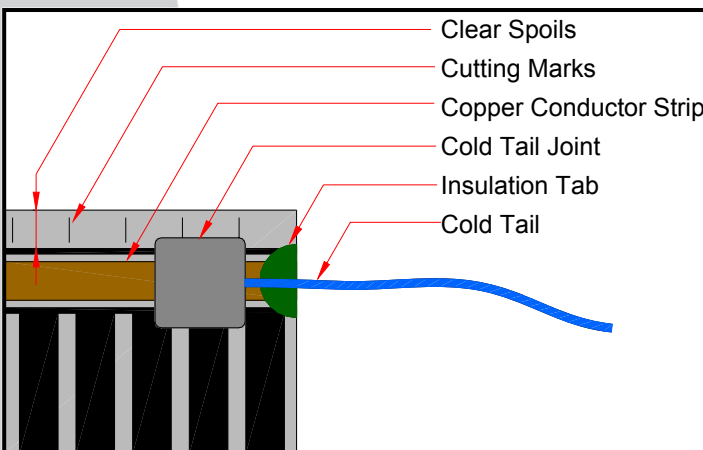
Laminate and veneered/engineered flooring needs to have an allowance made for expansion. Refer to manufacturers instructions

The Carbon Heating Film, when installed under a wood floor, will heat the floor to a temperature of 27°C. This is the limit to which most wood floors can be heated to. Consult wood flooring manufactures technical details for further information. Please note that the surface temperature of the wood flooring under rugs and flush or low profile furniture may exceed 27°C if not monitored.

If other floor finishes are to be installed over the carbon film, e.g. Carpet, Vinyl etc, a stable floating floor must be constructed. Heat-Pak® flooring is recommended for this application, which is available from your underfloor heating supplier, to give a smooth and thermally conductive sub-floor.

### **Contents of Heating Kit:**

- **Carbon heating film with cold connections made**
- **6mm Depron Insulation**
- **Digital Programmable Thermostat**
- **Floor Probe**
- **Floor plan showing element layout**
- **20Amp push fit cable connectors & connection box**
- **Polyethylene Sheet (Moisture Barrier)**
- **Factory test sheet with individual resistance readings**
- **Warranty / Guarantee Certificate**





## Pre-Installation

First unpack & identify all components (a list of supplied components is on page 2) and check the layout - see supplied floor plan (example Fig. 2)

Ensure that the sub-floor (concrete or timber) is clean, dry & free from dust & debris. The floor should also be suitably level to take the kind of flooring that you will be laying. Some types of wood plank flooring have a tolerance of just a mm or two per linear metre & we strongly recommend that your floor fitter surveys the floor **before** the heating is installed.

### Additional items to aid installation

Stanley/Craft Knife  
Double Sided Adhesive Tape  
Self Adhesive Cloth Tape (Duct Tape)  
Multi-Meter

