WARM WAVES

LISTED
Radiant Heating Panel
4UH6

Listed Underwriters Laboratories Inc & UL 1683

Warm Waves Infloor Heating System Contractor's Guide

The Warm Waves® Infloor Heating System can be customized and configured on a job site. The heat panel mat is available from a 550 ft^2 roll that can be cut to length or width to fit the room layout needed for a given installation, and it can be wired for either 120V or 240V AC power.

This reference guide is to show the possibilities Warm Waves® Infloor Heating System. Always consult a licensed electrician, the UL Manual and this Installation Guide to make sure your designed installation conforms to the relevant guidelines.

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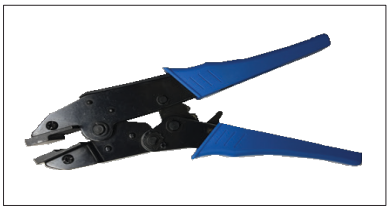
Tools Required for Installation

TOOLS NEEDED TO INSTALL THE WARM WAVES® INFLOOR HEATING SYSTEM

ELECTRICAL TOOLS

Digital Multi-Meter

Wire Cutters



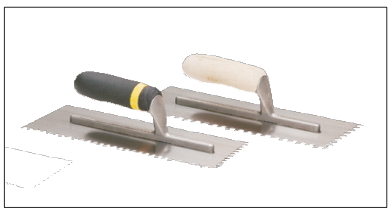
Crimping Tool

HEAT PANEL INSTALLATION TOOLS

Tape Measure

Scissors

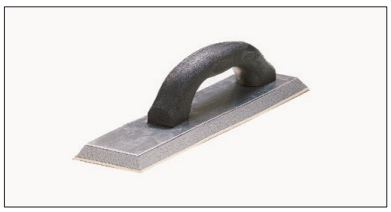
MORTAR AND GROUT INSTALLATION TOOLS



Trowels

Bucket

Mixer and Drill



Grout Float

Sponge

Broom/Dust Pan

General Notes and Information

READ ALL INFORMATION PROVIDED IN THIS GUIDE BEFORE ATTEMPTING TO INSTALL THIS PRODUCT.

This product must be installed according to the manufacturer's instructions, this installation guide and regulations required by the applicable governing body. Failure to do so will void the warranty for the product.

DANGER: Caution must be taken to guard against risk of electrical shock, fire and bodily injury during installation of this product.

All floors and subfloors must be prepared in accordance to ANSI (American National Standards Institute) and TCNA (The Tile Council of North America) specifications and local building codes or guidelines for use of thermal barriers with heating components. All grout, polymer modified thinset mortars and moisture barriers used in the installation must be fully cured (typically 28 days depending on size and type of tile installed, refer to manufacturer's recommendations) prior to heating your room for the first time.

DANGER: NEVER OVERLAP, layer or stack the heat mat on top of another piece of the heat mat. Failure to comply will damaged the system and associated areas including the building structure. The installation of this heat product must always use a DEDICATED electrical circuit.

The system should always be disconnected from its power source during servicing. This includes servicing to the thermostat.

All systems MUST be installed with a GFCI (Ground-Fault Circuit Interrupters) or EGFPD (Equipment Ground Fault Protection Device) compliant thermostat or breaker.

Inspect contents of the Warm Waves® Infloor Heating System for any damage PRIOR to proceeding with installation. If damaged, the system will not perform.

The supply wire or terminals cannot be repaired If the wire or terminal are damaged, it must be replaced If damaged, the system will not perform.

The National Electric Code does NOT allow the placement of nails, staples or other fasteners through the heat panel area or busbar zones. If a nail or staple is accidentally placed through this area, remove the nail or staple and tape over the damaged area (top and bottom) to seal it with the Edge Sealing Tape.

Prior to installation, consult the local codes. If any of the information in this guide is not consistent with local codes, the local codes must be followed. Electrical wiring is required to be run from a circuit breaker or other electrical circuit to the control. It is recommended that a qualified electrician perform these installation steps. **Be aware that local codes may require that this product and/or the control to be installed by an electrician, and may provide guidelines regarding thermal barrier requirements below the heat panel system.**

ALL REQUIRED INSPECTIONS PER LOCAL CODES MUST BE COMPLETED BEFORE COVERING THE HEAT PANEL MAT WITH FLOORING INSTALLATION PRODUCTS.

Thank You for Selecting Warm Waves® Infloor Heating System

This instructional manual is provided as a guide to installing a Warm Waves® Infloor Heating System, including design suggestions, installation steps, precautions and limitations.

Applications

Interior Infloor Heat

Listings

UL listed
Certified UL LLC and UL standard 1683

LISTED
Radiant Heating Pane
4UH6

Certified Underwriters Laboratories Inc & UL 1683

Electric

Controls: Warm Waves® Infloor Heating System must be controlled by a direct voltage floor heat sensing thermostat

Voltage: 120V-AC, 50hz / 60hz or 240V-AC, 50hz / 60hzz

Watts: 13 watts/sq. ft. (44 Btu/sq ft)

Maximum circuit load: 15 A

Maximum circuit overload protection: 20 A breaker GFCI (Ground Fault Circuit Interrupter) or EGFPD (Equipment Ground Fault Protection Device) required for each circuit (included in the thermostat control)

Maximum heat panel zone size: 120V system equals 120 sq ft per zone; 240V system equals 240 sq ft per zone. 1 thermostat per zone is required.

Heat Panel Mat

Maximum bend radius: Not to exceed 90° angle Do not crease/fold heat mat.

