Heatlay Ltd., 343 Montrose St. N., Cambridge, ON N3H 2H6, P: 519-650 -3737, F: 1-866-859-1241,
www.heatlay.com

INSTALLATION INSTRUCTIONS FOR HEATLAY HLX SERIES TRADITIONAL MORTAR BED HEATING MATS

WARNING

COMPLETLY READ ALL OF THESE INSTRUCTIONS AS WELL AS THOSE FOR ALL THE OTHER PRODUCTS USED IN YOUR FLOOR SYSTEM BEFORE BEGINNING INSTALLATION. FAILURE TO OBSERVE THE PRODUCT WARNINGS COULD RESULT IN DEATH OR INJURY FROM ELECTRICAL SHOCK OR FIRE. MAT FAILURE, IMPROPER OPERATION OR FLOOR DAMAGE MAY ALSO BE A RESULT. A MAT WARRANTY IS PROVIDED (PER NOTED TERMS) BASED ON THE INSTALLATION BEING DONE IN ACCORDANCE WITH THESE INSTRUCTIONS. IMPROPER INSTALLATION MAY VOID WARRANTY.

Inspection

Electrical inspection may be required during and or after heating mat installation. **BEFORE BEGINNING INSTALLATION** contact your local electrical and building inspection authorities for more information. Local codes may require this mat and/or the thermostatic control to be installed or connected by an electrician. Heatlay requires all electrical connections be made by qualified personnel and in accordance with the Canadian Electrical Code (CEC) or National Electrical Code (NEC) and all applicable local codes and ordinances.

Application

The Heatlay mat has been designed to warm hard surface materials such as ceramic and porcelain tiles, marble, granite, slate, laminate and engineered wood flooring. Heatlay mats are designed for use inside residential and light commercial buildings.

DO NOT use the Heatlay mat for applications other than for embedded indoor floor warming.
DO NOT use the Heatlay mat directly beneath carpet, solid wood, linoleum or vinyl floors.
DO NOT energize the Heatlay mat until it is embedded in thinset masonry and the masonry has cured per manufacturer's recommendations.
DO NOT cut or modify the Heatlay mat to fit the area.
DO NOT overlap Heatlay mats, install edge to edge.
DO NOT use staples to hold or secure the mat, cold lead or thermostat sensor wire.
DO NOT attempt to repair a damaged heating mat, call Heatlay for instructions before proceeding further.
DO NOT unroll and install mat when it is colder than 10C (50F).
DO NOT cross construction or expansion joints.

Heatlay mats provide comfort warming. Heatlay mats are approved to standard C22.2 No 130 and carry a –X rating, suitable for indoor embedded floor surface heating, dry locations. Residential kitchens, basements and bathrooms (not shower areas) are considered dry locations. Areas below a waterproof membrane are usually considered dry locations; consult with your local authority for confirmation. Heatlay mats must be connected to a ground fault protection device. Heatlay thermostats include ground fault protection.

Operational Notes

- The wire spacing and power output of each Heatlay mat is custom designed and also thermally balanced in multi-mat applications. The power output of each mat will be between 12-15 W/ft^2.
- Each floor is unique and will heat at a different rate as such it may take as little as 30 minutes or as long as 3 hours to reach the optimum temperature, possibly longer under certain conditions.
- Heatlay recommends using a floor sensing thermostat to regulate floor temperature. Heatlay offers a programmable thermostat which allows the mats to be automatically shut off at night or when you are away from home.
- If the overall floor surface feels unusually hot when the system is energized, or if the circuit breaker trips when the system is energized, the mat may be damaged. De-energize the system immediately and contact Heatlay. **Never bypass a tripped ground fault device.**

Planning Ahead

- To reduce the potential for tile cracking ensure the subfloor structure is built strongly enough to accommodate the tile (slate, granite, etc.) and tiling method selected. Your local tile retailer may be able to help with such information. The *ANSI*, *Tile Terrazzo Marble Association of Canada* or the *Tile Council of North America* have published standards available which provide detail on recommended methods of flooring construction. If using metal mesh always fully cover the mesh with a layer of thinset prior to laying the mat as the mesh edges are sharp enough to damage the heating mat.

- When installing the mat on a floor which is over an unheated area it is recommended that the area below the floor be insulated. If left uninsulated the finished floor may not be able to achieve comfort temperatures due to heat loss below.

- When installing the mat on top of a concrete slab it is recommended to insulate the slab surface, between the slab and the heating mat, in order to limit heat loss (refer to the applicable building code for slab insulation requirements). If left uninsulated the finished floor may not be able to achieve comfort temperatures due to the heat sink effect of the slab.

- Heatlay recommends that the mat(s) be installed on a dedicated 20 Amp circuit and controlled by a TH series line voltage ground fault thermostat. There are instances where the load requirements of the mats installed may exceed the dedicated circuit rating. In these instances divide the load (area) into zones and use multiple thermostats or use thermostat relays on multiple circuits controlled via one thermostat. Consult with the local electrical authority for approved methods. Contact Heatlay for control options.

