



Nuheat Mat

PRE-BUILT ELECTRIC FLOOR HEATING MAT

INSTALLATION GUIDE



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1.1 SPECIFICATION DATA

An electric radiant heating mat constructed of a heating wire embedded and bonded in a durable porous fabric in a pre-configured pattern that provides consistent warmth at 12 watts per square foot, for tile and stone floors and counters. Heating mats are available in both 110 V and 220 V standard sizes as well as full custom shapes up to 196 square feet for a single mat.

This product is intended for use under tile and stone only.

1.11 GENERAL INFORMATION

1. Nuheat Mat is an electrical radiant floor warming system designed to zone warm tile and stone floors.
2. Nuheat Mat is specified in areas where zone warming increases the energy efficiency of the living space such as bathrooms, kitchens, family rooms, entryways, mudrooms and laundry areas.
3. Nuheat Mat has a 25-year warranty.

1.12 PRODUCT APPROVALS

UL listed and CSA approved.

1.13 GENERAL INFORMATION

1. We manufacture both standard and custom mats in 110 V or 220 V.
2. Standard mats in 110 V are available in over 70 sizes from 7½ Sq Ft to 96 Sq Ft. Standard mats in 220 V are available from 14 Sq Ft to 96 Sq Ft.
3. Custom mats are available in three days plus shipping from signed shop drawings.
4. Nuheat Mat is manufactured to produce 12 watts/Sq Ft or 41 BTU/Sq Ft. The consistent wire spacing (1.5" to 1.75") reduces site irregularities in heat and eliminates cold spots.
5. The Nuheat Mat is water resistant and has a 1/8" profile.
6. The polyester material that covers the mat is manufactured to keep the wires in place therefore keeping the wire spacing and heat consistent.

1.2 MEASURING

1.21 MEASURING

Pick a corner of the room and use that as the starting point for your measurements. Remember that you must return to this starting point at the end of your measurements.

An online measuring tutorial is available at www.nuheat.com/floor-heating/custom-mats/#measuring

1. Pick a corner of the room and use that as the starting point for your measurements
2. Measure and draw the walls of the room on paper and record the measurements
3. Measure and draw the location of cabinets and vanities, make sure to take the measurement right up to the toe-kick
4. Measure from the walls to the center of the toilet drain
5. Indicate the thermostat location and voltage if known

1.22 DESIGNING

1. Choose from over 70 standard off-the-shelf mats
2. Combine multiple standard mats
3. Nuheat Custom Mat for any shape on 3 business days

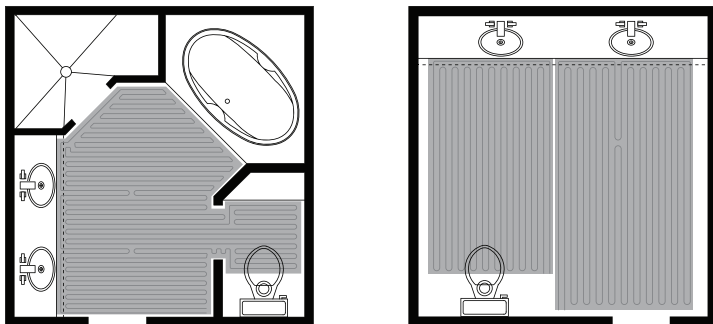


FIGURE 1.21: standard and custom mat layout example

1.3 INSTALLATION GUIDELINES

First time installers should contact the Customer Care Team at 1.800.778.WARM(9276).

- The installation of this heating product shall be in accordance with the manufacturer's instructions and in accordance with the Canadian Electrical Code Part 1 or the National Electrical Code (US) whichever is applicable.
- This equipment shall be installed only by qualified personnel who are familiar with the construction and operation of the apparatus and risks involved.
- Caution should be taken to guard against risk of electric shock, fire and bodily injury during the installation of this equipment.
- Nuheat Mat should be connected to a dedicated electrical circuit.
- It is mandatory to install a class "A" GFCI or GFCI circuit breaker with each Nuheat Mat installation.