Maximum exposure temperature: (Continuous and storage) 150°F (65 5°C)

Minimum installation temperature: 50°F (10°C)

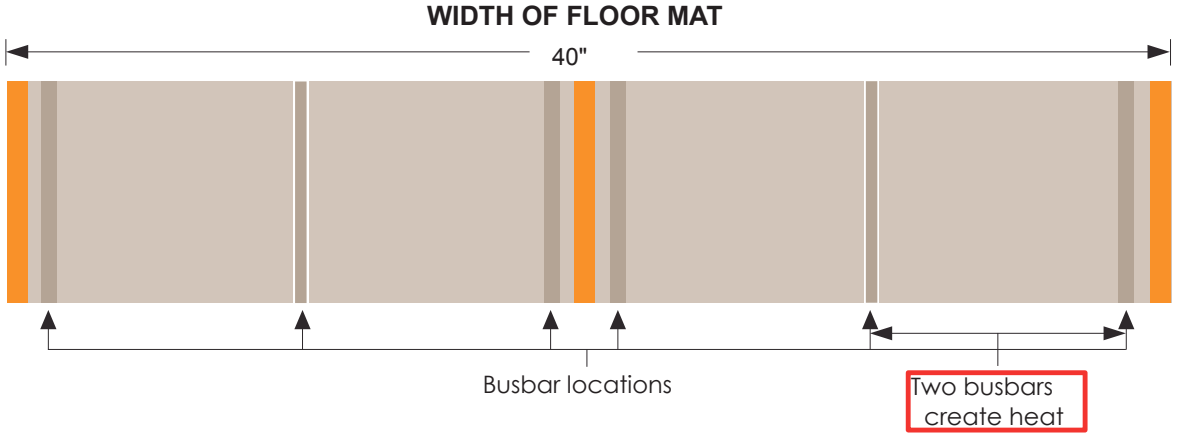
Skill Requirements

Installation must be performed by qualified persons, in accordance with local codes, ANSI/NFPA 70 (NEC Article 424) and CEC Part 1 Section 62 where applicable.

All electrical work must be installed in accordance with Article 424 Part IX of the National Electric Code (NEC) ANSI/NFPA 70 "STATEMENT OF NATIONAL ELECTRIC CODE PRODUCT COMPLIANCE (NEC). This product from Warm Waves® Products is compliant to Article 424, Part IX of the National Electric Code (NEC), "Electric Radiant Heat Panels and Heat Panel Sets" and as a Heat Panel Set Electrical installations must use a terminal junction assembly supplied by Warm Waves® Products Inc per NEC 424 96. Local building codes regarding thermal barriers must be followed.

Understanding Warm Waves® Infloor Heating System

Warm Waves® Infloor Heating System is 40" wide and can be cut to many lengths to accommodate your specific needs The heat mat may be cut to any length with the use of scissors. It can also be cut at any angle needed for each application, including cutting for an electrical outlet, toilet flange, drain or floor register. A great advantage for the installer is that this heat panel mat can be customized on the job site.



There are a few things you will need to know about the structure of the heat mat. Electrical current conducting copper busbars run down the length of the heat mat (two busbars are required to create heat - see illustration above). If you happen to damage a busbar during installation, you may experience a cold spot.

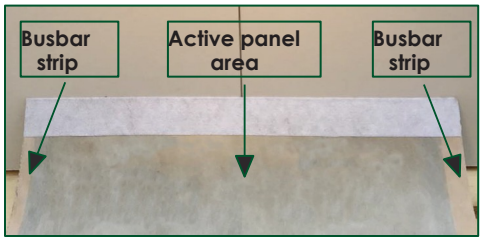
Under NO circumstances must the active areas of the heat mat be allowed to overlap itself or onto adjacent pieces of the heat mat. The heat mat can be installed with either side of the mat facing up or down.

Floor Temperature Expectations

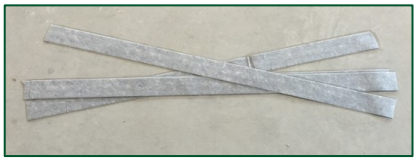
The Warm Waves® Infloor Heating System is designed to deliver 44 Btu/sq ft, with a maximum attainable temperature between 90°F and 104°F. Heat performance may vary depending upon the subfloor and the layers of material included in the floor installation. The floor temperature attainable is dependent on how well the floor is insulated, the temperature of the floor prior to start up, and the overall thermal drain of the floor mass. Insulation is recommended for best performance.

Edge Sealing Tape

REMEMBER: THE EDGE SEALING TAPE MUST BE USED ON ANY CUT, EXPOSED EDGE, EXPOSED BUS BARS OR ACTIVE AREA OF THE HEAT MAT THAT HAS BEEN CUT. EDGE TAPING IS ALSO REQUIRED IF THERE IS LESS THAN A 1/4 INCH OF BUSBAR STRIP. IF THE EDGES ARE NOT TAPED, THE SYSTEM WILL NOT PERFORM



Warm Waves® Infloor Heating System Edge Sealing Tape is required to seal any cut edges of the heat mat. The edge sealing tape is used to seal any cut edges, including holes cut in between the bus bars during the installation process. Refer to the Warm Waves® Infloor Heating System manual for detailed instructions.



Edge sealing tape

Warm Waves® Thermostat/Sensor

A line voltage programmable Thermostat is GFCI or EGFPD-protected (required by the NEC). Each thermostat includes a floor sensor, which Warm Waves® Infloor Heating System requires for each installation. The thermostat senses both ambient air and floor temperatures, enabling installers to set the floor temperature to the desired set point, along with maximizing the potential comfort of the room's environment. The maximum load allowed on a standard thermostat is 15 amps. The maximum amount of total heat mat allowable per circuit translates to the following:

Thermostat and floor sensor

120V AC: HEATED AREA 36 LINEAR FT = 120 SQ FT PER ZONE (1 THERMOSTAT)
240V AC: HEATED AREA 36 LINEAR FT = 240 SQ FT PER ZONE (1 THERMOSTAT)

NOTE: CHECK WITH YOUR FLOORING MANUFACTURER FOR MAXIMUM TEMPERATURE RATING THAT IS APPROPRIATE FOR YOUR FLOORING AND SET YOUR THERMOSTAT ACCORDINGLY.

IMPORTANT- MUST READ

DO

1. Do inspect all Warm Waves® Infloor Heating System components to ensure there is no damage before installing.
2. Do read this entire installation guide before installing.
3. Do perform all mandatory tests described in this installation guide.
4. Do consult an electrician to determine location/installation of thermostat and electrical supply, before starting the Warm Waves® Infloor Heating System installation.
5. Do install the floor sensor See details in this manual.
6. Do use only the Warm Waves® Infloor Heating System edge sealing tape as specified in the detailed installation instructions in this manual.
7. Do follow local codes when installing adjacent to drains or toilet flanges.
8. Do wait a minimum of 28 days after installation before you turn the Warm Waves® Infloor Heating system on. Refer to mortar manufacturer's guidelines.