- Ensure electrical junction boxes are properly positioned such that the leads from each mat will be able to reach into and extend 6” beyond the box. A large volume single gang 2” x 4” box is usually suitable for 1 or 2 mat installation, a 4” x 4” double gang box (with a single gang plaster or mudring) is recommended for installation with 2 or more mats.

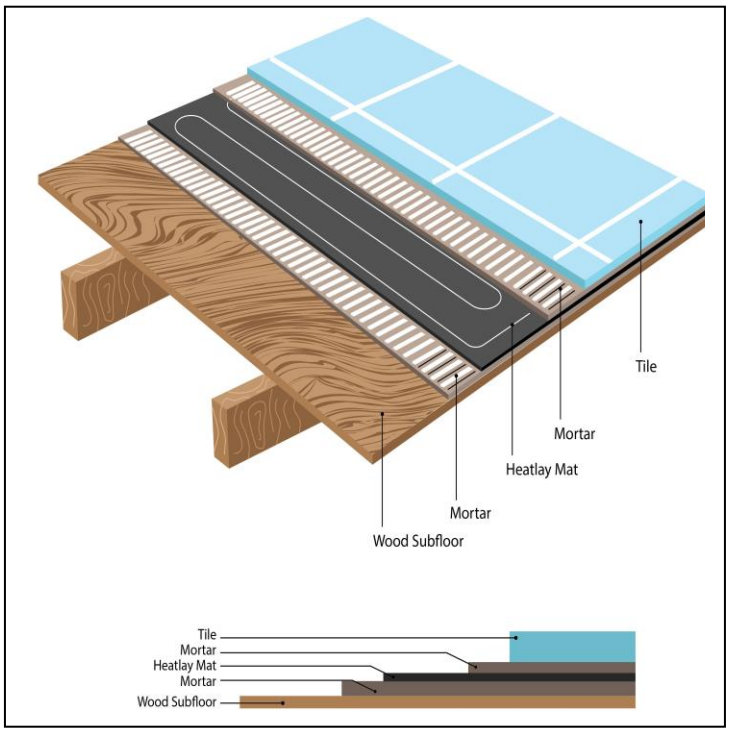
Take Pictures and Keep Notes of Installation Detail

Heatlay recommends you keep track of the details of your installation and save for future reference. The tables at the back of this instruction are set up to help you record the installation details. We recommend taking photos of the installation as it progresses from mat installation to a finished floor.

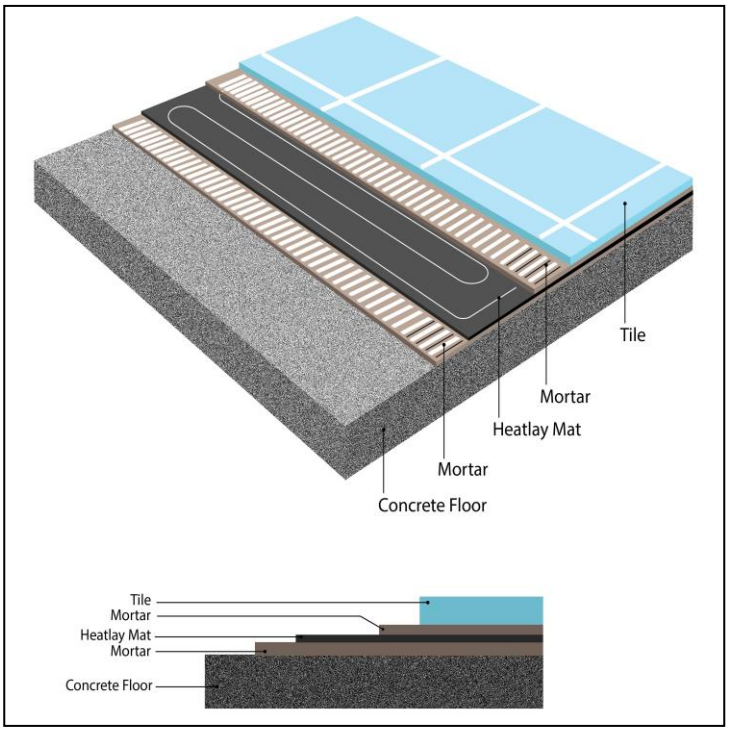
Typical Flooring Cross Sections

The following diagrams show cross sections of the most common floor constructions. Use them as a visual reference as you read further.