All Nuheat thermostats come equipped with a built-in class "A" GFCI.

- Do not use sharp tools or power tools to clean grout lines. Cleaning grout lines with sharp tools or power tools may damage the Nuheat Mat System and will void the Nuheat warranty.
- Indicate on the electrical panel which circuit is used for the electric floor heating system.
- Subfloor must be prepared in accordance to ANSI specifications.
- Nuheat Mat cannot be overlapped, crossed, cut, shortened or modified.
- The ambient air temperature must be above 10 °C or 50 °F when the Nuheat Mat Floor Heating System is installed.
- For concrete slab subfloors, we recommend insulating the slab prior to installing Nuheat Mat. Insulation will improve the upward heat transfer from the mat to the flooring surface and improve heat up time.

1.4 BEFORE YOU START

1.41 ASSEMBLE REQUIRED TOOLS

- Multimeter/Ohmmeter
- ¼" x ¼" square notched trowel
- Grouting float/lightweight roller
- Sponge
- Latex-modified thinset
- Thinset mixer
- Large bucket
- Duct tape
- Thermostat sensor probe (included with thermostat)



FIGURE 1.21: Assemble required tools

1.42 PRE-INSTALLATION GUIDELINES

Avoid the following activities that may damage the Nuheat Mat:

- Connecting the mat to power when folded
- Stapling
- Nailing
- Folding, bending overlapping mats
- Using grout scrapers or utility knives to clean grout lines may damage the mat and void Nuheat warranty.
- Clean grout lines with a sponge as you go.

1.43 DRY FIT AND ROUTE COLD LEAD PATH

Position Nuheat Mat to fit contours of room. Route a path for the cold lead to the electrical box. The cold lead CANNOT cross over on top of the Nuheat Mat. Nuheat Standard Mats can be flipped in any direction to place cold leads closer to thermostat location.

1.5 INSULATION & RESISTANCE TESTS

If insulation or resistance tests do not pass the requirements at any point of the installation, halt installation immediately and contact Customer Care at 1.800.778.WARM(9276) or email res.customercare@pentair.com.

1.51 INSULATION TEST

To ensure the heating wire is fully insulated:

1. With digital multimeter, set it to measure resistance/ohms. If using an ohmeter, set it to the 200 ohm setting.
2. Place one multimeter clip on the metal braid wire (ground). Place the other multimeter clip on the white wire (red wire for 240 V Nuheat Mats).
3. Confirm the reading on the multimeter/ohmeter is OL or infinity (open circuit).
4. Repeat steps 2-3 to check the reading between the metal braid wire (ground) and the other wire (black).

1.52 RESISTANCE TEST

To ensure the heating wire is fully insulated:

1. With digital multimeter, set it to measure resistance/ohms. If using an ohmeter, set it to the 200 ohm setting.
2. Place one multimeter clip on the white wire (red wire for 240 V Nuheat Mats). Place the other multimeter clip on the black wire.
3. Confirm the reading on the multimeter/ohmeter is within +10% / -5% of the factory resistance listed on the white tag that is attached to the cold lead. The white tag contains information including factory resistance readings, model number, manufacture date and amperage ratings.
4. Record the resistance test readings in the table on page 7.



Nuheat Mat must be tested before, during and after installation to validate the warranty.

1.6 MAT RESISTANCE LOG

1.61 MAT RESISTANCE LOG

For warranty and troubleshooting purposes, the mat resistance log must be completed and remain with the end user.

MAT RESISTANCE LOG	
MAT MODEL NUMBER	
FACTORY MEASURED RESISTANCE	
RESISTANCE TEST OHMS READING (BEFORE INSTALLATION)	
RESISTANCE TEST OHMS READING (DURING INSTALLATION)	
RESISTANCE TEST OHMS READING (AFTER INSTALLATION)	

Failure to record resistance tests in the above table will void the Nuheat warranty. To submit your warranty, visit www.nuheat.com and fill out the online warranty card.