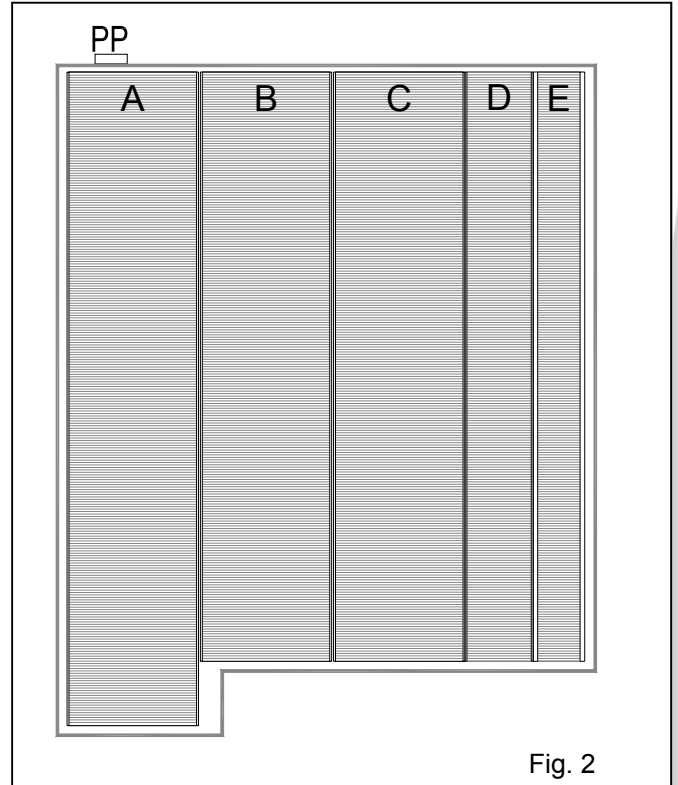


Fig. 2

## Electrical Provision

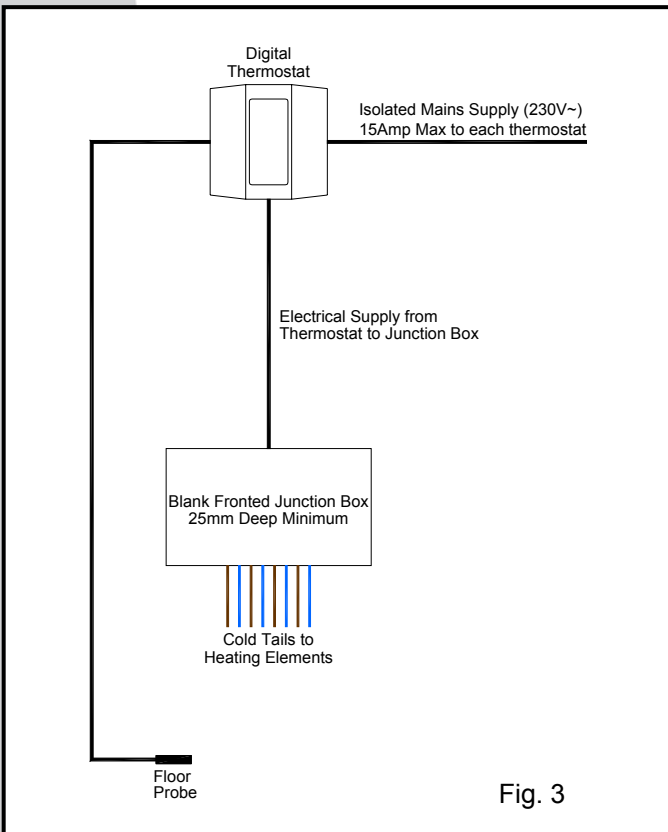


Fig. 3

Make the electrical provision as per the diagram Fig.3. The circuit must incorporate a 30mA RCD protection

For installations below 13Amp, A fused spur or combined spur/ RCD is recommended.

For installations over 13Amp a suitable isolated supply should be provided incorporating 30mA RCD protection.

The thermostat rating is 15amps & this is capable of controlling approx 3450watts of heating film (most domestic installations are within this figure). If the system supplied is over 3.45kW it will be subject to a more comprehensive electrical installation. (Your electrician will be able to advise you on this).

Note: all electrical connections should be made in compliance with building regulation Part 'P' and the IEE 16th Edition.



## Depron Underlay Installation

### Notes:

Depron should be cut with a Stanley knife or similar.

### **Step 1**

Once you are satisfied that the sub-floor is suitable (see pre-installation notes page 3), lay out the Depron insulation to cover the entire floor area, except for the 50mm gap. Depron sheets should be laid with staggered joints Fig.4.

If laying a double layer (recommended in conservatories & other areas with a high heat loss) the second layer should be laid at right angles to the first.

