

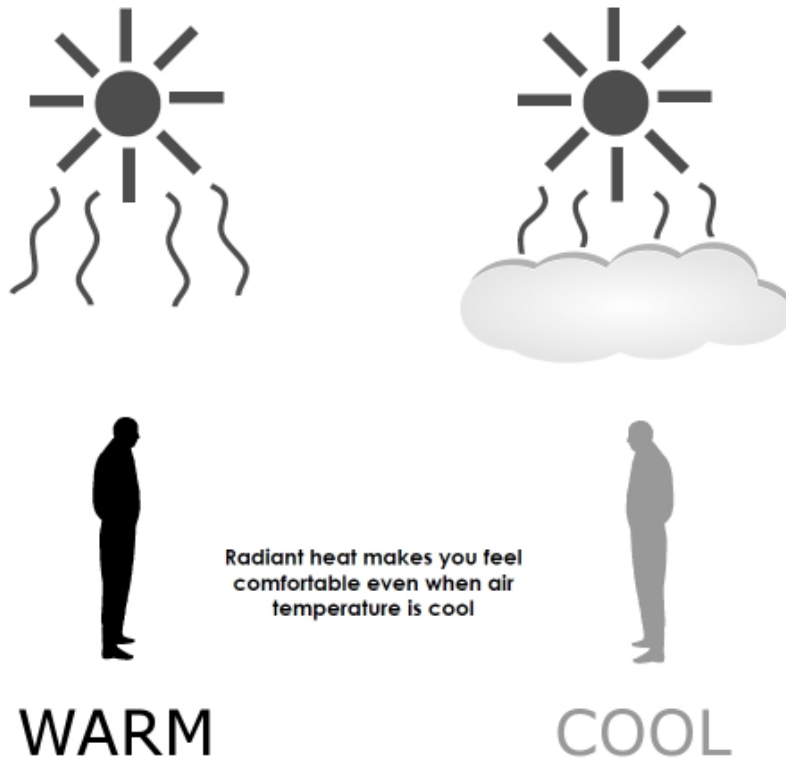
Installation Manual

Congratulations on your purchase of one of the most advanced electric heating systems available today!

WHAT IS RADIANT HEAT?

The Floor Heat Systems, Inc radiant floor heating system installed in your home is one of the most efficient electric heating system available today. The **INFRAFLOOR™** system installed directly below your floor, gently warms the objects and people in the room. These surfaces include walls, windows, floors and ceilings. These surfaces then gently warm the surrounding air, creating more natural warmth with minimal floor to ceiling temperature variation. This means that the air temperature can be lowered in the room while still maintaining comfort levels – this results in a reduction in heating bills over other conventional forms of electric heating systems.

This Installation Manual is provided to help you understand how your heating system works and therefore how to operate it to maximum efficiency.



The **INFRAFLOOR™** underfloor heating system works just like the sun. The heating elements warm the floor surface which then emits energy in the form of infrared heat. This is the same type of heat you feel when out on a sunny but cool spring day. Although the air temperature is cool the infra-red rays from the sun keep you warm.

An **INFRAFLOOR™** radiant heating system is the most efficient form of heat distribution available. The radiant heat in the form of Infra-red energy radiant throughout the room. The objects and occupants are heated first and then gently warm the surrounding air. As the body of air in the room is not overheated

convection currents are not created. This means that dust is not circulated and drafts are not created. This brings higher levels of comfort, not only to allergy sufferers but to everyone in the room.

The **INFRAFLOOR™** heating system is completely invisible and unobtrusive and allows more flexibility in creating the perfect living environment. It is reliable, safe and manufactured to last. Being electric with no moving parts it is completely maintenance free.

OPERATING INSTRUCTIONS

Operation of your **INFRAFLOOR™** heating system is similar to other conventional heating systems. Your method of control is via the wall mounted room thermostat. Set the thermostat to your desired temperature and the system will warm the room. There are several points to consider when operating your system to ensure economical operation:

1) Following installation of your **INFRAFLOOR™** heating system there are several precautions you should take on initial start – up of the heating system.

Do not be tempted to turn on the system immediately after laying the finished floor. Depending on the floor covering please allow time for the thin-set mortar or leveling compound to cure (see manufacturer's guidelines) completely.. Bring the system up to temperature gradually in stages over the next few days using the floor limit sensor temperature setting.

2) Each room installed with an **INFRAFLOOR™** heating system will have its own thermostat. This means that you can individually set the room temperature based on the use of the room. If the room is rarely used, turn the thermostat down to a lower level to conserve energy.

3) Your **INFRAFLOOR™** heating system is a direct acting system. However depending on the subfloor and the floor covering installed there may be a certain amount of thermal lag in the system (heat-up and cool down periods). Please anticipate these when switching your system on and off. Careful time clock control of on/off periods ensures maximum comfort at minimum cost.

4) Although your radiant heating system is less affected by air change/ventilation losses than a traditional convection heating system it is good practice to minimize drafts from open doors or windows as these can make occupants feel cold.

