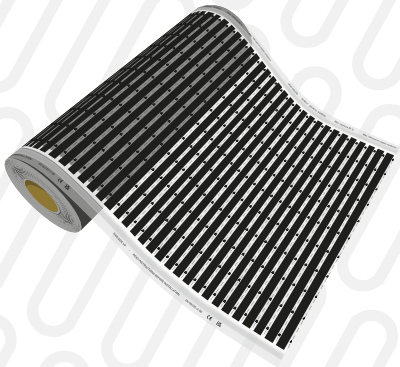
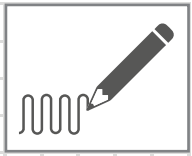
25 WARRANTY

HEATING FOIL



HEATCOM
SMART HEATING SOLUTIONS



INSTALLATION INSTRUCTIONS FOR UNDERFLOOR HEATING

Be sure to read the following installation instructions before installation.
The illustrations in the following instructions are indicative.

CONTENTS

PRODUCT IDENTIFICATION

The installation guide is applicable to the following products: Heatcom heating foil. The heating foil consist of a carbon based printed heating element and two copper bus bars, laminated between 2 PET layers. The heating foil is available in predefined kits or every width on 50m rolls.

IMPORTANT INFORMATION

The electric connection must be carried out by a Qualified Electrical Installer in accordance with the local wiring legislation. Other rules applicable for Underfloor Heating Systems must be met.

If the heating foil is damaged during installation, replace or remove the damaged section.

The heating foil shall always be cut at the specified cut lines.

Always turn off the power when working with mains installations.

Measure the resistance in the installation and verify insulation value. Fill in the readings in the warranty certificate in the section "Warranty".

TECHNICAL DATA

Voltage	230 V – 50Hz
Foil thickness	Approximately 0,4 mm
Foil material	PET
Bus conductors	Tinned copper
Heating zones, cut lines	22 mm
Maximum permissible cable temperature	90 °C
*Fire class, CPR	*E_{fl}
Warranty	25 years
Standard	EN60335-2-96
Approval	CE • UKCA
Tolerance length	+/- 1 %

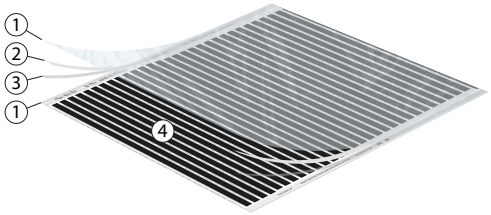
APPLICATIONS

The heating foil system is designed for indoor and dry rooms only and only for floor surfaces installed as floating type.

If installed between joists, the heating foil can be attached from underneath and stapled on each side of the foil, max. 10 mm from the edge - keeping 5mm distance to the bus conductors.

HEATING FOIL, EXPLAINED

1. Upper and lower layer of PET laminate foil
2. Tinned copper bus bars
3. Silver based compound, printed
4. Graphite based heating compound, printed



PREPARATIONS FOR INSTALLATION

POWER REQUIREMENT PER SQUARE METRE (W/m^2)

The power requirement per square metre (W/m^2) depends on the scope of installation and the insulation level of the room.

In some installations the power from the heating foil is not sufficient and should be complemented by another heating source.

DETERMINE THE HEATED AREA (m^2)

When planning the underfloor heating layout (see Fig. 1), there are guidelines that must be followed to perform a correct installation. Below are the guidelines to be met when the room plan is done and the heating foil laid, respectively

- Keep a distance of approx. 4 cm to the outer limits of the room, and do not install heating beyond this.
- Keep a distance of at least 3 cm from conductive materials and other heat sources, e.g. water pipes, fittings and chimneys.
- Do not install the heating foil under cabinets and other furniture raised less than 5 cm from the floor where the air can circulate freely underneath.

The room plan is a good tool during the actual laying of the heating foil, and later serves as documentation of how the heating foil has been installed in case of warranty and repairs.

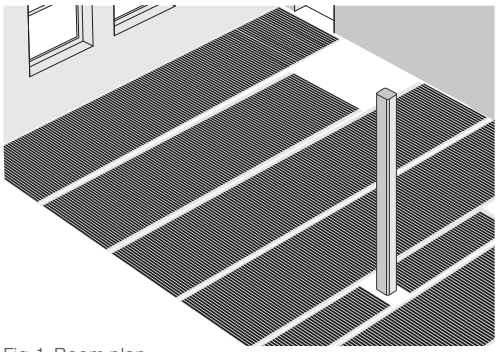


Fig. 1. Room plan

To determine how to install the heating foil in the heated area most efficiently, note the following:

- The heating foil is available in kits with predefined lengths of 1 or 2 different widths or as full rolls of widths 20-30-40-60-80-100-120 cm.
- Orient the heating foil so the amount of parallel rows are kept as low as possible, all rows

must be connected in parallel to the supply.