DO NOT

1. Do NOT install the heat mat under large appliances.
2. Do NOT install the heat mat under built-in cabinetry.
3. Do NOT install the heat mat in food pantries.
4. Do NOT operate the system full time without installed flooring over it.
5. Do NOT install the heat mat between floor joists under the subfloor.
6. Do NOT install the heat mat in or as a ceiling panel.
7. Do nNOT ot install in walls or as a wall system.
8. Do NOT damage busbars. If you damage a busbar, you may get a cold spot.
9. Do NOT nail or staple active areas or busbars on mat.
10. Do NOT overlap heat panel mats over each other.

Electrical Requirements

A single-gang junction box or a double-gang box is required for the thermostat. Two conduits should be placed from the junction box to the bottom of the rough-in wall. One conduit is for the supply leads from the heat mat and the other conduit is for the floor sensor. The sensor wire must not be placed in the same conduit as the supply leads.

NOTE: TO REMAIN COMPLIANT WITH THE NATIONAL ELECTRICAL CODE (NEC, ARTICLE 424 PART IX) THE ELECTRICAL INSTALLATION MUST USE A TERMINAL JUNCTION TO BE CONSIDERED A HEAT PANEL SET. THIS IS A REQUIRED PART OF THE INSTALLATION PROCEDURE. THE HEAT MAT CAN ONLY BE INSTALLED ON A DEDICATED ELECTRICAL CIRCUIT(S), NOT TO EXCEED 80% OF THE BREAKER'S RATED CAPACITY. POWER IS USED @13 WATTS PER SQUARE FEET OF HEAT MAT, WITH A THERMAL OUTPUT OF 44 BRITISH THERMAL UNITS (BTU) PER SQUARE FEET OF HEAT MAT.

Installing a Warm Waves® Thermostat/Sensor

Before installation of the Thermostat, always make sure the power is off. The installation needs to be done by a qualified electrician in accordance with all current electrical and building regulations. The installer needs to follow the thermostat manufacturer's instruction manual. Once the thermostat has been installed, complete the thermostat programming.

Each thermostat designed for a heat mat includes a sensor intended for use with the mat. Please refer to the Thermostat Installation Manual at www.warmwaves.com

General Installation Instructions

1. Have electrician identify location of junction box for power leads and thermostat.
2. Carefully plan the layout of the heat mat for the installation. Refer to pages 12-13 for layout suggestions.

NOTE: Due to thickness of harness, suggested location of harness should be away from doorways/ openings into the room.

3. If necessary, cut the heat mat to desired length using scissors.
4. Cut out any notches according to the installation plan.

NOTE: If you are installing the heating product in a floor that has a toilet, you must use a synthetic ring. You can not use a wax ring for the toilet. Panels of heat mat may be laid out side by side, then the electric leads connected. If less than ¼ inch of busbar strip is left, this edge must be taped with edge sealing tape or the system will not work properly. The heat mat can be installed with some space between panels, if deemed necessary; however it should be noted that "cold spots" will form if the gap between the edges of the active heat area is greater than 6 inches. The thermal conductivity for this product is up to 3 inches from the edge of the active heat panel area.

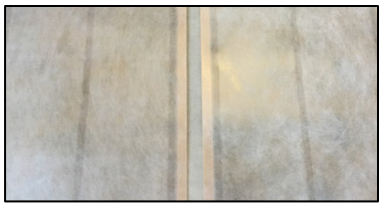
Install heat mat adjacent to drains or toilet flanges or over thermal barrier material, in accordance with local code requirements. National Electric Code forbids the placement of nails, staples or other fasteners through the active heat area or busbar zones. If the mat has already been set in the polymer modified thinset mortar, tape only the side that is facing up.

Measure

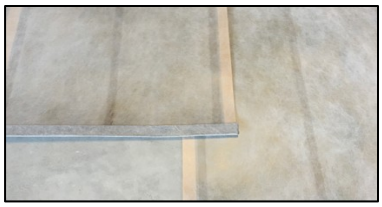
Cut

Tape and seal from center out

DANGER: UNDER NO CIRCUMSTANCES MUST THE ACTIVE PANEL AREAS OF THE HEAT MAT BE ALLOWED TO OVERLAP ITSELF OR ONTO ADJACENT PIECES OF HEAT MAT. FAILURE TO COMPLY WILL DAMAGE THE SYSTEM AND ASSOCIATED AREAS INCLUDING THE BUILDING STRUCTURE.



Correct



Incorrect

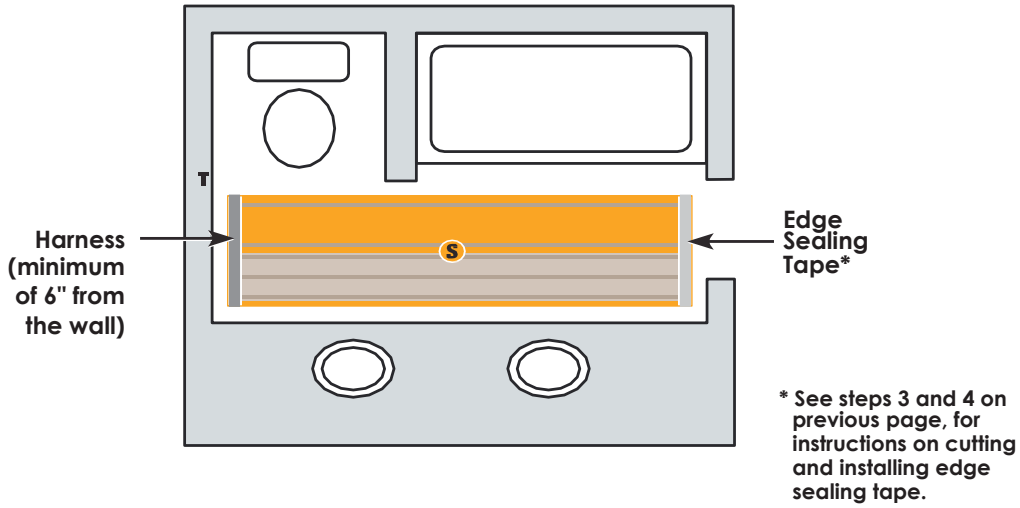
General Installation Instructions Layout

The installation of Warm Waves® Infloor Heating System begins with planning a layout for the heat mat. A planned layout will determine thermostat and sensor location.