5) Set the thermostat to your desired comfort level and leave it. Setting the thermostat to a high temperature will not make the room get to temperature quicker. It will merely overheat the occupants once the set temperature is reached.

6) Thermostats are fitted with floor limit sensors. The temperature of the actual floor can be varied to suit individual comfort levels. We recommend a maximum floor temperature setting of 82°F for optimum comfort conditions.

Be Aware

Although your **INFRAFLOOR™** heating system requires no annual maintenance, care should be taken to ensure that the system is not damaged. Additional information for renovating and repairing is available in the system's Installation Manual.

1) Never pierce the floor. Piercing an electrically conductive cable with a nail or screw can trip the GFCI and cut all power to the system.

2) Never cover any heated part of **INFRAFLOOR™** heating system within walls, solid or permanent floor fixtures or furniture. This could trap heat and potentially cause local overheating.

3) Thick rugs , dog beds, bean bags, exercise mats and items with high thermal insulation should not be laid on the heated floor as this may cause localized overheating.

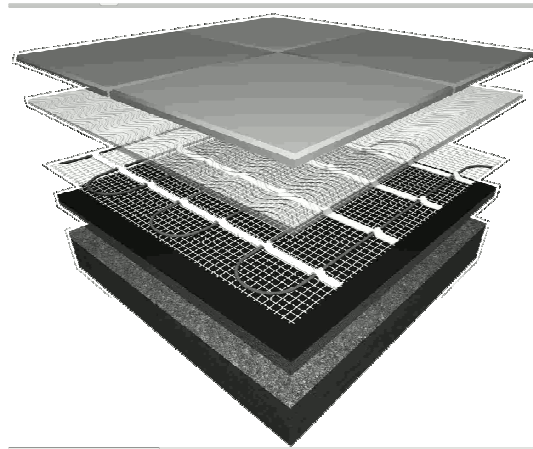
Information for repair or renovation tradesmen

Please inform all repair or renovation tradesmen if they are working in the area of an **INFRAFLOOR™** heating system, they should read the information contained within the installation and operating manual before commencing work. Failure to comply with this information may result in risk of electric shock.

IMPORTANT!

This manual must be fully read and understood before installing your underfloor heating system. Incorrect installation or failure to complete the warranty slip and **INFRAFLOOR™** installation plan will invalidate the FloorHeat Systems 10 year warranty.

THIS BOOKLET TOGETHER WITH THE THERMOSTAT OPERATING INSTRUCTION, ORIGINAL SALES RECEIPT AND SUPPLIED STICKER MUST BE PLACED BY THE MAIN POWER PANEL.



If you require assistance call our dedicated technical team now 888-203-9730.

Operating Manual

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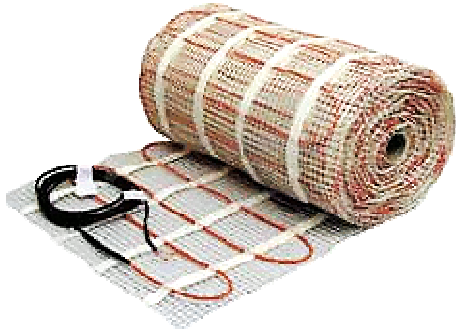
Installation is straight forward! However if you require assistance call our dedicated technical team now on 888-203-9730.

Please read the following instructions carefully to ensure easy installation. Remember that the final electrical connections must be made by a qualified electrician and the warranty certificate must be completed and signed by the electrician to ensure warranty coverage.

Floor Heat Systems, Inc accepts no liability, expressed or implied, for any loss or consequential damage.

Floor Heat Systems ▪ 1954 1st Street ▪ Highland Park, IL 60035

If you require assistance call our dedicated technical team now 888-203-9730.



This INFRAFLOOR underfloor heating cable mat shall be installed only by qualified personnel who are familiar with the construction and operation of the product and the risks involved.

The installation of this heating product shall be in accordance with the manufacturer's instructions and the regulations of the authority having jurisdiction.

Attention!

The installation shall be made in accordance with Article 424, Part J, of the NEC (National Electric Code), NFPA 70. The final connection to the power supply **MUST** be carried out by a suitably qualified and licensed electrician.

The minimum handling installation temperature for InfraFloor™ Mat is 23°F.

NEVER turn the **INFRAFLOOR™** heating system on when is in roll or cables touch each other. It will destroy the unit, void the Warranty and may cause fire hazard.

INSTALL ALMOST ANYWHERE

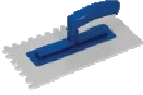
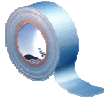

INFRAFLOOR™ can be installed on top of plywood or solid concrete floors in all room types. **INFRAFLOOR™** can also be installed under most floor coverings including: tile, natural stone, slate, porcelain, marble, limestone & terracotta.