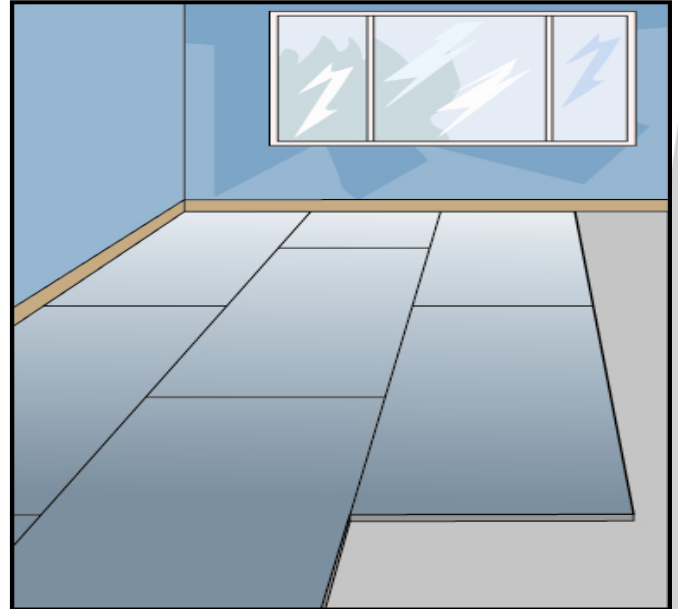


Fig. 4

### **Step 2**

Leave a gap of approximately 50mm at one edge of the room along where the cold cables are to be run, so as to allow them to sit flush under the floor covering when it is laid. For systems of more than 8 elements a gap wider than 50mm may be required.

Using a length of 50mm wide double sided tape on the sub floor within the gap that has been made in the Depron, can be used to hold the cold cables in place.

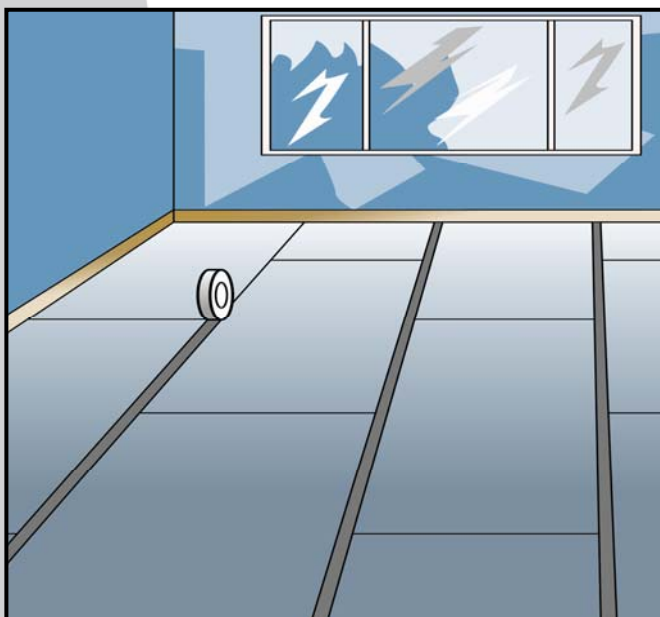


Fig. 5

### **Step 3**

If you wish, you can join the sheets of Depron together to prevent them from moving apart. This can be done by taping the edges of adjoining sheets together with a self adhesive cloth tape (Duct Tape) Fig. 5



## Carbon Film Installation Under Wood/Laminate Flooring

Only **LIGHT FOOTWEAR** should be worn . Avoid foot traffic on the heating elements and cold tail joints.

### Step 4

Un-pack the heating elements for the room and check that you have all the elements detailed on the enclosed drawing & room test data sheet.

Carbon Film Data Sheet - Customer Copy

CS / S Number:  Order No: **FHS Sample**

130 W/m<sup>2</sup>

Material	Volts	L.D.	Qty	Element Length (Mtrs)	Length (Mtrs)	Design Resistance Reading (Ω)		Actual Reading
						From	To	
500/530	230	A	1	3.65	290	212	248	
		B	1	3.65	290	212	248	
		C	1	3.10	290	250	292	
		D	1	3.10	290	250	292	
		E	1	3.10	290	250	292	
		F	1	3.10	290	250	292	

Totals No. of Elements: 6  
Total Linear Metres: 330/400

Tail Length (Mtrs)	Design Resistance Reading (Ω)		Actual Reading
	From	To	
290	212	248	
290	212	248	
290	250	292	
290	250	292	
290	250	292	
290	250	292	

Summary: Before the floor covering is installed, checked and resistance readings taken. Resistance tolerance as stated and performed by a suitably qualified person attached to heating elements and a coloured sheath.