1.62 FLOOR SENSOR PROBE TEST

To ensure the floor sensor probe is not damaged:

1. With a digital multimeter (or ohmmeter), set the device to the 20K Ω (Kilohms) setting.
2. Place a multimeter clip on each of the wires. It does not matter which clip is attached to which wire. Some multimeters do not have the 20K Ω (Kilohms) setting. Find a suitable multimeter that has this setting.
3. Confirm the reading on the device is between 8-12K Ω (Kilohms) at room temperature.
4. If test readings do not pass requirements at any point of the installation, halt installation immediately and contact Customer Care at 1.800.778.WARM(9276) or email res.customercare@pentair.com.

2.1 SECURING MAT TO THE SUBFLOOR

2.11 SECURING MAT TO THE SUBFLOOR

1. Prepare thinset mixture.
2. Spread thinset onto subfloor.



Use $\frac{1}{4}$ " x $\frac{1}{4}$ " square notched trowel to spread $\frac{1}{4}$ " layer of acrylic/latex modified thinset onto subfloor. Work on one manageable section at a time.



FIGURE 2.12: Spread thinset onto subfloor

3. Place Nuheat Mat onto fresh thinset.



FIGURE 2.13: Place mat onto fresh thinset

4. Press Nuheat Mat into thinset.



Press Nuheat Mat firmly into thinset with grout float or lightweight roller. Create 100% contact between Nuheat Mat, thinset and subfloor. Press out air bubbles underneath mat. Route cold lead(s) to electrical box.

2.1 SECURING MAT TO THE SUBFLOOR

2.11 SECURING MAT TO THE SUBFLOOR (CONTINUED)

5. Perform insulation and resistance test on page 6.

6. Secure floor sensor probe.



Duct tape the floor sensor probe on top of the Nuheat Mat. The probe's tip should be between the heating wires. Ensure the probe's tip is located in an area that can represent the overall floor temperature and away from other heating/cooling sources (ie. heat ducts vents, direct sunlight, drafts caused by large windows/doors, areas covered by rugs or fixed furniture). The probe wire CAN cross on top of the heating wire(s).



FIGURE 2.16: Secure floor sensor probe

2.2 INSTALL FLOORING - TILE & STONE

2.21 INSTALL FLOORING - TILE & STONE

1. Apply thin layer of thinset.



Use ¼" x ¼" square notched trowel to spread minimum ¼" layer of acrylic/latex modified thinset on top of Nuheat Mat as per manufacturer's instructions.



FIGURE 2.21: Install tile/stone flooring

2. Install tile/stone as per manufacturer's instructions.
3. Clean grout lines.



Do not use sharp tools or power tools to clean grout lines; doing so may damage Nuheat Mat.



FIGURE 2.23: Clean grout lines

4. Perform insulation and resistance test on page 6.
5. Make electrical connections.



Before activating Nuheat Mat, ensure setting compound has fully cured. Refer to setting compound manufacturer's specifications for cure times. Installation of Nuheat Mat is now complete.

2.3 INSTALL FLOORING - LAMINATE/ENGINEERED WOOD

2.31 INSTALL FLOORING - LAMINATE/ENGINEERED WOOD

1. Apply smooth layer of thinset.



Use smooth trowel to spread minimum ¼" layer of acrylic/latex modified thinset on top of Nuheat Mat. Ensure thinset layer is level and smooth. Self-leveling compounds may also be used. Allow thinset or self-leveller to cure as per manufacturer's instructions.

2. Perform insulation and resistance test on page 6.

3. Install laminate/engineered wood flooring.



Install vapor barrier, if applicable, and underlay as per manufacturer's instructions. Install laminate/engineered wood floor as per manufacturer's instructions.

4. Make electrical connections.



Before activating Nuheat Mat, ensure setting compound has fully cured. Refer to setting compound manufacturer's specifications for cure times. Installation of Nuheat Mat is now complete.