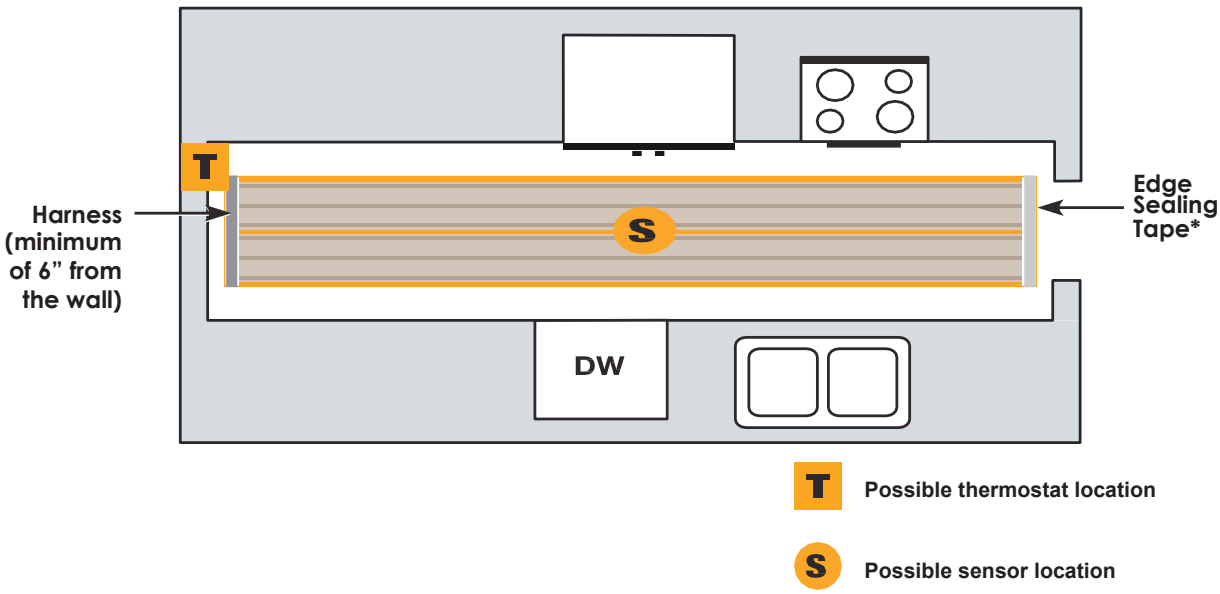
For 120 sq ft or less (heat mat), a 120V system can be used. **For use with more than 120 sq. ft. of heat mat, a 240V system may be used, but additional thermostats may be required for additional square footage to optimize the performance of the system.**

Examples:

15 Sq. Ft. Bathroom Layout



25 Sq. Ft. Kitchen Layout

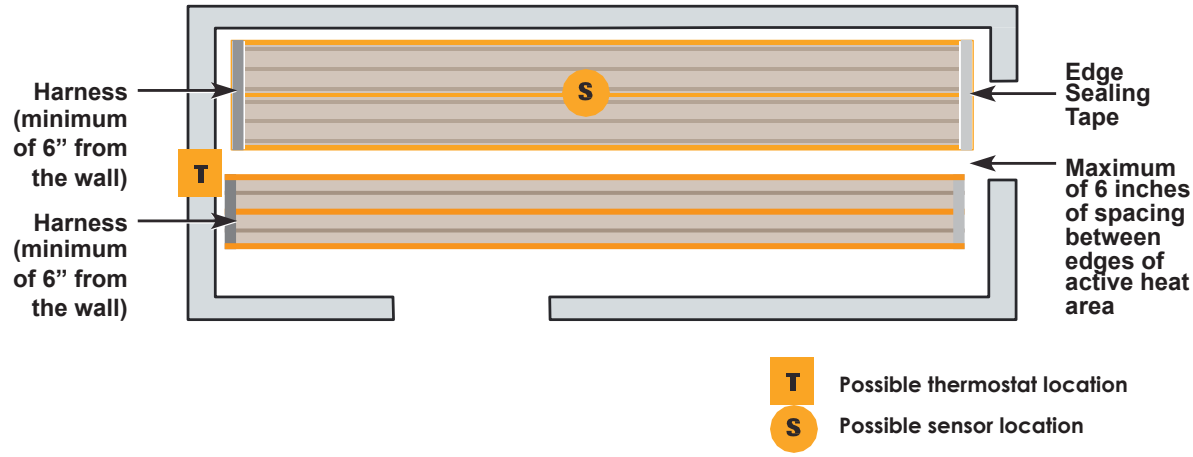


NOTE: The thermal conductivity for this product is up to 3 inches from the edge of the active area. For most accurate temperature readings, sensor should be located under the Warm Waves® Infloor Heating System mat.

General Installation Instructions Layout

Example:

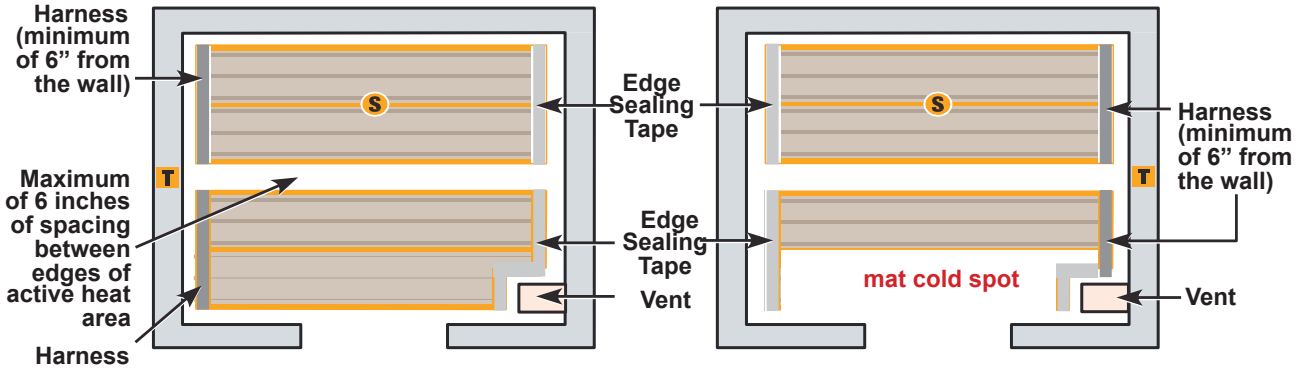
Living Room Layout
(mat side by side layout)



NOTE: The thermal conductivity for this product is up to 3 inches from the edge of the active area. For most accurate temperature readings, sensor should be located under the Warm Waves® Infloor Heating System mat.