Total No. of Elements: 6  
Total Voltage: 120V W  
Total Resistance: 41 Ω

### Step 5

Check the resistance of each element using a suitable electrical testing device.

A basic multi-meter will be sufficient to test the elements at this stage.

You can purchase a suitable test device from your underfloor heating supplier or most DIY stores stock similar products.

**DO NOT** continue without first testing each element.

The desired resistance readings for each element are listed on the enclosed room test data sheet. A sample of the data sheet is shown in fig. 6. The reading should be within the Design Resistance Reading Range e.g a reading of 223Ω for the range circled in the example fig 6 is acceptable.

**Note. The cold cables are double Insulated, a coloured outer and a clear inner.**

Fig. 6

### Step 6

Position the rolled up elements along the edge of the room Fig.7, as per the drawing supplied. When you are satisfied with the position of the elements (ensuring that they will not overlap), roll out the heating elements copper face down. Fig.8 Adjust positioning to obtain the best floor coverage and lightly fix into position with self adhesive cloth tape (duct tape) to avoid movement.

Whilst working around the elements use a board or spare sheet of Depron to spread your weight. **DO NOT** walk directly on the heating elements or cold tail connections.

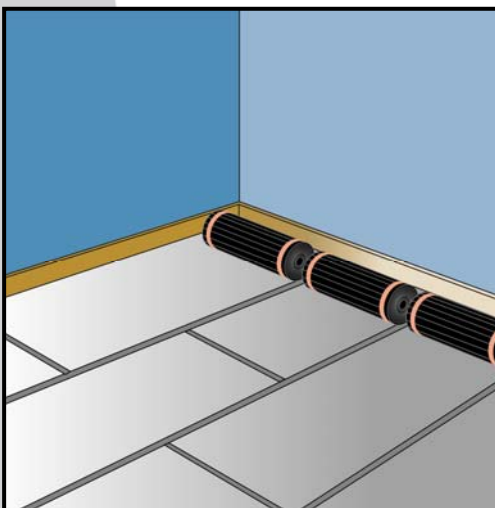


Fig. 7

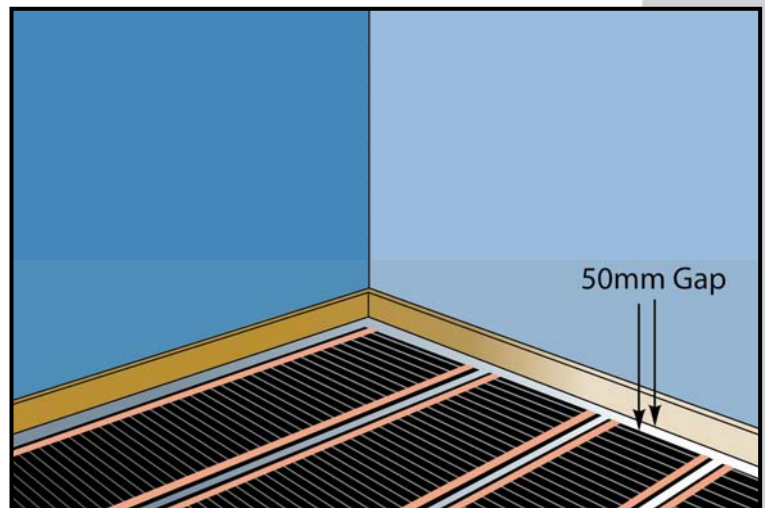


Fig. 8





**Step 7**

Below each of the “cold tail” joints form a cut out in the Depron underlay to allow the plastic cover of the joint and the cold tail itself to lay within the Depron. Fig. 9

The cut out for the cold tail should extend to the 50mm gap at the edge of the room.