MAINTENANCE FREE, SAFE, OVERALL WARMTH

Totally safe, **INFRAFLOOR'S** radiant heat provides overall warmth and comfort without blowing dust or allergens like convection heating. The radiant floor provides comfortable, even temperature distribution and is completely maintenance free.

HOW EFFECTIVE IS UNDER TILE HEATING?

INFRAFLOOR™ is a highly effective radiant heating system. It can provide supplemental heating for comfort or primary heating. If you are using your **INFRAFLOOR** heating mat as a primary or "sole" heat source, make sure that the Watts installed meet your BTU requirements. 1 Watt=3.412 BTU's.

THIS BOX CONTAINS	ADDITIONAL ACCESSORIES (available separately)	
1x INFRAFLOOR Mat	Various Tools	
	Duct Tape	
1x Warranty Certificate	Thermostat	

INSTALLATION

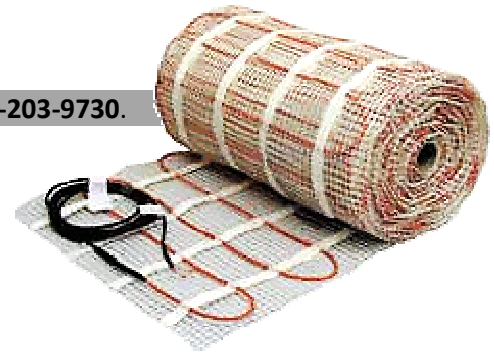
PRE-INSTALLATION CHECKLIST

<ul style="list-style-type: none"> • The orange heating cable must NOT be cut. Only the cold lead wire (black cable) may be shortened, as required. • The installation must be protected by a 30mA GFCI for safe operation. Potentially wet areas, such as kitchens and baths, require a 5mA GFCI. • Check that the label on the INFRAFLOOR outer packaging and the label attached to the cold lead of the cable mat are an identical match. Also that the mat supplied matches your requirement for area coverage and heat output by cross referencing on the product table (page 3) before commencing installation. • In case of any discrepancies, you should report these to the manufacturer or supplier and discontinue the installation immediately. • When installing INFRAFLOOR always wear rubber soled boots and avoid any unnecessary traffic over the cable mat. Inform other trades working in the vicinity of the installation process and request that they do not walk on the mat. • Before laying the cable mat, check the cable resistance with an Ohm meter. It should match the rating on the mat label and on the product table (page 3) with a tolerance of -5 to +10%. You should check the cable mat resistance 	<ul style="list-style-type: none"> • All the orange heating cable must be installed in the floor and covered with thin-set mortar and/or self-leveling cement. • When using thin-set mortar ensure that the cable is totally encapsulated with no air pockets. • The perimeter of the self-leveling compound area must be separated from the vertical structures by an expansion joint (polystyrene, etc. up to 0.5" wide). In cases where cables are laid in an area larger than 180 sq. ft. or with a diagonal greater than 23ft, it is necessary to install an expansion joint. The heating cable should not cross expansion joints. The non-heating connecting cables located at the expansion joints must be laid loosely in a protective tube. • Consult the self-leveling compound manufacturer's instructions as to a suitable drying out period before turning on the heating system. • Use a polymer modified (latex or acrylic) Portland thin-set mortar when tiling over underfloor heating. • The heating mat should not be placed in floor areas that will be permanently covered with floor fitted furniture, fitments or appliances (e.g. kitchen cabinets, bathtubs, vanities, toilets,
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| <p>regularly at all stages of the installation.</p> <ul style="list-style-type: none"> • When installing multiple INFRAFLOOR cable mats in a single room, the mats should be connected in parallel. • Consideration should be given to sub-floor thermal insulation before laying your INFRAFLOOR mat. A high thermal barrier such as cork or polystyrene foam board will significantly slow the process of heat losses into the sub-floor, improve performance and reduce the initial warm-up time. • Install insulation materials onto the concrete subfloor using modified thin-set mortar prior to laying INFRAFLOOR mat and covering with thin-set mortar or self-leveling compound. | <p>refrigerator, etc.).</p> <ul style="list-style-type: none"> • A minimum clearance of 2" should be left between the heating mat and perimeter walls. • Final electrical connection to the main power supply MUST be carried out by a qualified electrician. • Ensure that you have a thermostat with a floor sensor before commencing installation. The floor limit sensor must be installed in the floor before laying the INFRAFLOOR mat. • Consideration should be given to the load rating of the controlling thermostat. Where the load rating of the thermostat (Watts) is exceeded, a suitably rated contactor should be installed. |
|--|--|

The minimum handling installation temperature for **INFRAFLOOR** underfloor heating cable mats is 23°F

If you require assistance call our dedicated technical team now 888-203-9730.