- Each width of heating foil has different max. lengths of a row, see table 1.
- To go around an obstacle in the room the heating foil can be connected in series on each side of the obstacle, just keep in mind that the total length of the row is a sum of all the lengths connected in series.
- Important that the heating foil must never overlap.
- To avoid cold areas on the floor, do not space the rows of heating foil with more than 50mm.
- The connection point of the thermostat and location of floor sensor must be determined and included in the room plan (see Fig. 1 as example).

Max. lengths of a row	
20 cm heating foil, 12 W/m	10 A ~ 190 m
30 cm heating foil, 60 W/m²	10 A ~ 125 m
40 cm heating foil, 24 W/m	10 A ~ 95 m
60 cm heating foil, 36 W/m	10 A ~ 60 m
80 cm heating foil, 48 W/m	10 A ~ 45 m
100 cm heating foil, 60 W/m	10 A ~ 35 m
120 cm heating foil, 72 W/m	10 A ~ 30 m

Table 1. Max lengths

THERMAL RESISTANCE

The thermal resistance (insulation, R-value) between heating foil and rooms cannot exceed 0.125 m² K/W.

Thermal resistance for typical floor types can be seen in table. 2:

Typical insulation values: (R-values)	
Tiles, paint and other thin coatings:	0.035 m²K/W
Linoleum and vinyl, etc.:	0.040 m ²K/W
Laminate floors, thin carpets and parquet:	0.125 m²K/W
Plank flooring, wood fibre and thick carpets:	0.175 m²K/W

Table 2. Typical insulation values

GENERAL INSTALLATION GUIDELINES

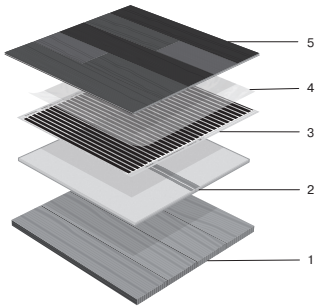
1. Read the previous sections of this guide before proceeding, as they contain important information.
2. Check the user manual for the thermostat to see if there are sections of this that will affect installing the heating foil.
3. The heating shall always be controlled by a thermostat that is protected by a 30mA RCD and approriate overload protection
4. The installation shall be able to be electrically disconnected by a 2 pole switch or breaker
5. Cut-outs has to be made in the insulation boards for the wiring between the rows of heating foil and the connections.
6. Scratching and careless handling of the heating foil will void warranty and reduce life expectancy of the product. Therefore, pay attention when installing and walking

on the heating foil.

7. Always wear shoes with soft soles if you walk on the heating foil.
8. Dropping sharp/pointy tools or similar on the heating foil will likely damage it and if it happens, the area should be inspected and possibly repaired.
9. The ambient temperature must be at least 5 ˚C when installing the heating foil.
10. The room shall be dry and in stable conditions before and after the installation.
11. The subfloor shall be dry and mechanically stable. If moisture can be expected to rise from the subfloor, a suitable barrier should be installed prior to the installation.
12. Between the heating foil and the flooring a 0,2mm plastic foil shall be installed.
13. Terminal connections to the foil and each end of the foil must be covered by tape to make them electrically safe and protect from moisture getting into the foil.

TYPICAL FLOOR BUILD UP

1. Subfloor
2. Insulation boards
3. Heating foil
4. Plastic foil 0,2mm
5. Flooring



INSTALLATION INSTRUCTIONS

Ensure all preparations has been done and details considered as described in sections “PREPARATION FOR INSTALLATION” and “GENERAL INSTALLATION GUIDELINES".

1. Prepare place of installation (fig.2)
   - Remove all old installations if relevant
   - If necessary fill up any cavities in subfloor and along walls.