If you have installed more than one layer of Depron, only form the cut-outs in the top layer.

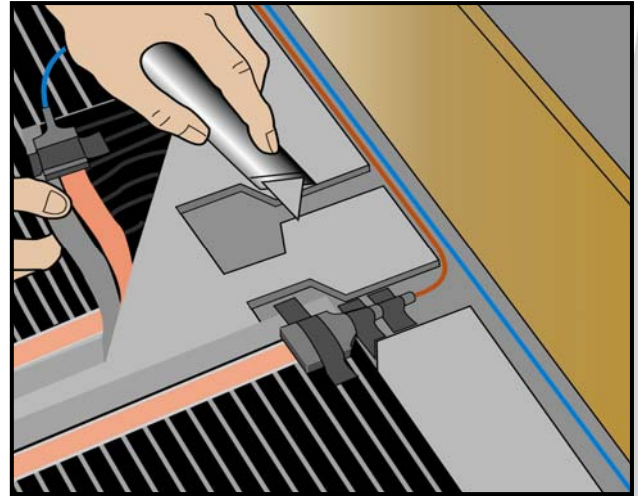


Fig. 9

**Step 8**

If used, peel the backing from the double sided tape that was fixed into the 50mm gap at the edge of the room.

Starting from the point furthest from the connection box, run the cold tails from each element along the room perimeter, fixing them to the exposed double sided tape or if tape is not used, lay them carefully in the gap.

**DO NOT** run the cold tails under the heating elements

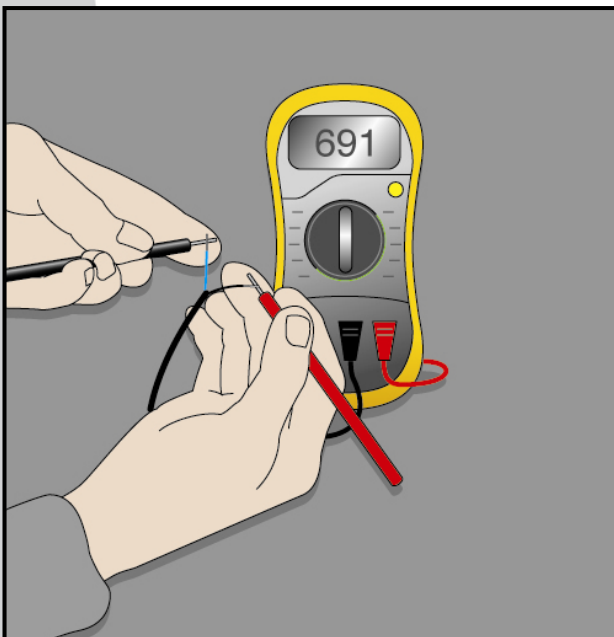


Fig. 10

**Step 9**

Once the cold tails are in position a resistance test needs to be performed on each individual element for a second time. The desired resistance readings for each element are listed on the enclosed room test data sheet.

Record the actual reading in the box provided on the data sheet. **This is a requirement of the guarantee and MUST be performed at this stage.** The data sheet needs to be retained on site with the heating system.

**Note. The cold cables are double insulated, a coloured outer and a clear inner.**

**Step 10**

The cold tails can now be joined in parallel at the junction box using the 8-way electrical connectors provided.