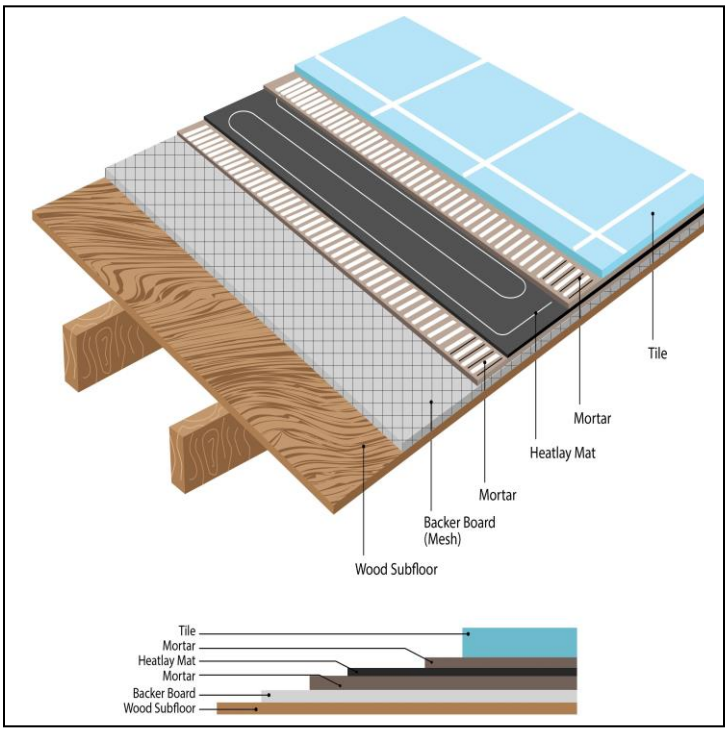
Tile over wood subfloor.



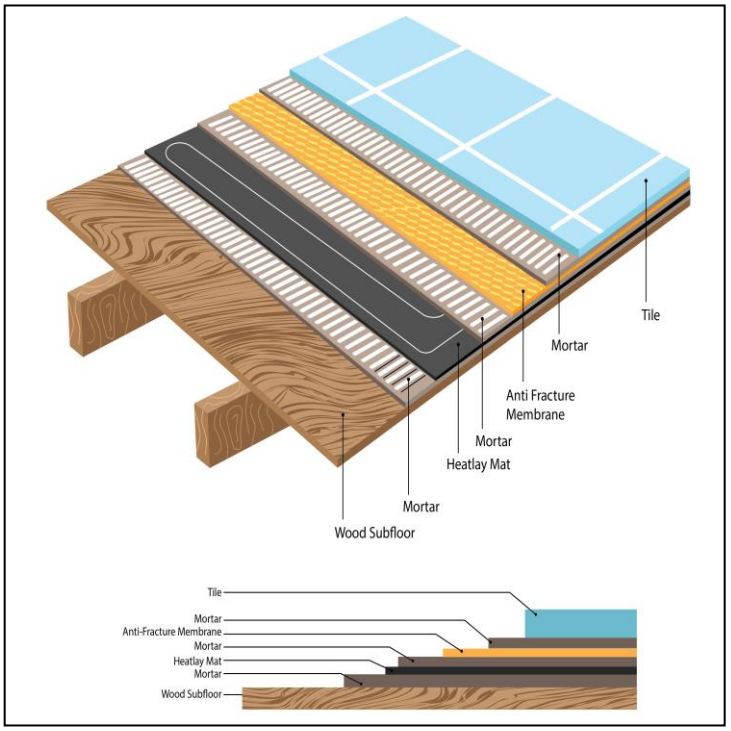
Tile over concrete subfloor.



Tile over backerboard (or mesh).

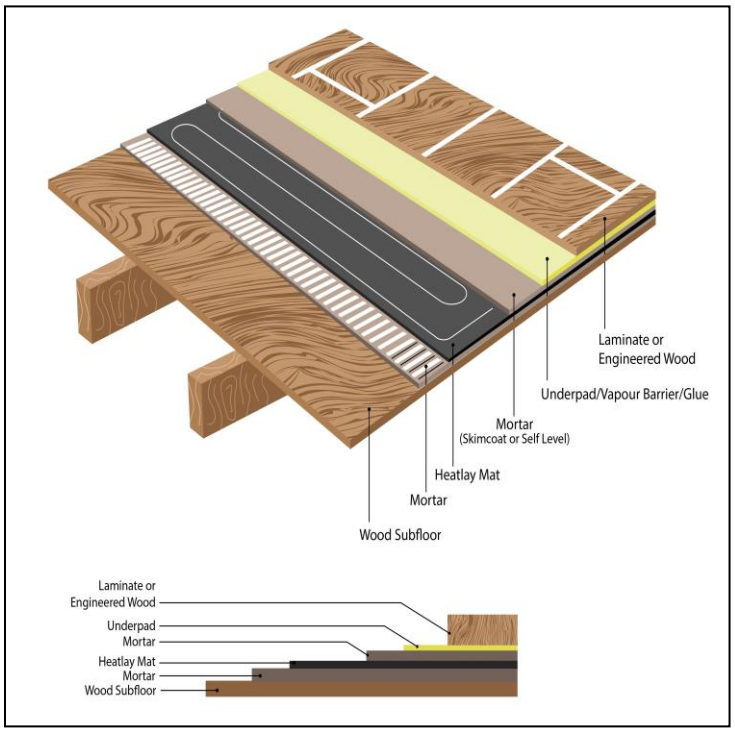


Tile over anti-fracture membrane.