Layout with Vent

Correct and Incorrect Installation



CORRECT

ALL mat busbars are connected to harness.

INCORRECT

In one section of the lower mat, only one of the mat busbars is connected to the harness. That section of the mat will not work and result in a cold spot in the floor.

NOTE: For most accurate temperature readings, sensor should be located under the Warm Waves® Infloor Heating System mat.

General Installations Guidelines

THE FOLLOWING SECTION OUTLINES THE PREPARATION REQUIRED PRIOR TO INSTALLING THE HEAT MAT.

Floor and Subfloor Preparation

1. Ensure concrete or wood subfloor is structurally sound; follow TCNA (Tile Council North America) installation guidelines for subfloor rigidity.
2. All substrates must be dry, structurally sound, with maximum deflection per industry standards of L/360 for ceramic tile installations and L/720 for natural stone installations, and free from oil, grease, dust, paint, sealers or concrete curing compounds. All contaminants must be removed prior to installation of tile. Surface protrusions shall be removed by sanding, scraping or scarifying. After preparation, remove all dust by vacuuming.
3. There must not be any protrusions sticking up from the subfloor that could impact or cause damage to the heat mat such as nails, rebar or any other potentially damaging material.
4. Local building codes regarding subfloor thermal barriers must be followed.

On the following pages, you may substitute stone and tile with carpet, linoleum or other floor finish. Make sure the covering is R1 or less and the manufacturer of the covering says it can be used under radiant floors.

Mat Preparation

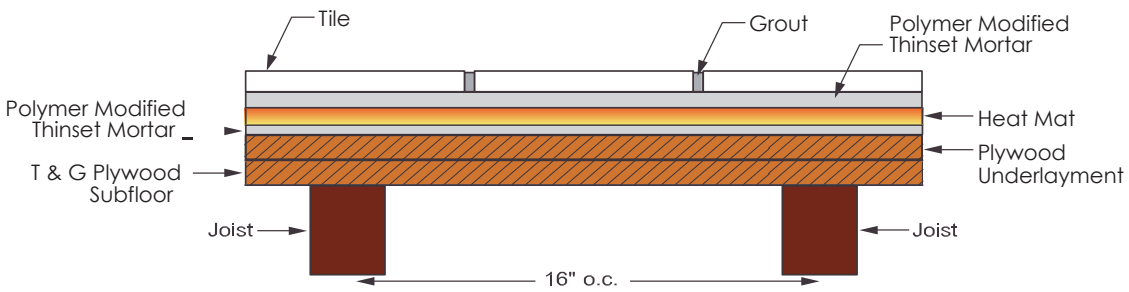
1. Consult with an electrician to determine the location of thermostat, electrical supply and heat sensor. Also check Ohm reading of mat and sensor prior to cutting, to ensure proper functioning.
2. Carefully plan the layout of the heat mat for installation.
3. If needed, cut to the desired length using the scissors.
4. **Panels must be cut only on the horizontal cut lines.**
5. Seal the end that has been cut with the edge sealing tape.
6. Check the Ohm reading again after layout has been established and mat has been fitted.
8. **A floor sensor MUST be installed** to achieve the desired floor temperature (sensor is included with the thermostat). Consult your electrician and/or installer to locate where the sensor will be placed. For most accurate temperature readings, sensor should be located under the Warm Waves® Infloor Heating System mat.
   a. To install the sensor, cut a groove in the underlayment to accommodate the heat sensor and heat sensor wire, leading to the sensor wire conduit.
   b. Before beginning the installation, the electrician should temporarily connect electrical supply to mat to ensure proper heating. Make sure electrical supply is disconnected before proceeding with installation.