The junction box should be a double gang blank fronted box of a minimum 25mm depth. Fig. 11

The paralleled cold tails should be routed to the junction box and connected to a suitably sized supply cable from the thermostat. See Fig. 2 Page 3

**Note. The cold cables are double insulated, a coloured outer and a clear inner.**

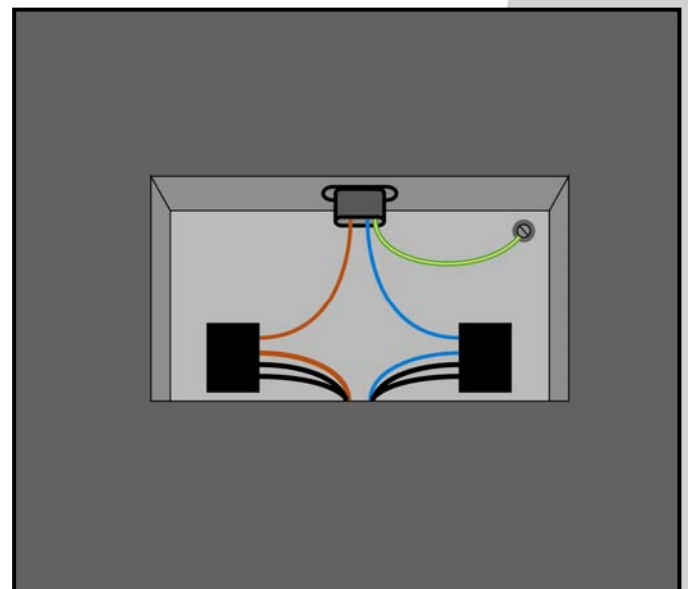


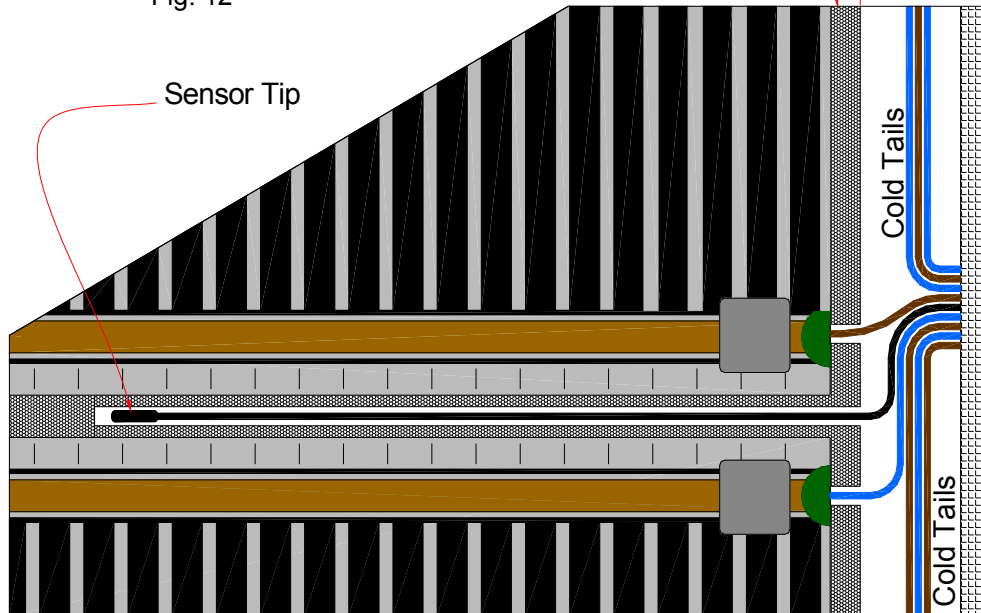
Fig. 11



Depron

50mm Gap

Fig. 12



Position the floor sensor. If installing Heat-Pak® over the carbon system, refer to separate instructions regarding the floor sensor.

For standard installation, the tip of the sensor should be approximately 300-500mm from the edge of the room with the tail of the probe running back to the thermostat via the 50mm cold tail gap. Fig. 12. Form a channel in the Depron in between two of the elements running into the cold tail gap. Press the sensor into the channel and tape in place with self adhesive cloth tape.

The sensor wire can be shortened or if required lengthened up to 50m with a minimum 0.75mm<sup>2</sup> 2-core flex cable. This connection should be located above floor level ideally within the cold tail junction box.

It is advisable to mark on the installed location of the sensor tip, on the floor plan for future reference.