3.1 ELECTRICAL CONNECTIONS

3.11 ELECTRICAL CONNECTIONS

1. Connect the tin plated copper ground braid/wire of the Nuheat Mat to the ground screw or ground conductor inside the electrical box using approved wire connectors.
2. Attach corresponding lead wires to electrical box using CSA Certified/UL Listed cable fittings. Make electrical connection only after flooring is complete.
3. Nuheat Mat must be connected to minimum 14AWG supply conductors.
Supply conductors shall be suitable for residential wiring according to local and national electrical code.

When controlling multiple mats with one thermostat, all mats may be connected directly to the thermostat provided the total amperage does not exceed the 15-amp maximum load of the Nuheat thermostat. Alternatively, the mat cold leads can be run to a separate electrical box and connected to the Nuheat thermostat using suitable electrical house wiring. Consult with your electrician to determine the best method for your installation. In all cases, ensure the electrical box can easily fit all of the connections.



Risk of electric shock and fire. Damage to supply conductor insulation may occur if conductors are routed less than 2" (51mm) from heating wire. Refer to installation instructions for recommended means of routing supply conductors.

4. Affix supplied orange label to panel board beside appropriate circuit indicating branch circuit supplying power to Nuheat Mat.
5. Affix the supplied "Concealed Area Warning" label to adjacent points of access to concealed areas in which installed heating products are accessible.
6. Affix the supplied "Radiant Floor Heating" sticker to the room control for the Nuheat Floor Heating System.

3.1 ELECTRICAL CONNECTIONS

3.11 ELECTRICAL CONNECTIONS (CONTINUED)

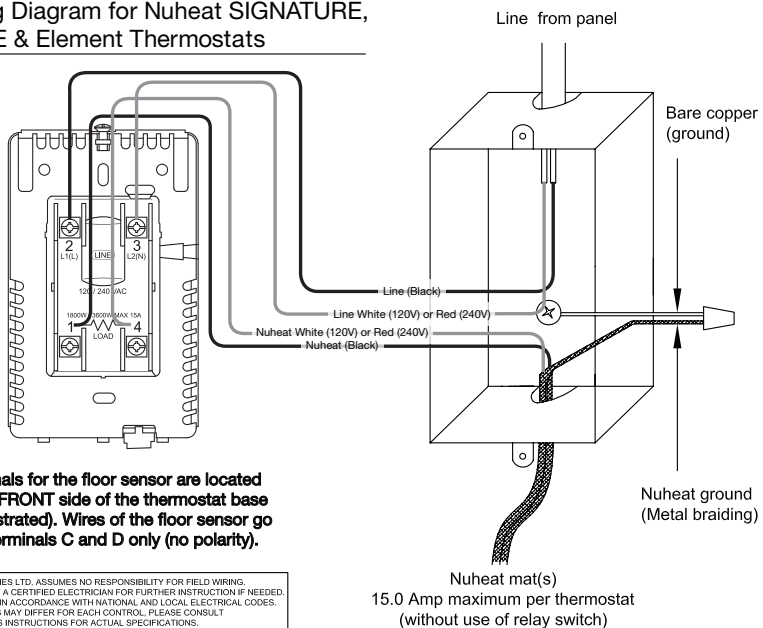
All wiring must follow specifications set out in Part 1 of Canadian Electrical Code, or Article 424 of the National Electrical Code ANSI/ NFPA 70, or whichever is applicable to local electrical inspection regulations and authorities. All Nuheat thermostats are equipped with built-in Class "A" GFCI protection. If Nuheat Mat is connected directly to a Nuheat thermostat, a non-GFCI equipped breaker should be used. If the Nuheat Mat is controlling an external relay for a separate circuit, it is mandatory to install a Class "A" GFCI or GFCI circuit breaker for the external/separate circuit.

The cold leads of Nuheat Mat may need to be routed inside suitable conduit according to local electrical codes. Check with the local authority having jurisdiction to determine requirements.



NEC/CEC rules state that the cold lead tag must remain on the cold lead. The tag contains critical information necessary for testing, warranty and troubleshooting purposes. Do not remove the tag for any reason.