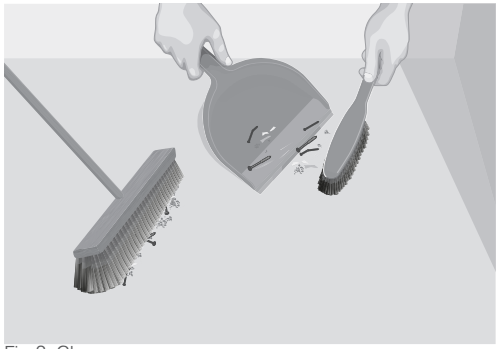


Fig.2. Clean room

2. Prepare the installation for the thermostat. (fig.3)
   - From the floor and up to where the thermostat is to be placed, make enough room in the wall for a conduit pipe for the floor sensor, and a conduit pipe for the supply cable.
   - Alternatively, preparations are made to route the floor sensor and supply cable in pipes/channels on the wall.
   - For the floor sensor we recommend using conduit pipe, to be able to replace this in case of failure.

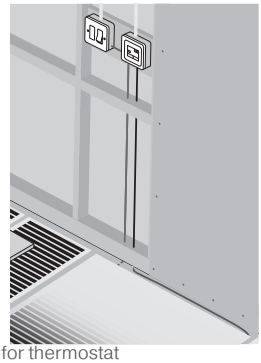


Fig.3. Prepare for thermostat

3. Make sure that there are no sharp edges, leaves, dirt or foreign objects on the subfloor. The subfloor shall be even, stable, smooth, dry and clean.
4. Install a 0,2mm foil for moisture protection if considered relevant in the application.
5. Install the 6mm underlayment boards, the entire subfloor shall be covered - creating a new stable and insulated base for the heating foil. (fig.4)
   - Install them in a tessalating pattern
   - Tape the joints between the boards to secure them and leave no gap

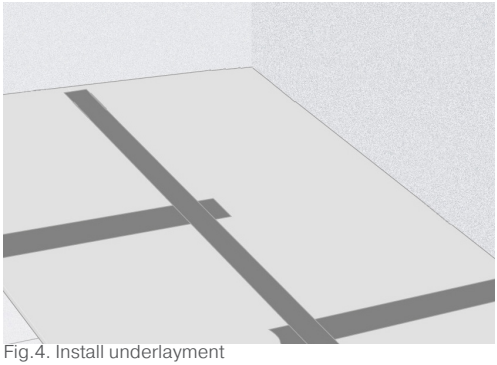


Fig.4. Install underlayment

6. Where the conduit pipes from the thermostat goes into the floor, make cutouts in the underlayment boards to make room for these (fig.5)
   - The end of the floor sensor should be placed min. 0,5m from the wall
   - If the floor sensor is in a conduit pipe it can be necessary to make further room in the subfloor - the top of the conduit pipe should be flush with the underlayment boards.
   - If the floor sensor is in a conduit pipe, place this directly below the heated area of the heating foil. Otherwise the best position will be just below one of the copper bus bars in the heating foil

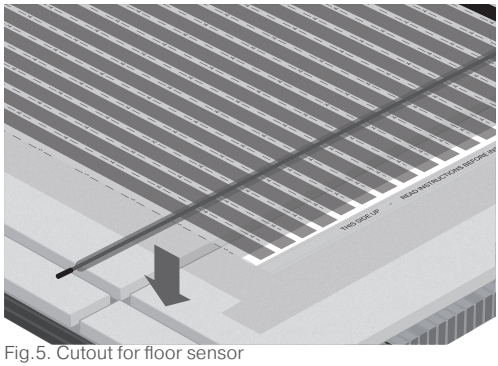


Fig.5. Cutout for floor sensor

7. According to the room plan, roll out the rows of heating foil and cut in length.
   - Cut the heating foil on the lines marked with scissors
   - Fix the rows of heating foil, temporary with some tape untill all floor is covered.

8. Seal all ends of the heating foil. In the end with connections, apply tape between the bus bars to be able to insert the terminals later. In opposite end, apply tape to the whole width. Tape shall be folded around the heating foil. (fig.6)

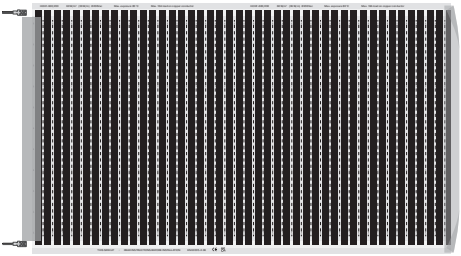


Fig. 6. Cover ends with tape

9. Fix the heating foil to the underlayment boards with a canvas tape or similar, leave approx. 1m free on each row to be able to do the connections.