Test the resistance of the floor probe. Refer to the label on the floor probe wrapper for desired resistance readings. Make a note of the reading.

## Step 12

When you are satisfied with the layout, cover the heating elements with the plastic sheet/moisture barrier provided. The grade of PE-Sheet supplied will depend upon what is being installed over the system. If a wood floor, engineered wood or laminate floor is being laid, a 100micron sheet (clear) will be provided. When fitting Heat-Pak® over a carbon heating system a 200micron sheet (coloured blue) has to be used. The joints of the sheeting have to overlap by at least 20 cm. These overlaps have to be sealed over their total length with a self-adhesive PVC cloth tape (Duct Tape)

## Step 13

The floor finish can now be laid directly over the moisture barrier in accordance with the flooring manufacturers instructions. **Under no circumstances** should a separate underlay be installed at any point between the heating element and the floor finish. Ensure that the floor finish has been acclimatised prior to installation to avoid excessive shrinkage when heated. Refer to the notes on page 2 of this manual.

During the process of laying the floor, care should be taken not to damage any of the heating elements or cold tails. A spare sheet of Depron or a board, can be used to kneel on to help spread weight.

## Step 14

Once the floor finish has been laid, perform resistance tests on the floor probe and across the feed cable that connects the thermostat to the junction box, to ensure that no elements have been damaged during the flooring installation. The desired resistance reading for the heating system is at the bottom of the room test data sheet and should be within the tolerance of +10 –5%. Record the final readings on the guarantee certificate.

Once this test has been completed, final connections to the thermostat can be made. See Separate installation instructions for the thermostat.



## Notes

1. Electric underfloor heating is designed to run at low temperatures and can have a slightly slower warm-up time than conventional heating. This can be countered by using the features of the programmable thermostat instead of switching the system on or off.
2. If installed in new buildings and especially conservatories, the heating period may be affected by the moisture content within the building. All new floor constructions and new buildings should be fully dried out before fitting wood, engineered wood or laminate flooring.
3. The carbon film heating system is primarily designed to heat wood, engineered wood or laminate flooring. With such materials it is important to control the temperature to which they are heated. The industry standard for most wood flooring products is 27°C. Be aware that the carbon film heating system is capable of heating above this temperature and is only limited by the thermostat and the temperatures that it is set to operate to.

## Electrical Notes

To satisfy the requirements of an acceptable British Standard a double sheathed single core cable to BS.6004 must be used under floors. All our cold cables comply to this standard.

Each individual heating element is designed to accommodate a current carrying capacity of up to 10Amps and should be connected *in parallel* at the junction box.

Consideration must be given by the electrical contractor in respect of the individual heating circuit ratings relative to the thermostat rating, circuit breakers, interconnecting cable sizing and switched contactors where the load of the heating system exceeds the rating of a single thermostat. Good wiring practice must be observed and the wiring must comply with the IEE 16th edition regulations.

The electrical installation must incorporate a 30mA RCD Protection

## Trouble shooting and FAQ's

- Q.** When I perform the resistance test on the heating element I cannot get a reading.
- A.** Check that the test equipment you are using is set to read  $\Omega$  and that both the inner and outer cable insulation sheaths have been removed.
- Q.** What size cable should be used to connect the thermostat to the junction box?
- A.** The size of the cable will vary depending upon the electrical load required for the heating system. Therefore this cable needs to be correctly sized by the electrician.
- Q.** The heating elements are slightly too long, can they be cut?
- A.** Yes. The element should be cut across it's width, along a clear section, in line with the cutting marks on either edge of the element. Once cut, the ends of the copper conductors need to be sealed either re-using the green stickers from the end of the off-cut or use electrical insulation tape.
- Q.** Can the elements be overlapped?
- A.** Under no circumstances should the heated areas of the elements be overlapped. Only the clear spoils at the edge of the element can be over lapped

These instructions are correct at time of writing

For help and advice regarding this product, please contact the Floor Heating Helpline: 0870 199 7842