Wiring Diagram for Nuheat SIGNATURE, HOME & Element Thermostats



3.2 ELECTRICAL GUIDELINES

3.21 ELECTRICAL GUIDELINES

- The installation of this heating product shall be in accordance with the manufacturer's instructions and in accordance with the Canadian Electrical Code Part 1 or the National Electrical Code (USA), whichever is applicable.
- This equipment shall be installed only by qualified personnel who are familiar with the construction and operation of the apparatus and risks involved.
- Caution should be taken to guard against electric shock, fire and bodily injury during the installation of this equipment.
- De-energize power circuits before installation or servicing.
- Nuheat Mat should not be connected to power until the Nuheat Mat is fully installed and covered by flooring material.
- Subfloor must be prepared in accordance with ANSI specifications.
- The heating portion of the Nuheat Mat shall not touch, cross over, or overlap itself.
- Do not install Nuheat Mat in direct contact with or within 0.25" (6.5mm) of any combustible surfaces or materials (excluding wood-based substrates).
- The minimum bending radius of the cold lead is 2" (51mm) and heating wire is 0.625" (16mm).
- The ambient temperature must be above 10°C or 50°F when Nuheat Mat is installed.
- As per National Electrical Code (US) and Canadian Electrical Code (CAN), Nuheat Mat must be installed on a dedicated circuit for heating appliances/devices (additional Nuheat Mats, baseboard heaters, electric fireplaces, etc.).
- Nuheat Mat is designed for indoor floor heating applications in general use (-X) in US and Canada and in wet (-W) areas in Canada.
- Minimum distance of 1.5" (38.1mm) between adjacent heating devices.
- Total combined R-values of all floor coverings must not exceed R-2.5.
- Nuheat Mat should not be altered.
- Nuheat Mat is not for installation in pool and spa areas, nor outdoor use.
- Do not place objects directly on top of the floor that could impede/trap heat emanating from the floor heating system including but not limited to flush-to-floor furniture, rubber or memory foam mats, and mattresses. These objects could cause unsafe temperatures to be reached underneath these objects which may cause damage to the object and/or the flooring material.

3.22 TROUBLESHOOTING

Should you have any questions or difficulties installing or controlling your Nuheat Mat, please consult our comprehensive troubleshooting FAQ section at www.nuheat.com or contact Customer Care directly at 1.800.778.WARM(9276) or email res.customercares@pentair.com.

4.1 WARRANTY INFORMATION



4.11 WARRANTY INFORMATION

Nuheat offers a 25-year Limited Product Warranty and/or 25-year Limited Total Care* Warranty when installed by a Certified PRO Installer.

The **online warranty registration form** must be completed at www.nuheat.com within thirty (30) days from the date of installation and kept by the homeowner, together with a copy of the commissioning report, relevant invoice, and photographs, showing the product(s) in their entirety after installation but before the installation of the flooring material.

*Total Care warranty is an upgrade of our standard product warranty and additionally covers repair or replacement of the Product and restoring the floor in its original state or, if not possible, to an equivalent standard, at no cost to the Buyer. In order to remedy the defect, Pentair must have access to 1m² (10 ft²) of the floor covering material.

For more information, please call: +1.800.778.WARM[9276]
or email: res.customercare@pentair.com.

5.1 THERMOSTATS & CONTROLS



SIGNATURE THERMOSTAT

Wi-fi – Enabled Floor Heating Thermostat

- WiFi-enabled
- 3.5" Color touchscreen
- Energy usage monitor
- 7-day programmability
- Dual-voltage (120 V & 240 V)



HOME THERMOSTAT

Universal Floor Heating Thermostat

- 3.5" Color touchscreen
- Energy usage monitor
- 7-day programmability
- Dual-voltage (120 V & 240 V)



ELEMENT THERMOSTAT

Non-programmable Thermostat

- Manual temperature control
- Dual-voltage (120 V & 240 V)



MAT SENSE PRO ELECTRIC FAULT INDICATOR

The Mat Sense Pro is an electrical fault indicator that simultaneously monitors the hot neutral and ground wires during your Nuheat Mat or Nuheat Cable Installation. Use an electric fault indicator to ensure a correct Nuheat Mat or Cable installation every time.



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