Wrap cut end with end sealing tape

AFTER COMPLETING THESE STEPS, REFER TO PAGES 15-19 FOR INSTALLATION WITH YOUR SPECIFIC FLOOR COVERING

Tile Installation: Over Plywood

Radiant Heat over Plywood Subfloor, Plywood Underlayment, Polymer Modified



TCNA Handbook Installation Method RH130 for Interior Floors

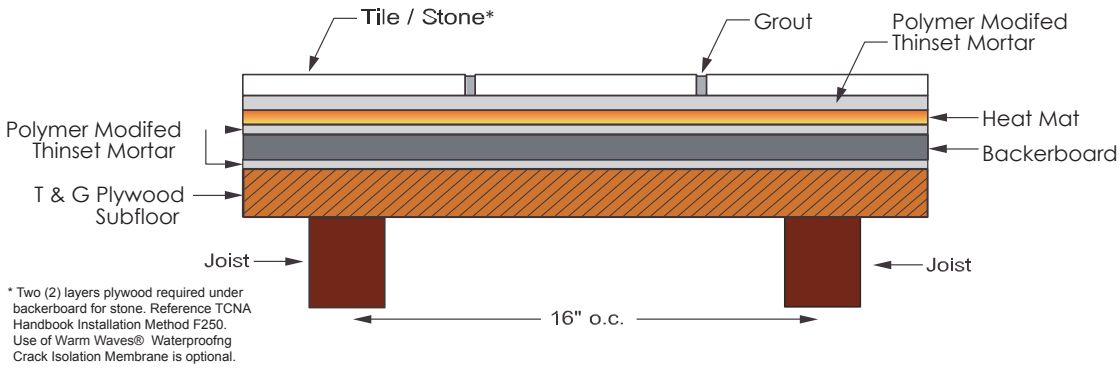
1. Ensure floor is properly prepared. See page 13 for details.
2. Ensure mat is ready to be installed. See page 14 for details.
3. Disconnect wires and roll back half the mat (DO NOT CREASE THE MAT).
4. Use polymer modified thinset mortar that meets or exceeds A118.11 to bond mat to substrate.
5. Refer to photos **(figs. 1-5)** on page 20.
   a. Apply polymer modified thinset mortar using flat side of trowel to to embed the sensor and wire in the groove and to promote better substrate contact. Next, comb in one direction with ¼" x 3/16" V-notch trowel or 3/16" x 5/32" V-notch trowel. Spread only an area that can be covered with the mat while mortar is still tacky. Refer to manufacturer's product data sheet.
   b. Roll mat into polymer modified thinset mortar **(figs. 2 and 3).**
   c. Working from the center to the edges, press into place with the flat side of the trowel to remove air bubbles and ensure full contact **(fig. 4).**
   d. Pull back a corner of the mat to verify that the trowel ridges were flattened and proper mortar coverage was achieved. Once verified, press the corner lifted back into place with the flat side of the trowel.
6. Roll back other half of mat (DO NOT CREASE THE MAT) and repeat step 5 **(fig. 5).**
7. Allow to cure overnight.
8. Install tile with a polymer modified thinset mortar that meets or exceeds ANSI A118.11 and is appropriate for the tile selected.
9. Allow to cure overnight then install grout
10. Run wires through conduit and connect Thermostat according to the manufacturer's instructions in the thermostat box.

NOTES:

1. **The method you choose to place the sensor determines which step the sensor is inserted in the above installation.** Choose the best sensor placement option for your install.
2. Certain moisture sensitive stones, (eg. green marble) or resin-backed tiles may require special setting materials such as epoxy mortar. Consult the stone supplier for more information
2 Wait a minimum of 28 days after installation before you turn system on.

Tile Installation: Wood Subfloor with Backboard

Radiant Heat over Plywood Subfloor, Backerboard, Polymer Modified Thinset Mortar



TCNA Handbook Installation Method RH130 for Interior Floors

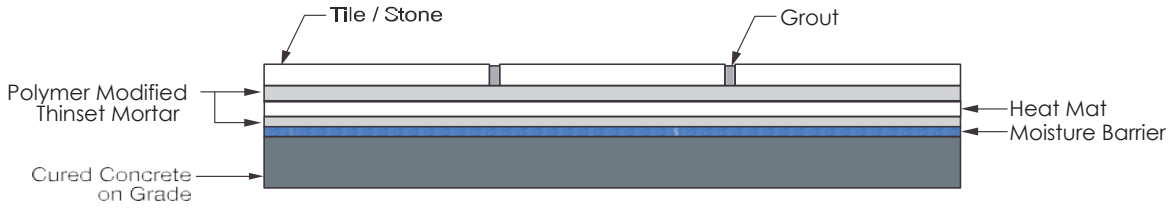
1. Ensure floor is properly prepared. See page 13 for details.
2. Ensure mat is ready to be installed. See page 14 for details.
3. Disconnect wires and roll back half the mat (DO NOT CREASE THE MAT).
4. Install backerboard per manufacturer's instructions. Use polymer modified thinset mortar that meets or exceeds A118.11 to bond mat to backerboard.
5. Refer to photos **(figs. 1-5)** on page 20.
   a. Apply polymer modified thinset mortar using flat side of trowel to to embed the sensor and wire in the groove and to promote better substrate contact. Next, comb in one direction with ¼" x 3/16" V-notch trowel or 3/16" x 5/32" V-notch trowel. Spread only an area that can be covered with the mat while mortar is still tacky. Refer to manufacturer's product data sheet.
   b. Roll mat into polymer modified thinset mortar **(figs. 2 and 3).**
   c. Working from the center to the edges, press into place with the flat side of the trowel to remove air bubbles and ensure full contact **(fig. 4).**
   d. Pull back a corner of the mat to verify that the trowel ridges were flattened and proper mortar coverage was achieved. Once verified, press the corner lifted back into place with the flat side of the trowel.
6. Roll back other half of mat (DO NOT CREASE THE MAT) and repeat step 5 **(fig. 5).**
7. Allow to cure overnight.
8. Install tile with a polymer modified thinset mortar that meets or exceeds ANSI A118.11 and is appropriate for the tile selected.
9. Allow to cure overnight, then install grout.
10. Run wires through conduit and connect Thermostat according to the manufacturer's instructions in the thermostat box.

NOTES:

1. **The method you choose to place the sensor determines which step the sensor is inserted in the above installation.** Choose the best sensor placement option for your install.
2. Certain moisture sensitive stones, (e g , green marble) or resin-backed tiles may require special setting materials such as epoxy mortar. Consult the stone supplier for more information
3. Wait a minimum of 28 days after installation before you turn system on.