PRODUCT TABLES

11 W/Sq. ft. - CABLE MAT FOR INSTALLATION AT 120V

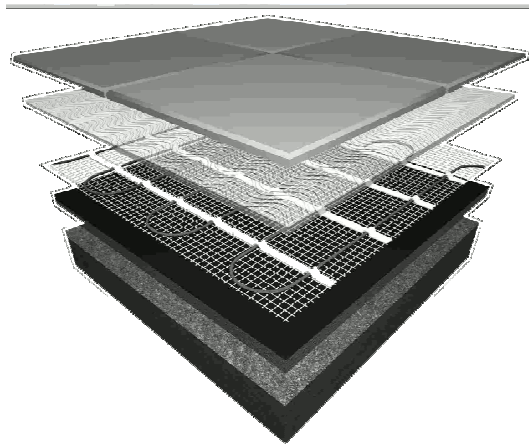
S.F. Area to be heated	Mat Reference	Output (W)	Width (ft)	Length (ft)	Resistance (Ω)
7	54FM120	77	1.5	4.5	187.1
11	87FM120	132	1.5	7.3	109.4
18	141FM120	203	1.5	11.8	71.1
23	183FM120	272	1.5	15.3	52.9
34	270FM120	46	1.5	22.5	35.4
47	375FM120	562	1.5	31.3	25.6
59	468FM120	703	1.5	39.0	20.5
74	591FM120	880	1.5	49.3	16.4
84	672FM120	985	1.5	56.0	14.6
89	711FM120	1054	1.5	59.3	13.7

11 W/Sq. ft. - CABLE MAT FOR INSTALLATION AT 240V

S.F. Area to be heated	Mat Reference	Output (W)	Width (ft)	Length (ft)	Resistance (Ω)
6	48FM240	70	1.5	4.0	820.2
14	108FM240	153	1.5	9.0	376.6
22	174FM240	262	1.5	14.5	219.7
35	282FM240	404	1.5	23.5	142.5
46	366FM240	544	1.5	30.5	106.0
68	540FM240	812	1.5	45.0	71.0
94	750FM240	1123	1.5	62.5	51.3
148	1182FM240	1758	1.5	98.5	32.8
168	1344FM240	1968	1.5	112.0	29.3
178	1422FM240	2106	1.5	118.5	27.4

FLOOR CONSTRUCTIONS

Concrete Slab

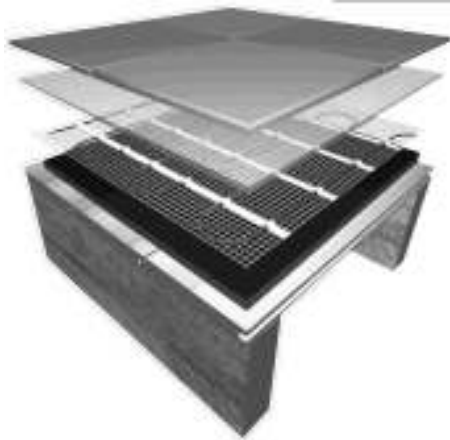


Concrete Floors - For optimum performance it is recommended that concrete subfloors be covered by a layer of insulation: cork or polystyrene foam board. This will minimize heat loss & ensure quicker heat-up times. **INFRAFLOOR™** can be laid directly onto an un-insulated concrete floor if it is insulated from below. If not insulated from below, this will increase operating costs.

- 1
- 2
- 3
- 4
- 5

1. Tile/Stone Floor
2. Thin-set mortar and/or self-leveling compound
3. INFRAFLOOR Mat
4. Optional Insulation
5. Concrete Sub-Floor

Wood Floors



- 1
- 2
- 3
- 4
- 5

1. Tile/Stone Floor
2. Tile Thin-set mortar and/or Self leveling compound
3. INFRAFLOOR Mat
4. Backer Board/ Plywood
5. Suspended Wood Sub-Floor

GETTING STARTED

It is good practice to plan your installation using a sketch marking your layout pattern and planning the positions for floor sensor, the connection box and thermostat.

Accurately measure the free floor area to be heated, in square feet, deducting any items of fixed furniture such as baths, WCs, showers, kitchen cabinets/appliances, etc. Use this calculated area (sq. ft.) to select the nearest cable mat size **DOWN** using the product selection chart. **NEVER** select the nearest mat size up.

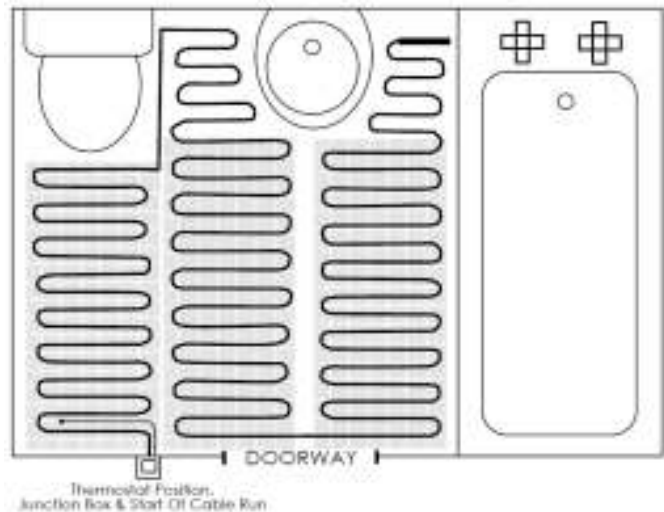
If the calculated “heated” floor area is larger than the mat sizes offered, you can use a combination of mats to achieve the coverage. Additional mats should be wired in parallel using a suitable junction box.