10. Prepare the interconnecting cables for the rows of heating foil. (fig.7)
- All rows shall be connected in parallel.
- One row will be the start, connected to the thermostat and connected to the next row
- Be aware of the maximum lenght of a row that relates to the width of the heating foil (table 1)
- The cables shall be long enough to avoid strain on the connections
- Remove the insulation on the cables, 10mm where 2 cables are going into same terminal - 12mm where only one cable goes into the terminal
- Insert the cables into the terminals and crimp with the correct pliers
- If only one cable is used in the terminal, the copper strands shall be folded to make a good connection
- Inspect the connections and make sure all crimps is strong and of good quality

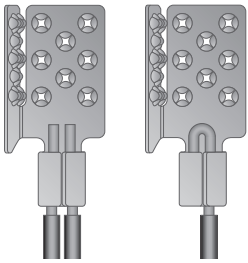


Fig. 7. Crimp cables in terminals

11. Connect the terminals to the heating foil. (fig.8)
- Insert bottom flap of the terminal into the pocket between the layers of the heating foil - located at each bus bar
- With your fingers, bend the top flap of the terminal with moderate pressure fixing the terminal to the heating foil
- Use the pliers, with the heating foil and terminal between the jaws, squeeze the levers untill they bottom out and release. Repeat and from an opposite direction if possible
- To make sure every connection is crimped - a colour marker could be used on each terminal when crimped

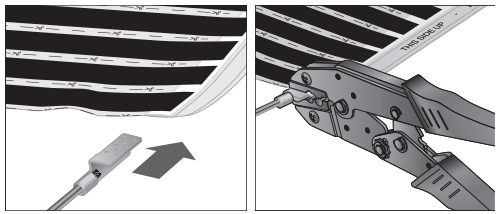


Fig. 8. Crimp terminals on foil

12. Before proceeding, fill out the warranty certificate with details from the installation. Calculate the resistance and include this value in the warranty certificate. Measure the total resistance of the heated area from the end of the supply cable. The measured resistance should correspond to the calculated resistance of the heated area, +/- 10%:

$R_{calc} = U^2/(P_{Total}) = 230^2/(720) = \underline{73,5\ \Omega}$

$R_{meas} = R_{calc}$ *+/-10% ~* $\underline{66 - 81\ \Omega}$
Your measurement shall lie between these 2 values

13. If measurements were within tolerances the installation can proceed to next step. If the measurements was not within tolerances:
- If no resistance can be measured, check your instrument and check the connections to the first row of heating foil
- If resistance is higher check that all connections between the rows have good contact also check that all rows of heating foil is of the same wattage (W/m²) and that the correct data has been used for the calculations (table 1)
- If resistance is lower check that all rows of heating foil is of the same wattage (W/m²) and that the correct data has been used for the calculations (table 1)

14. All connections to the rows of heating foil shall be covered with a piece of mastic tape 50mm wide and approx. 100mm length. Stick half of the tape to either bottom or top and fold it around to the other side. (fig.9)

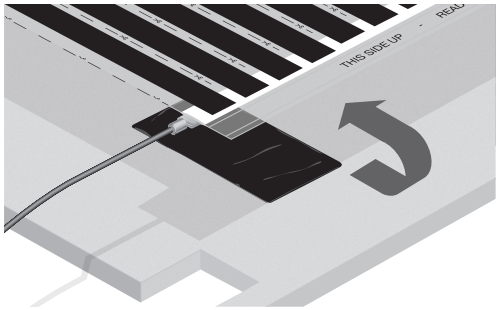


Fig. 9. Cover terminals with tape

15. Arrange all the wiring between the rows of heating foil and bundle them nicely with tape or cable ties. Make cut outs in the underlayment boards to fit all the wiring and cut outs for all the connection points to the heating foil. Secure all the wiring down into the cut outs by applying canvas tape or similar.

16. Inspect the installation, document by taking detailed photos and clean the floor surface from any dirt and materials from the installation process

17. Cover the entire floor surface with a plastic foil, min. 0,2mm thick

18. The chosen flooring can now be installed
- The flooring shall be installed as a floating layer and can not be fixed to the underlying layers. (fig.10)
- In case of future repairs it is good practice to start the flooring opposite side to where the connections are made to the heating foil
- Always keep spare flooring on hand in case repairs are needed
- If the flooring is vinyl or similar, a layer of tongue/groove boards has to be installed as a base for this

- If glue is used to hold the flooring boards together, this must be able to withstand 40°C
- The compressive strength of the underlayment boards used beneath the heating foil shall not be lesser than any recommendations from the manufacturer of the flooring material