Tile Installation: Cured Concrete on Grade

Radiant Heat over Concrete, Polymer Modified Thinset Mortar



TCNA Handbook Installation Method RH130 for Interior Floors

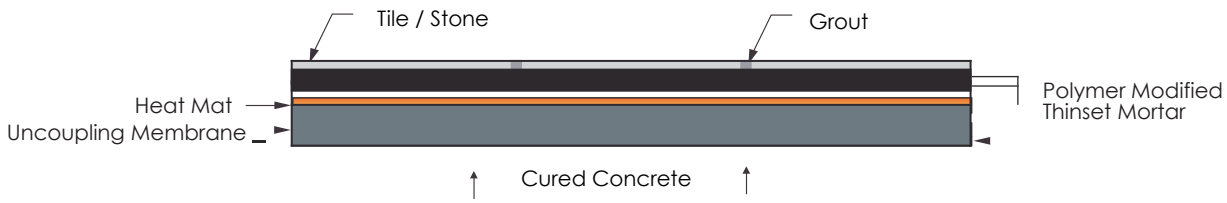
1. Ensure floor is properly prepared. See page 13 for details.
2. Ensure mat is ready to be installed. See page 14 for details.
3. Disconnect wires and remove the mat from the floor.
4. Apply moisture barrier. Polymer modifed thinset mortar waterproofing crack isolation membrane can be used as the moisture barrier. Refer to product data sheet for thickness and cure times.
5. Once moisture barrier is cured, return mat to original layout position and roll back half the mat. (DO NOT CREASE THE MAT)
6. Use polymer modified thinset mortar that meets or exceeds A118.11 to bond mat to substrate.
7. Refer to photos **(figs. 1-5)** on page 20
   a. Apply polymer modified thinset mortar using flat side of trowel to embed the sensor and wire in the groove and to promote better substrate contact. Next, comb in one direction with ¼" x 3/16" V-notch trowel or 3/16" x 5/32" V-notch trowel. Spread only an area that can be covered with the mat while mortar is still tacky. Refer to manufacturer's product data sheet.
   b. Roll mat into polymer modified thinset mortar **(figs. 2 and 3).**
   c. Working from the center to the edges, press into place with the flat side of the trowel to remove air bubbles and ensure full contact **(fig. 4).**
   d. Pull back a corner of the mat to verify that the trowel ridges were flattened and proper mortar coverage was achieved. Once verified, press the corner lifted back into place with the flat side of the trowel.
8. Roll back other half of mat (DO NOT CREASE THE MAT) and repeat step 7 **(fig. 5).**
9. Allow to cure overnight.
10. Install tile with a polymer modified thinset mortar that meets or exceeds ANSI A118.11 and is appropriate for the tile selected.
11. Allow to cure overnight; then install grout.
12. Run wires through conduit and connect to Thermostat according to the manufacturer's instructions in the thermostat box.

NOTES:

1. **The method you choose to place the sensor determines when the sensor is inserted in the above installation.** Choose the best sensor placement option for your install.
2. Certain moisture sensitive stones (eg. green marble) or resin-backed tiles may require special setting materials such as epoxy mortar. Consult the stone supplier for more information.
3. Wait a minimum of 28 days after installation before you turn system on.

Tile Installation: Uncoupling Membrane Installation

Radiant Heat over Concrete, Polymer Modified Thinset Mortar

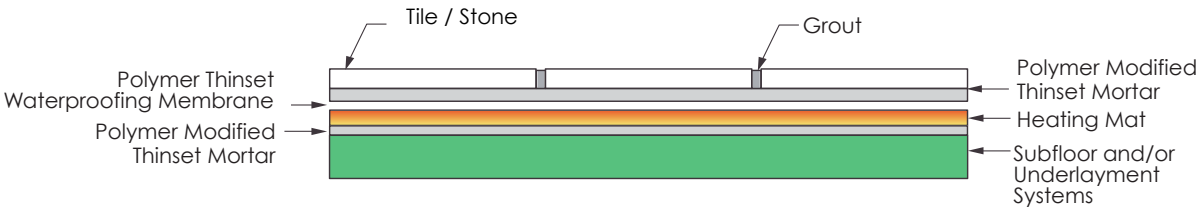


1. Ensure floor is properly prepared. See page 13 for details.
2. Ensure mat is ready to be installed. See page 14 for details.
3. Disconnect wires and remove mat from the floor.
4. Install uncoupling membrane per manufacturer's instructions. Ensure you fill all the cavities on the top side of the membrane with polymer modified thinset mortar and cure overnight.
5. Return mat to original layout position and roll back half the mat. (DO NOT CREASE THE MAT)
6. Use polymer modified thinset mortar that meets or exceeds A118.11 to bond mat to substrate.
7. Refer to photos **(figs. 1-5)** on page 20.
   a. Apply polymer modified thinset mortar using flat side of trowel to embed the sensor and wire in the groove and to promote better substrate contact. Next, comb in one direction with ¼" x 3/16" v-notch trowel or 3/16" x 5/32" v-notch trowel. Spread only an area that can be covered with the mat while mortar is still tacky. Refer to manufacturer's product data sheet.
   b. Roll mat into polymer modified thinset mortar **(figs. 2 and 3).**
   c. Working from the center to the edges, press into place with the flat side of the trowel to remove air bubbles and ensure full contact **(fig. 4).**
   d. Pull back a corner of the mat to verify that the trowel ridges were flattened and proper mortar coverage was achieved. Once verified, press the corner lifted back into place with the flat side of the trowel.
8. Roll back other half of mat (DO NOT CREASE THE MAT) and repeat step 7 **(fig. 5).**
9. Allow to cure overnight.
10. Install tile with a polymer modified thinset mortar that meets or exceeds ANSI A118.11 and is appropriate for the tile selected.
11. Allow to cure overnight then install grout.
12. Run wires through conduit and connect Thermostat according to the manufacturer's instructions in the thermostat box.

NOTES:

1. **The method you choose to place the sensor determines when the sensor is inserted in the above installation.** Choose the best sensor placement option for your install.
2. Certain moisture sensitive stones (eg. green marble) or resin-backed tiles may require special setting materials such as epoxy mortar. Consult the stone supplier for more information.
3. Wait a minimum of 28 days after installation before you turn system on.

Tile Installation: Waterproofing/Crack Prevention



For use in TCNA Environmental Exposure Classifications RES1 / RES2 installations, with limited water exposure, including floor areas in bathrooms. Not for use in submerged areas or in showers. (See Installation Type column in the chart below.)

INSTALLATION TYPE	ADDITIONAL STEP TO BE ADDED
Over Plywood	
Follow instructions on page 15 through step 7. Add "Additional Step" shown at the right before proceeding.	Apply waterproof membrane directly over heat mat. Modified Polymer Thinset Mortar Waterproofing Crack Isolation Membrane or equivalent can be used. Refer to manufacturer's product data sheet for thickness and cure times. Continue with step 8.
Wood Subfloor with Backerboard	
Follow instructions on page 16 up through step 7. Add "Additional Step" shown at the right before proceeding.	Apply waterproof membrane directly over heat mat. Modified Polymer Thinset Mortar Waterproofing Crack Isolation Membrane or equivalent can be used. Refer to manufacturer's product data sheet for thickness and cure times. Continue with step 8.
Cured Concrete on Grade	
Follow instructions on page 17 through step 9. Add "Additional Step" shown at the right before proceeding.	Apply waterproof membrane directly over heat mat. Modified polymer thinset mortar waterproofing crack isolation membrane or equivalent can be used. Refer to manufacturer's product data sheet for thickness and cure times. Continue with step 10.
Uncoupling Membrane Installation	
Follow instructions on page 18 through step 9. Add "Additional Step" shown at the right before proceeding.	Apply waterproof membrane directly over heat mat. Modified polymer thinset mortar waterproofing crack isolation membrane or equivalent can be used. Refer to manufacturer's product data sheet for thickness and cure times. Continue with step 10.