It is important that the correct size of **INFRAFLOOR** matting is used as the cable cannot be shortened.

Example:

Calculated Heated Area	Heating Mat Coverage	Product SKU #
27 S.F.	23 S.F.	183FM120
77.5 S.F.	74 S.F.	591FM120

Example Mat Layout



Note:

For hard to reach areas the cable can be removed from the matting and attached to the floor with thin-set mortar tape.

DO NOT install thermostats on an interior shower wall.

LAYING THERMAL INSULATION

Use of scrim faced reinforced extruded polystyrene foam board, minimum thickness (1/4") with a minimum thermal resistance value of R=1 is recommended.

CONCRETE FLOORS

Ensure the floor is level and dust free. A new concrete screed should be well cured prior to laying insulation board. A bed of polymer modified thin-set mortar should be applied to the floor using a notched trowel. Lay the boards in a staggered brick work pattern butting the edges together. Boards should be thoroughly bedded, ensuring that no air pockets remain.

A waterproof joint can be made using silicon sealant before butting the board edges together. When the thin-set mortar is dry, board joints can be taped with a fiberglass reinforcing scrim tape.

WOOD FLOORS

Boards can be laid onto a thin-set mortar. A bed of polymer modified thin-set mortar should be applied to the floor using a notched trowel. Lay the boards in a staggered brick work pattern butting the edges together. Boards should be thoroughly bedded, ensuring that no air pockets remain. 0.5" boards can be mechanically fixed to flat and level plywood floors (12" centers) using stainless steel screws with penny washers under their heads. These should be screwed down until the washer grips the boards. Cementitious surface joints can be taped with a fiberglass reinforcing scrim tape.



Note: 1/4" boards should NOT be mechanically fixed to the floor.

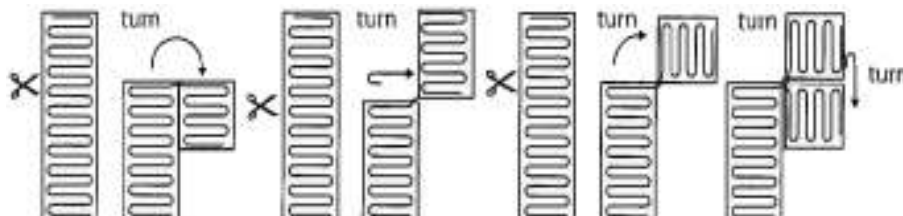
LAYING THE MAT

When rolling out the mat and you reach the end of a run, simply cut the backing mesh (NOT the orange cable) and turn 180 degrees.

The mat is unrolled in the opposite direction ensuring a minimum spacing of 2" between the cable loops. When satisfied with the proposed layout stick the matting to the floor using the integral "peel-n-stick" tape strips or using duct tape.

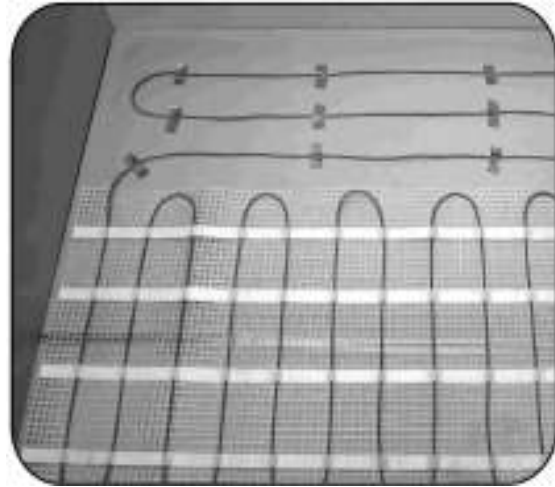
Note: the floor shall be clean from the dust and sharp objects.

Cables should never touch or cross each other at any time.



ADJUSTING THE MAT

For areas that will not accommodate the full mat width of 18" the cable can be removed from the matting and attached to the floor uniformly with duct tape. The matting can be further secured to the floor by hot glue gun or staple gun. This is recommended on the outer edges of the matting when using self-leveling compound to prevent the mat lifting. These additional fixing methods should only be used on the matting and NOT on the cable.