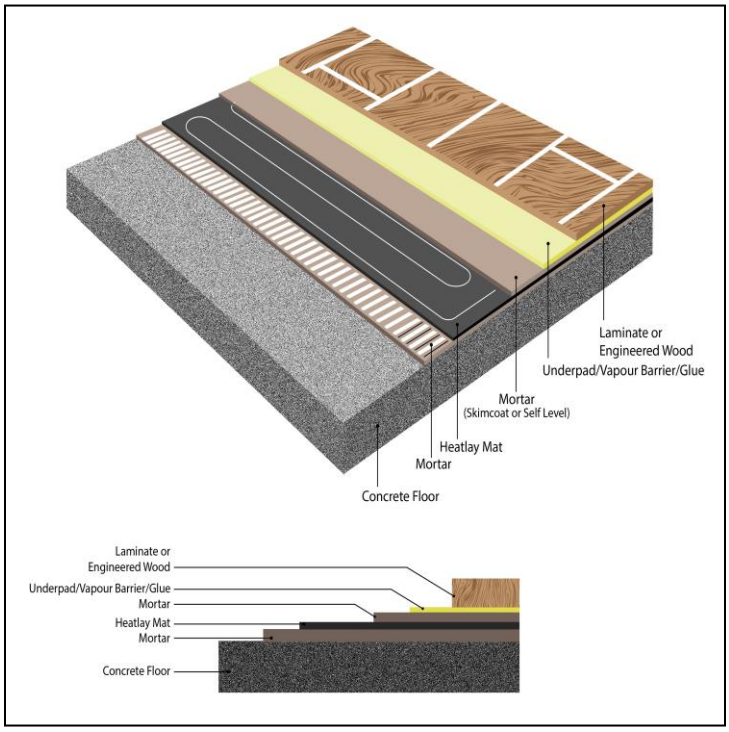


Typical Flooring Cross Sections, cont'd

Laminate over wood subfloor.



Laminate over concrete subfloor.



Tools required

- Square notch trowel, 1/4"x1/4" or larger (e.g. 3/8" x 3/8").
- Rubber grout float.
- Tape or hot melt glue.
- Electrical and construction tools: (screwdriver, wire stripper, etc.).
- Digital ohmmeter capable of 20 to 20,000 ohms readings.
- Megohmmeter capable of 500V testing or a multimeter capable of continuity measurements.

Materials

- Heatlay mat
- Tiling materials (latex/polymer modified thinset mortar, waterproof membranes, tile, grout, etc.).
- Floor-sensing thermostat with integral ground fault protection.
- Thermostatic relay and ground fault protection device (only as required for multiple mat installations).
- Electrical junction box for thermostat. A 2"x4" box is suitable for a single mat installation, a 4"x4" box is recommended for two or more mats. Conduit (if required by local code).

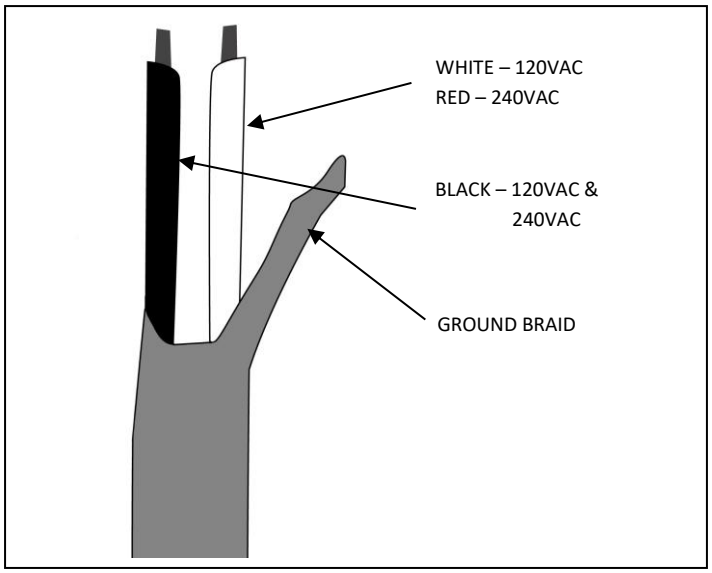
Subfloor Preparation

Before beginning installation ensure the subfloor is clean and free of loose material. Protrusions such as nails or screw heads sticking above the floor level must be removed and ridges levelled smooth. Review and follow your thinset manufacturer's recommended floor preparation requirements.