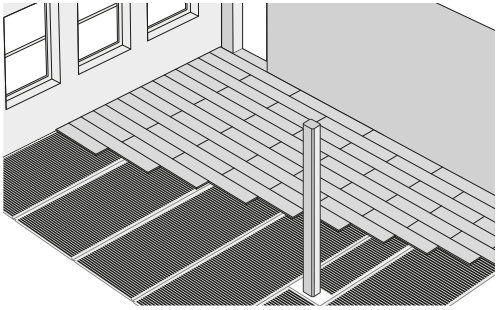


Fig. 10. Install flooring

19. Repeat the measurement as done in step 12, verify the measurement and document this

20. Connect the floor sensor and supply cable for the heating foil to the thermostat
- Configure the thermostat to use the floor sensor as protection for max. temperature. Apply to the recommendations from the manufacturer of the flooring material
- Check the operation of the thermostat and that the heating is switched on/off according to the set temperature of the thermostat

FROM INSTALLER TO CUSTOMER

The installation must be checked, measured and connected by an authorised electrician. Always use a thermostat with a temperature limitation function. Follow the flooring manufacturer's guidelines regarding the highest permissible temperature.
The location of the underfloor heating system must be documented at the electrical panel. The documentation must provide information about live parts in the building. The installer must provide drawings or photos containing information about the location of the underfloor heating together with the completed warranty certificate.

MAINTENANCE AND USE

Take into account the risk of thermal blockage when placing furniture, carpets and other things on the heated floor. The floor must never be thermally blocked by objects that can prevent the heat from rising into the room, which can cause the floor to overheat. An object that stands on legs min. 5 cm high, so that air can move freely under it, will not pose any risk.

WARRANTY

As a manufacturer and supplier in the EU, Heatcom Corporation A/S provides the following warranty in accordance with the general rules on product liability, as set out in Directive 85/374/EEC, and other relevant national legislation. Heatcom Corporation A/S provides a 25-year warranty on the product covered by this manual.

The warranty only applies to heating foil installations carried out in accordance with the installation instructions, limitations included.
The warranty does not cover the following:

- Faults caused by other supplier's faulty construction
- Faults caused by improper use
- Faults caused by other installations or equipment
- Faults due to incorrect installation
- This warranty does not cover excessive repair costs resulting from the installer failing to follow best practices or adhere to industry standards in the installation including the flooring.
- In the event that an entire flooring must be replaced, the warranty coverage is limited to a maximum amount of 100 €/m² of the affected area.
- Consequential damage to other equipment and building parts Heatcom Corporation A/S is covered by international insurance. If the payment for the equipment is in arrears, the warranty from Heatcom Corporation A/S is void.

If the product unexpectedly fails during the warranty period, the following documentation must be available to Heatcom Corporation or the retailer where the product was purchased, before the claim can be processed. Otherwise, the warranty is no longer valid:

- Installation report with pictures of the installation before flooring, complete and signed by the authorised electrician.
- Invoice for the purchase of the product, including purchase data.
- A report prepared by a professional "troubleshooter". The report must make it probable that the failed product is identical to the one stated on

the purchase invoice and that a manufacturing defect is the main reason for the product's failure. The report must contain measurement results, photos of the room and location of fault, breaking up the floor in steps, before the fault is rectified and after rectification.

- The defective part of the product.
- Part of the floor surface that has covered the product.

When your Heatcom Corporation A/S warranty is triggered, Heatcom Corporation A/S will either repair the damaged product, deliver a new similar product or cover the costs for repairing defects. If the documentation is not delivered complete and as described, the warranty is no longer valid.

WARRANTY CERTIFICATE

Installation location:

Name: _____

Address: _____

Postcode: _____

Date of purchase: _____

Installer (Company name and contact details): Installation finished: _____

_____

Foil specifications		**Circuit 1**		**Circuit 2**		**Circuit 3**	
Foil width	W/m	Length	W (W/m X Length)	Length	W (W/m X Length)	Length	W (W/m X Length)
20 cm							
30 cm							
40 cm							
60 cm							
80 cm							
100 cm							
120 cm							
		$*P_{Total}$		$*P_{Total}$		$*P_{Total}$	
		$**R_{Calc}$		$**R_{Calc}$		$**R_{Calc}$	
First measurement		$R_{Measured}$		$R_{Measured}$		$R_{Measured}$	
Last measurement		$R_{Measured}$		$R_{Measured}$		$R_{Measured}$	

$*P_{Total}$ = Sum of all W *$**R_{calc} = U^2/(P_{Total}) = \underline{xx,x\ \Omega}$* *Measured values shall lie within +/-10% from R_{Calc}*

25 WARRANTY

HEATCOM
SMART HEATING SOLUTIONS

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