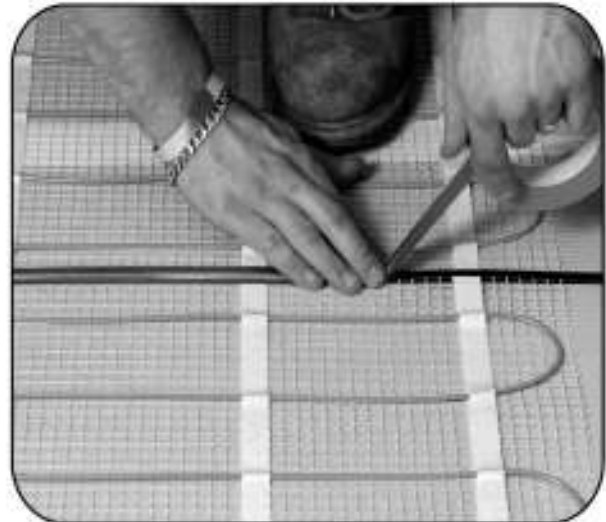
WARNING: Risk of electric shock and fire. Damage to supply conductor insulation may occur if conductors are routed less than 2" from this heating product. Refer to above for recommended means of routing supply conductors.

Connections of multiple mats must be done in PARALLEL at the power source/thermostat.

NEVER cut off the end of the heating cable to connect another one in series.

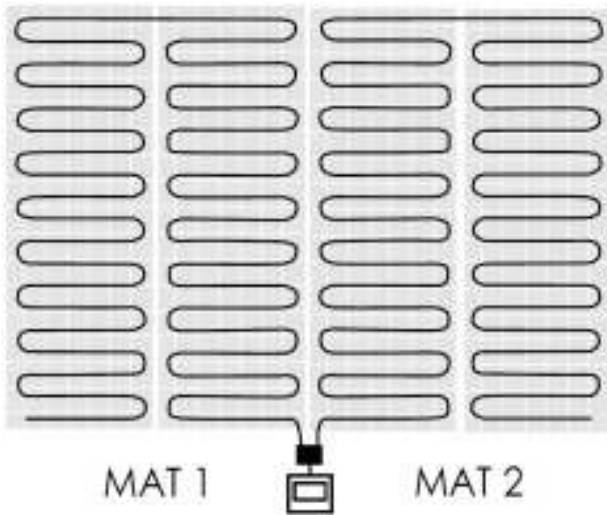
INSTALLING THE FLOOR PROBE/SENSOR

If necessary, cut a groove in the floor to accommodate the floor sensor for the thermostat. Before laying the sensor check the resistance using an Ohm meter. The sensor should be positioned between 2 heating cable loops under the mat approximately 20" from the wall. Additionally, a second backup sensor can be installed as a precaution against future replacement. Bring it to the box, but do not connect the second sensor to the thermostat. The existing floor should be prepared as normal for tiling. The entire floor should be swept clean and be free of any sharp projections. The floor surface should then be primed to accept the tile thin-set mortar if required.



JOINING MULTIPLE MATS

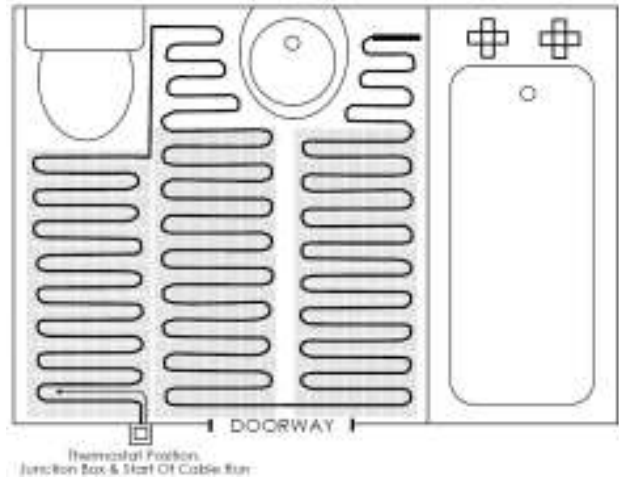
If your area to be heated is larger than the largest available mat size, **INFRAFLOOR™** cable mats can be simply wire in parallel.



EXAMPLE MAT LAYOUT

Note:

When spreading the floor with thin-set mortar use the trowel in the same direction as the cable runs to avoid damaging the cable. A plastic trowel is recommended



COMPLETING YOUR INSTALLATION

There are two recommended methods of covering the cable mat:

Concrete or wood floors using thin-set mortar – skim coat

Working with a width of mat at a time, apply polymer (latex or acrylic) modified Portland thin-set mortar on top of the mat so that it is completely covered, ensuring that there are no air pockets. This should be done using a rubber backed trowel or similar, taking care not to damage the cable. Once dry, another layer of thin-set mortar can then be applied carefully using a notched trowel to comb the thin-set mortar before laying the tiles.

Concrete and wood floors using self-leveling cement:

An alternative method for all but the smallest installation is to cover the cable mat installation with suitable latex self-leveling cement. This product will find its own level and once dry will provide a suitable flat surface to apply a layer of thin-set mortar before laying the tiles.



Important!