Electrical Tests

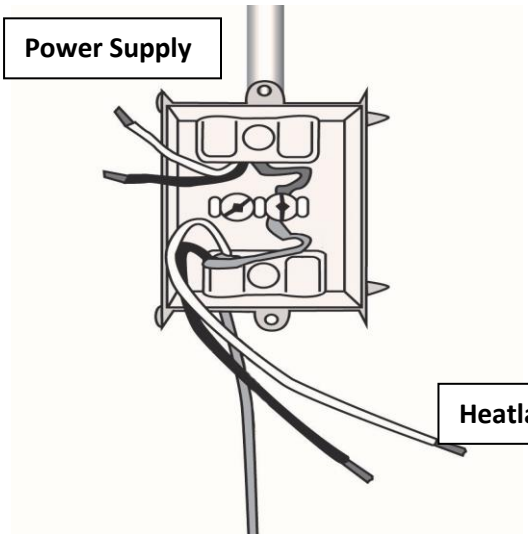
- Conduct electrical tests: 1) after the dry test fit, 2) after the mat is installed in its mortar layer and 3) after tiling/finishing the flooring.
- If there are problems with any of these tests resolve before proceeding further.
- Check the resistance of the mat. The resistance for 120V mats is measured between the black and white conductors; the resistance for 240V mats is measured between the red and black conductors. The resistance value measured should be +/- 10% of the resistance value noted on the rating label.
- Heatlay recommends that the insulation resistance of each mat be tested by connecting a megohmmeter across the black lead and the ground braid. Test 500VDC, 20 megohm minimum insulation resistance. Ground the black conductor after each test to discharge any energy build-up. If a megohmmeter is unavailable measure the continuity across the black lead and the ground braid. The continuity reading should be infinite or "OL".
- Measure the resistance across the two conductors of the temperature sensor, the resistance value will change with temperature, as such it may read anywhere from 8,000-14,000 ohms.
- As the tests are completed record the measurements in the tables on the back page.
- **IMPORTANT**. Heatlay requires all electrical connections be made by qualified personnel and in accordance with the Canadian Electrical Code (CEC) or National Electrical Code (NEC) and all applicable local codes and ordinances.
- Only connect the mat to the rated voltage. **DO NOT** use higher voltages as this will increase current draw and cause the mat to overheat; possibly resulting in death or injury from electrical shock or fire, mat failure, improper operation or floor damage.
- Consult the thermostat manufacturer's instructions for proper wiring detail.
- A circuit protected by a ground fault protection device must be used to power mats connected through a relay.

HL Mat Leads



Multimeter

Wiring Reference



- Each Heatlay HL mat has one leads with 2 conductors.
- Each lead has its own grounding braid.
- Ensure that the cold lead braid is directly connected to electrical ground. If the ground braid is not connected to electrical ground there will be a risk of electrical short circuit, overheating or electrical shock.

Test Fit - Dry

1. Verify the mat voltage is correct; 120V mats have black and white leads, 240V mats have red and black leads.

2. Completely roll out the mat(s) on the floor to ensure it fits the floor space and run the leads into the junction box. *Multiple mats install edge to edge, do not overlap.*

2. Confirm the leads are long enough to reach the electrical junction box and will extend a minimum of 6" beyond the box.

3. Conduct Electrical Tests as previously described.

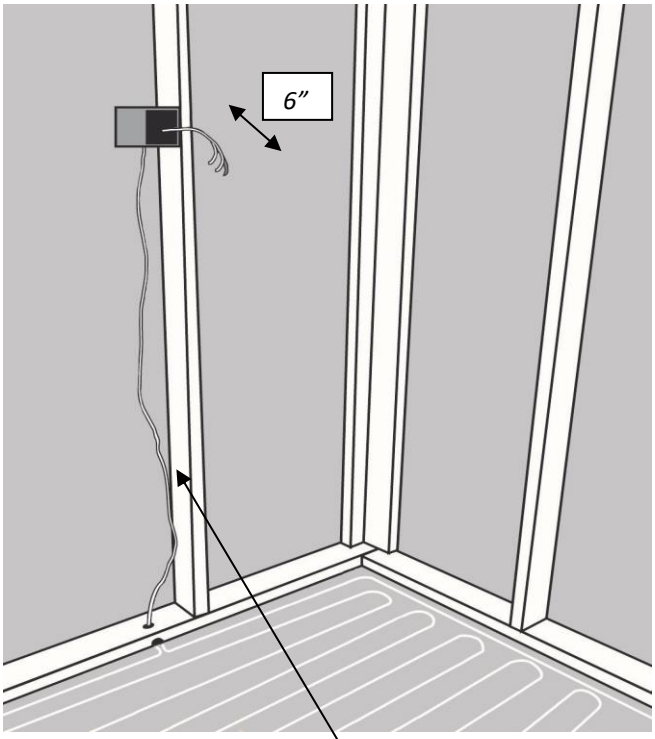
4. Use a marker to trace the cold leads and mark the splice locations on the subfloor.
   - ❖ The cold lead and splices are slightly thicker than the mat, some removal of sub-floor material may be required where the splices will set or where the cold leads will run to eliminate any possible interference with the tile. See side note.

5. Carefully roll the mat back up and have ready for the next step.

6. Drill or cut holes at the bottom wall stud plate for routing the cold lead and thermostat sensor wire to the electrical junction box.

- ❖ **DO NOT** cut or modify the Heatlay mat to fit the area, if there is a problem with fit contact Heatlay.

- ❖ Ensure that you have the sensor for the thermostat; it is usually packed in the same box as the thermostat and will be needed prior to tiling or putting on the laminate or engineered wood floors.