NOTES:

1. **The method you choose to place the sensor determines when the sensor is inserted in the above installation.** Choose the best sensor placement option for your install.
2. Certain moisture sensitive stones (eg. green marble) or resin-backed tiles may require special setting materials such as epoxy mortar. Consult the stone supplier for more information.
3. Wait a minimum of 28 days after installation before you turn system on.

Tile Installation

WARM WAVES® INFLOOR HEATING SYSTEM HEAT MAT INSTALLATION

Fig. 1

Figure 1

Apply polymer modified thinset mortar using flat side of trowel to promote better substrate contact, then comb in one direction with ¼" x 3⁄16" V-notch trowel or 3⁄16" x 5⁄32" V-notch trowel. Spread only an area that can be covered with the mat while the mortar is still tacky (refer to manufacturer's product data sheet).

Fig. 2

Figures 2 and 3

Roll mat into polymer modified thinset mortar. The heat panel mat can be placed into the mortar with the writing either up or down. It does not matter which side is up.

Fig. 3

Fig. 4

Figure 4

Working from the center to the edges, press into place with the flat side of the trowel to remove air bubbles and ensure full contact.

Fig. 5

Figure 5

Roll back other half of mat (DO NOT CREASE THE MAT) and repeat. If you crease mat, system will not work properly.

Troubleshooting

PROBLEM	POSSIBLE SOLUTION
System does not turn on	• Check that circuit breaker is on. • Check that thermostat is turned on. • Make sure that the GFCI or EGFPD on the circuit breaker is not tripped on both the thermostat and the panel. • Check wiring at thermostat.
Can't feel any heat	• Confirm your floor sensor is on and that the temperature is not set too low (thermostat installation guide). • Check temperature set point on thermostat. • Make sure thermostat is set for ambient air and floor temperature. • Double check your ohm readings, making sure there are no loose connections.
GFCI or EGFPD tripping on thermostat	• Tripping is often caused by moisture in the polymer modified thinset mortar. Turn system off and allow longer cure time • Double check your Ohm readings making sure there are no loose connections (for reference, see page 22).
Heat works, but then shuts off	• Check thermostat floor sensor setting. • Make sure thermostat is set on floor and ambient. • Make sure the floor sensor is in an appropriate location. • Check thermostat programming / timing.
Floor continues to heat after it should stop	• Thermostat "bypassed" or switch on. Your control has the proper wire connections per diagram on back, but your multi-meter shows full line voltage on the "load side" of the control when you believe it should not be sending power to the floor. If it is a programmable control, there may be an error in programming (check thermostat installation guide). • There may be a problem with the floor temperature sensor itself, or it may not be in the proper location.

NOTE: THIS IS A TROUBLESHOOTING DOCUMENT. IF YOU ARE NOT QUALIFIED TO DO ELECTRICAL WORK, **WE RECOMMEND HIRING A QUALIFIED, LICENSED ELECTRICIAN.** ANY TROUBLESHOOTING WORK SHOULD BE DONE WITH THE POWER REMOVED FROM THE CIRCUIT UNLESS OTHERWISE INDICATED. **IF YOUR PROBLEM CAN'T BE RESOLVED WITH THESE TIPS, CALL WARM WAVES® PRODUCTS 877.309.9276.**

THESE TIPS ARE PROVIDED TO ASSIST WITH TROUBLESHOOTING THE FLOOR WARMING SYSTEM; RESULTS ARE NEVER GUARANTEED. WARM WAVES® INFLOOR HEATING PRODUCTS DOES NOT ASSUME ANY LIABILITY OR RESPONSIBILITY FOR DAMAGE OR INJURY THAT MAY OCCUR FROM USING THESE TIPS. REFER TO THE INSTALLATION GUIDE OR OTHER APPROPRIATE INSTRUCTIONS AND WARNINGS REGARDING INSTALLATION, USE AND MAINTENANCE. FOR MORE INFORMATION, VISIT WWW.WARMWAVES.COM.

Ohms Reference Guide

The following chart is intended to serve as a quick reference. Match the square footage of your cut heat panel mats for the floor to the chart, to check your Ohms.

For example, for a 21.9 ft^2 panel mat layout, you should be seeing an Ohms reading of 45-55 in your heat panels.

All Warm Waves custom mats are made to spec. Consult the cord tag to see the actual Ohm reading.

Ohms Guidelines	Square Feet
454.5-555.5	2. 19
226.8-277.2	4. 38
151.2-184.8	6. 57
113.4-138.6	8.76
90.9-111.1	10. 95
75.6-92.4	13. 14
64.8-79.2	15. 33
56.7-69.3	17. 52
50.4-61.6	19. 71
45-55	21. 9
41.4-50.6	24. 09
37.8-46.2	26. 28
35.1-42.9	28. 47
32.4-39.6	30/ 66
30.15-36.85	32. 85
28.35-34.65	35. 04
27-33	37. 23
25.2-30.8	39. 42
23.85-29.15	41. 61
22.5-27.5	43. 8
21.6-26.4	45. 99
20.7-25.3	48. 18
19.8-24.2	50. 37

Warm Waves® Infloor Heating System Information Card

Installer Information / DATE Installed: _____

Name	
Company	
Permit #	
Mobile / Phone Fax	
Installer's Address	
Electrician	NAME: License#:

Customer Information

Name	
Address	
Telephone	
Mobile Fax	
Address of Installation	

Infloor Heat System Information
Designed Specification

Location (Room)	Model name	Square Feet	Volts	Amps	Watts

Inspection Data
Building Inspector Name, License#, Phone: _____

Location (Room)	Model name	Square Feet	Volts	Amps	Watts

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