- i) The heating cable must NOT be cut or shortened and the joint between the cold lead wire (Black) and the heating cable (Orange) must not be bent or put under strain. Orange heating cables should never cross or touch (2" gap min) and must be installed in the floor. To insure no heating wire enters the wall, leave 3" of lead wire in the floor.
- ii) Always wear rubber soled shoes when walking on the cable mat and avoid any unnecessary traffic over the area until the cable is completely protected under a screed or layer of thin-set mortar.
- iii) A fully qualified electrician must now make the final connections to the main power supply and install the thermostat. The thermostat should be installed in the room to be heated. For showers, the thermostat must be placed outside the shower at least 4 ft. Control of the heated floor in this application is provided by the floor sensor only.
- iv) Make sure to check that the heater is connected to the proper voltage supply – 120V or 240V.

Finally the electrician should check for continuity of the floor sensor and retest the resistance of the cable. The installation should be protected by a 30mA GFCI for safe operation. Potentially wet areas, such as kitchens and baths, require a 5mA GFCI.

SWITCHING ON

Consult the thin-set mortar manufacturer’s instructions to determine a suitable drying out period before turning on the system. Once the thin-set mortar and grout has completely dried, operate the system at a reduced temperature, gradually increasing it over a 7 day period to full operation.

WARRANTY CERTIFICATE

Following installation, the Warranty certificate on the back of this installation guide should be **FULLY** completed, including a plan of the mat lay-out and position of the floor sensor. This could then be used for locating the cable mat in warranty claim situations. This booklet should be permanently fixed in or near the installation main power panel.

HEAT-UP TIMES

The speed of response of your **INFRAFLOOR** system depends on several factors including subfloor construction and tile material and thickness.

The table below provides indications of approximate heat-up times for various sub-floor constructions.

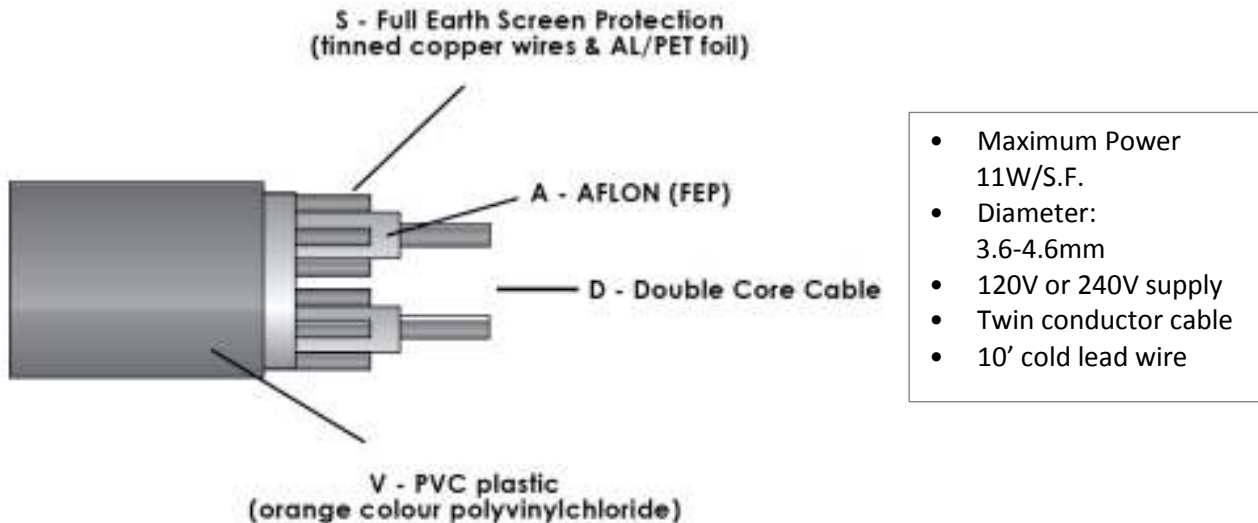
Subfloor Construction	Heat-up Time (hrs.)
Insulation board (0.5") on wood	0.5
Concrete slab -insulated under slab	2-5
Un-insulated slab	3-8+
Concrete with insulated board	1

TROUBLESHOOTING

Should you experience any problems with **your INFRAFLOOR™** installation not warming your floor surface please carry out the following tests before calling the Floor Heat Systems technical support team.

Step	Test	Outcome	Action
1	Check for a 120/240V supply to the thermostat terminals	120/240V	If no voltage present check electric power supply
2	Set the thermostat to the highest position and test for a 120/240V output. This may take a few minutes	120/240V	First, check the resistance of the floor sensor (step 3). If the floor sensor is normal the thermostat is faulty. Contact your supplier.
3	Turn off power to thermostat and test floor limit sensor resistance	Approximately 8-12KΩ for temperatures 68-86°F	If sensor is faulty, contact your supplier for a replacement or connect a backup sensor if it is installed in the floor
4	Turn off power to the thermostat and ensure mat resistance	Depends on mat size (see mat label)	If mat is faulty or the mat has been damaged. Contact your supplier.
5	Turn off power to the thermostat and measure resistance between the conductors and the ground wire	Yes (resistance value)	If there is resistance reading between the conductor and ground, the mat has been damaged. Contact your supplier

CABLE CONSTRUCTION



INFRAFLOOR INSTALLATION PLAN

To ensure the validity of your warranty please provide a layout plan of your INFRAFLOOR™ underfloor heating installation.