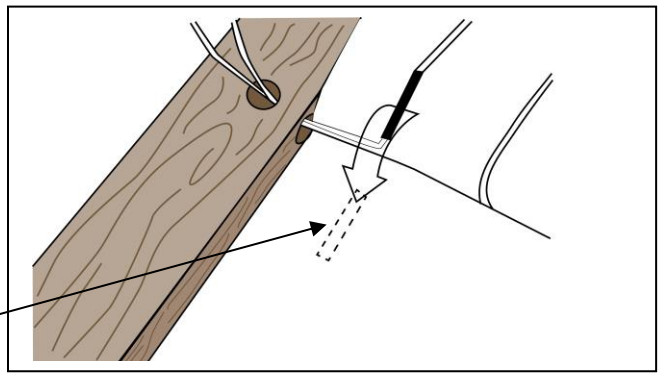


Cold Lead and Conduit Note

The braided cold lead may be installed with, or without, electrical conduit. Confirm conduit requirements with your local electrical and building inspection authorities.
Each mat has 1 lead with 2 conductors.

Splice Thickness Note

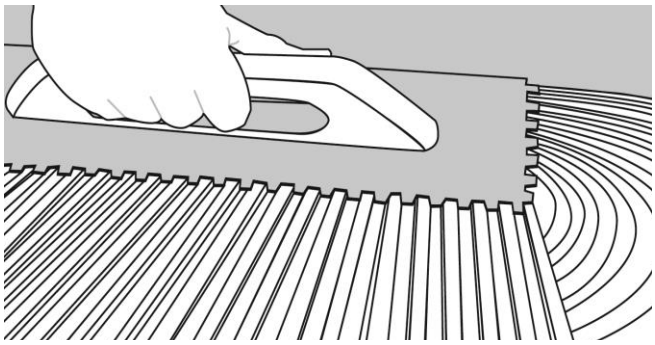
The splice is thicker than the majority of the mat. This thickness difference is typically balanced out by the mortar coverings and thus will not affect the final floor height level. If you are concerned it may present a height issue then it is suggested to cut, or chip, a recessed notch in the floor.



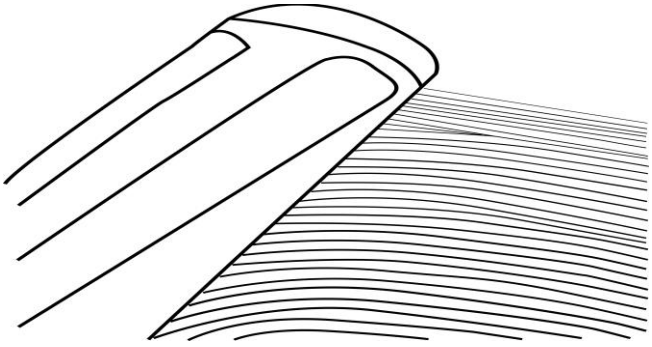
Splice notch.

Install the Mat

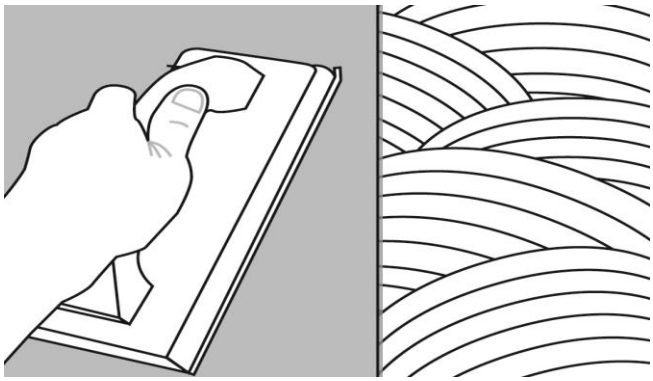
IMPORTANT Take care not to damage the mat during installation, avoid the placement of heavy equipment or pails of mortar on the mat. Limit trade traffic across floor.



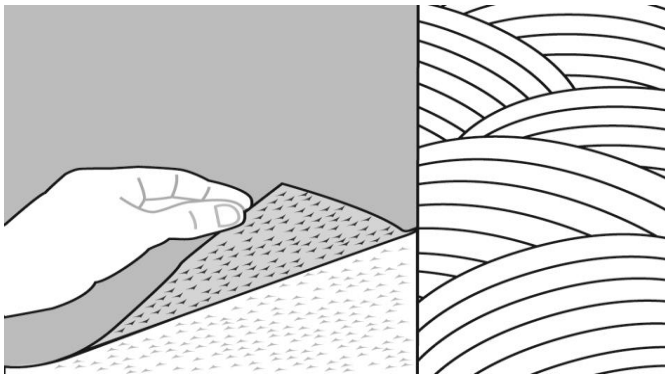
1. Using square notch trowel, 1/4” x 1/4” or larger (e.g. 3/8” x 3/8”) apply a layer of thinset to the subfloor area which will be covered by the Heatlay mat. If the subfloor area is particularly large it may be necessary to apply the thinset in sections.