Floor Heat Systems has provided an example (next page) and a tickbox checklist to ensure this procedure is carried out correctly. A photograph of the complete cable layout and sensor positioning before tiling is highly recommended. These records could then be used for locating the cable in warranty claim situations.

This sketch should be left next to the main power panel of the heating system together with thermostat user instructions, warranty certificate, original sales receipt and supplied sticker (see opposite) for the main power panel to alert users of the installation. A second sticker (see opposite) should be fixed to the individual room heater controller.

WARNING

Risk of electric shock. Electric wiring and heating panels contained below the floor. Do

RADIANT FLOOR HEATING

Fix this label to the thermostat.

Part 1 - To be completed by the cable mat installer

What are the room dimensions? _____

What is the product code(s) of the INFRAFLOOR mat installed? _____

Have you marked the position of the junction box on the sketch? _____

Have you marked the position of the thermostat box on the sketch? _____

Have you marked the position of the floor probe on the sketch? _____

Have you marked the position of the cable turns? _____

Part 2 – To be completed by the electrician

What is the measured resistance of the installed INFRAFLOOR mats (Ohms)?

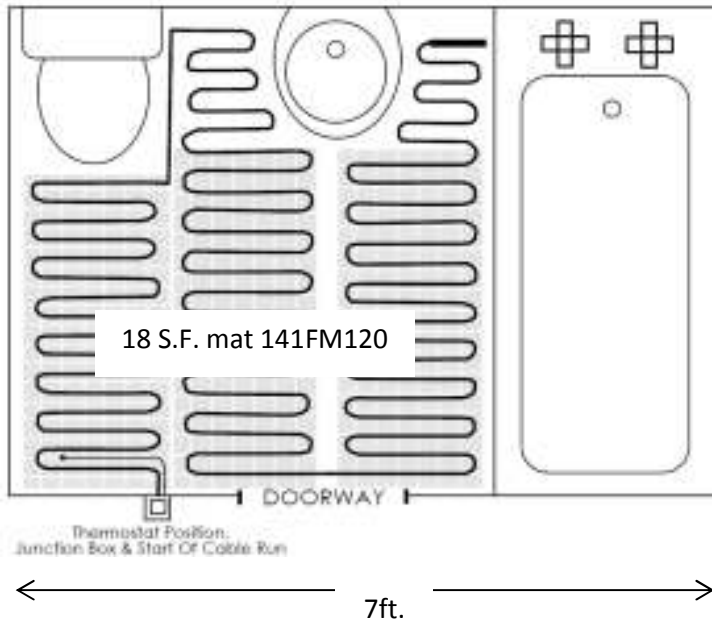
SKU# _____ SKU# _____ SKU# _____ SKU# _____
_____ Ω _____ Ω _____ Ω _____ Ω

What is the total power of the installation (W) _____ W

Circuit Voltage: _____ (V). What is the GFCI rating (mA) _____

Rated Voltage of the mats _____ (V).

INSTALLATION PLAN



↑ Please retain a detailed layout plan using the example to the left as a guide.

Take care to show the following:

- Product used
- Thermostat position
- Junction box position
- Start and end of cable run
- Floor probe position
- Any fixed furniture/fitings
- Room dimensions



**10 Year
Warranty**

WARRANTY CERTIFICATE

INFRAFLOOR™ underfloor heating mat

This warranty is only valid under the following conditions:

- All electrical connections were carried out by a qualified and licensed electrician.
- The warranty covers faults in material for 10 years for INFRAFLOOR heating mat and 2 years for other components from the date of purchase.
- The completed warranty and proof of purchase must be presented in connection with warranty claims.
- The INFRAFLOOR™ installation plan has been completed by the installer and the electrician.
- The warranty covers the repair/replacement of goods found to be faulty due to manufacturing defect and does not cover any secondary charges relating to the repair/replacement of any floor covering.
- The Floor Heat Systems, Inc warranty does not cover faults resulting from incorrect design or installation or damage caused by others.

Please complete this installation completion certificate and retain a copy to validate the warranty.			
Owners Name:			
Address:			
Room(s) Installed:			
Mat SKU#(s)			
Resistance (Ohms):			
Installer's Name:		Phone:	
Electrician's Name:		Phone:	
Electrician's License Number:			
Signed by electrician:		Date Completion Tested:	
FloorHeat Systems 1954 First Street ▪ Highland Park, IL 60035 ▪ 888-203-9730			
This instruction manual must be left at the main power panel along with a copy of the thermostat operating instructions and the original sales receipt. The supplied stickers should be placed near the main power panel and in the room installed with the underfloor heating			