2. Carefully roll out the mat into the mortar bed.



3. The entire mat must be in contact (embedded) with the thinset layer. To ensure complete contact use a rubber grout float to press the mat into the thinset.



4. Check the bond between the mat and thinset by peeling up an edge of the mat, the mat should look at least 90% covered with thinset material. Check that the splices and cold leads are in the proper positions.

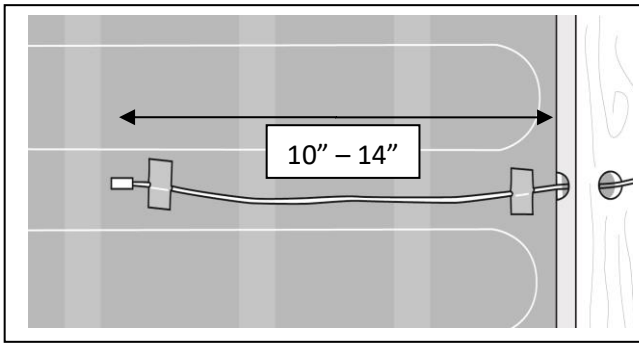
5. Run the cold leads into the electrical junction box and protect at the bottom wall stud with a guard plate.

6. If there is more than one mat being installed ensure the edges of the mats are aligned edge to edge, this ensures even heating across the floor.

7. Conduct Electrical Tests as previously described. Your installation may require inspection at this point; consult with your local building and electrical inspection authorities.

Secure the Thermostat Floor Sensing Probe

IMPORTANT. The thermostat floor sensing probe must be installed prior to setting the tile (or other covering) in place. Secure the probe on top of the mat with tape or hot melt. The sensor should be positioned in the middle of two heating cable runs, and 10” – 14” from the edge of the mat. Avoid placing it in an area where the floor sees direct sunlight. Run the free end of the sensor wire back to the junction box.



Installation Warnings

Do not hammer high spots to level floor, hammering high spots can damage the heating mat resulting in risk of electrical shock and/or mat failure.

Clean grout lines carefully, scrapers can penetrate and cut into the heating mat below possibly resulting in death or injury from electrical shock or fire, mat failure, improper operation or floor damage.

Do not drill into floors with Heatlay mats; drills can cut into the heating mat below possibly resulting in death or injury from electrical shock or fire, mat failure, improper operation or floor damage.

Thinset and grout materials have cure times, review the recommended cure time from each manufacturer and do not energize the mat until the materials have fully cured. This cure time may be as long as 28 days.

Install the Floor Covering

Tile

- **Before installing.** Read the tile flooring manufacturer’s installation instructions; review any specific instructions they may have with regard to the use of their product with electric radiant heating.
- Install the tile on top of the mat and grout in the normal manner. The thickness of the thinset layer must be in accordance with the tile and thinset manufacturer’s recommendations.
- Conduct Electrical Tests as previously described. Your installation may require inspection at this point; consult with your local building and electrical inspection authorities.

Laminate or Engineered Wood Floors

- **Before installing.** Read the laminate or engineered flooring manufacturer's installation instructions; review any specific instructions they may have with regard to the use of their product with electric radiant heating.

- Cover the mat with at least ¼" of thinset or self leveling compound. Ensure the thinset or self leveling compound is smooth and level as an uneven finish may result in a poor floor fit. Allow the compound to cure as per the manufacturer's instructions.

- Install a vapour barrier (if necessary) and any under padding as per manufacturer's instructions.

- Install the laminate or engineered wood flooring as per the manufacturer's instruction. Allow the floor time to acclimatize to the room's temperature and humidity levels before using the floor heating (1-3 days).

- Conduct electrical tests as previously described, if there are any problems contact Heatlay before proceeding further.

- Many laminate and engineered wood flooring manufacturers recommend that the floor temperature be limited to a maximum of 28C (82F). Heatlay thermostats, employing a floor sensing bulb, provide this level of control.

Special Note on Waterproofing (not anti-fracture) Membrane Installations

Use Heatlay mats in conjunction with waterproof membranes that, as a minimum, meet American National Standard for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations (ANSI A118.10) and are suitable for the intended application.

IMPORTANT. The mats must be installed on a GFCI (personnel protection, 5 milliamp trip level) protected circuit.

- **Before installing.** Read the waterproofing membrane manufacturer's installation instruction and tile flooring manufacturer's installation instruction. Review any specific instructions either may have with regard to the use of their products with electric radiant heating.

- Apply a layer of mortar (minimum 1/4" x 3/16" V-notched trowel or a 1/8" x 1/8" square-notched trowel) on top of the mat to secure the waterproofing membrane.

  *The **Mat**, consisting of **Heating Wire, Splice Connections** and **Cold Leads**, as well as any **Thermostat Sensor**, must be **Fully Covered** by a waterproofing membrane when in wet locations.*

- Install the tile on top of the membrane. The thickness of the thinset layer must be in accordance with the tile and thinset manufacturer's recommendations.

- Conduct Electrical Tests as previously described. Your installation may require inspection at this point; consult with your local building and electrical inspection authorities.

Installation Record

Floor Installer Information

Business Name		Installer's Name	
Business Address (Street/Town/Code)		Business Email	
		Business Fax	
Business Phone		Date Completed	

Electrician Information

Business Name		Installer's Name	
Business Address (Street/Town/Code)		Business Email	
		Business Fax	
Business Phone		Date Completed	

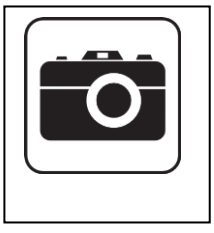
Multimeter Resistance Measurements

Room					
Mat 1: Ohms at dry fit.		Ohms after installing mat.		Ohms after tiling/finishing.	
Mat 2: Ohms at dry fit.		Ohms after installing mat.		Ohms after tiling/finishing.	
Mat 3: Ohms at dry fit.		Ohms after installing mat.		Ohms after tiling/finishing.	
Mat 4: Ohms at dry fit.		Ohms after installing mat.		Ohms after tiling/finishing.	
Mat 5: Ohms at dry fit.		Ohms after installing mat.		Ohms after tiling/finishing.	
Thermostat Sensor: Ohms at dry fit.		Ohms after installing mat.		Ohms after tiling/finishing.	

Insulation Resistance Measurements (megohmmeter or continuity)

Room					
Mat 1: IR at dry fit.		IR after installing mat.		IR after tiling/finishing.	
Mat 2: IR at dry fit.		IR after installing mat.		IR after tiling/finishing.	
Mat 3: IR at dry fit.		IR after installing mat.		IR after tiling/finishing.	
Mat 4: IR at dry fit.		IR after installing mat.		IR after tiling/finishing.	
Mat 5: IR at dry fit.		IR after installing mat.		IR after tiling/finishing.	

Photo Details



	Notes
Photo 1:	
Photo 2:	
Photo 3:	
Photo 4:	
Photo 5:	

LIMITED WARRANTY AND LIABILITY

Heatlay Ltd. (the company) warrants its electric floorwarming mats to be free from defects in materials and workmanship for twenty five (25) years from the date of purchase by the original purchaser. The maximum liability of the company is limited to the purchase price of the original mat and does not include; labour, removal, installation, incidental, consequential or other costs. This warranty is not transferrable; it is exclusively for the sole benefit of the original purchaser.

If the malfunction of the mat is determined to be a result of defective materials or workmanship by Heatlay Ltd. then a refund of all or part of the original purchase price of the mat will be paid in accordance with the following: 100% for the first five (5) years, then on a declining scale calculated by multiplying the original purchase price by the percentage of remaining warranty (e.g.; a valid claim in year 6 will be able to receive 19/25 of the original mat purchase price).

A refund of the purchase price described above is conditional upon all of the following being provided to Heatlay Ltd.:

a) Confirmation of proof of purchase.
b) Confirmation the mat was installed in accordance with the installation instructions.
c) Confirmation the mat was installed in accordance with the Canadian Electrical Code (CEC) or National Electrical Code (NEC) and all applicable local codes and ordinances.
d) Confirmation the mat was installed by qualified personnel.
e) Confirmation the mat was not damaged or in any way by activities unrelated to the operation of the mat.
f) Full details of the installation, operation, and any repairs or modifications that may have been made.
g) The installation made available for examination by the company's representatives.

A refund of your purchase price as described above shall be your singular and exclusive remedy for a breach of this warranty.

The following are not covered by this Limited Warranty:

a) Any incidental or consequential damage, loss of time, loss of use or loss of income.
b) Any labour, materials or freight costs associated with removing, repairing or replacing flooring materials.
c) Any investigative costs related to the claim.

Heatlay Ltd. makes no claim as to the amount of floor temperature rise, the time to reach a given floor temperature or final floor temperature due to the innumerable variations in building construction and environmental conditions.

Heatlay Ltd. disclaims any warranty not provided herein, including any implied warranty of merchantability or implied warranty of fitness for a particular purpose. Heatlay Ltd. further disclaims any responsibility for extraordinary, incidental, or consequential damages arising from ownership or use of this mat including or loss of use, loss or time or loss of income. Heatlay Ltd. makes no other express warranty regarding any mat beyond this document. Any samples shown are merely for demonstration purposes and do not represent the final product. No employee agent or representative of Heatlay Ltd. has any authority to extend or revise this warranty unless such extension or revision is made in writing by the president of Heatlay Ltd.

Any implied warranties that may not be disclaimed, including implied warranties of merchantability or fitness for a particular purpose are limited in duration to twenty five (25) years from the date of purchase, unless prohibited by law, in which case all such implied warranties shall expire at the earliest time permitted by applicable law.

Some states do not allow limitations on how long an implied warranty may last, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

To begin the warranty refund process, please send a description of the defect and proof of purchase, postage paid, to Heatlay Ltd. at the address noted herein.

Heatlay Ltd., 343 Montrose St. N., Cambridge, ON N3H 2H6, P: 519-650 -3737, F: 1-866-859-1241, www.heatlay.com

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