



Introduction

The NUHEAT floor-warming system is designed for easy installation under tile and stone floors. Our thin (1/8" thick) and durable mats are ideal for both renovation and new construction projects. Over 60 different standard sizes are in stock for rectangular and square shaped rooms. Our made-to-fit mats can be manufactured to fit spaces with angles and curves. No matter what shape your room is, NUHEAT can fit it precisely.

This manual covers the steps to guarantee that the layout, installation and operation of your NUHEAT system is a success.

NUHEAT Services

Customer Service — call our customer service team toll free with any questions about the NUHEAT floor-warming system, your installation or general information about radiant heating at 1-800-778-WARM (9276).

Design Services — our design team will look at the floor plan you provide and specify a floor-warming plan that works for your specific application(s).

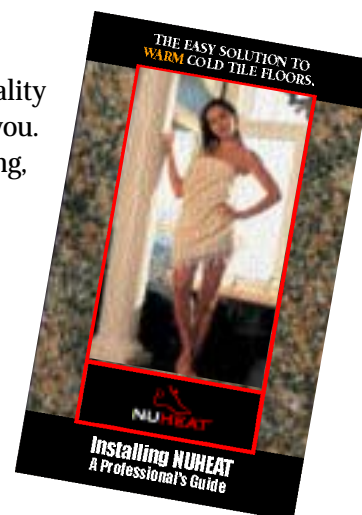
Certified Installers — NUHEAT can suggest trained and experienced *Certified Installers* to provide a quality installation of your floor-warming system.

Become a *Certified Installer!*

If you are committed to providing your customers with quality work and outstanding service, NUHEAT wants to hear from you. We provide a *Certified Installer Program* complete with training, certification and customer referrals (if requested).

Join the NUHEAT team of *Certified Installers* today!

NOTE: Contact your *Authorized Distributor* or NUHEAT to receive a comprehensive installation video.



B-Installing NUHEAT

WARNING: Before beginning the installation, all first-time installers must call NUHEAT at 1-800-778-9276. We will review your project with you and give valuable installation tips. Failure to do this will void the 25-year warranty.

A successful NUHEAT application requires the following tools:



- Acrylic or latex modified thinset
- Duct tape
- 1/4 inch square notched trowel
- Small plastic bristled brush
- Margin trowel
- Grouting float
- Digital multimeter
- Sponge
- Bucket of water

Step 1B: Test the NUHEAT mats — #1

Perform the first of three resistance and insulation tests to ensure the mats are working properly.

To confirm the proper power consumption of your mat, perform the resistance test:

- Set your digital multimeter to the 200 ohms (Ω) setting
- Add alligator clips to the multimeter to make testing easier
- Connect the black and white mat lead wires to the probes of the multimeter
- Ensure that the resistance reading is within the range of plus 10% to minus 5% of the resistance rating listed on your mat tag (Figure 1)



Figure 1



Figure 2

To confirm that there is no short to ground in your mat, perform the insulation test:


- Ensure that your digital multimeter is set to the mega ohms setting
- Connect the silver braid (ground) and black lead wire to the probes of the multimeter
- Make sure that your multimeter reads “open” or “OL” (Figure 2) — check the instructions of your multimeter to confirm which code represents “open line”
- Repeat this test between the silver braid and the white lead wire

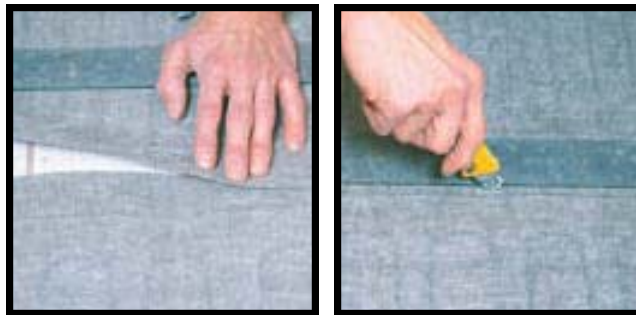
- i) Document your test results on the warranty card — **failure to take and record these tests will void the 25-year warranty**
- ii) **Contact NUHEAT at 1-800-778-WARM (9276) if your test results do not match the mat tag located on the lead wire**

NOTE: Failure to perform the resistance and insulation tests will result in the voidance of the 25-year warranty.

Step 2B: Dry fit the mats

- i) Make sure the floor is clean and free of debris (i.e. protruding nails, staples, etc.)
- ii) Place the NUHEAT mats in the predetermined areas on the floor to confirm that everything fits the room correctly
- iii) Lay the mat in front of the toe kick (foot print) of the sink cabinet first and roll it out from here to ensure that this area is heated in your kitchen or bathroom
- iv) Map out the path of your mat leads to confirm that they reach the power supply
- v) Remember that during construction or renovations, walls and fixtures can change
- vi) Ease the folds out of your mat(s) — dampening the folds with a wet sponge can help flatten them to the floor

 **TIP:** When using multiple mats ensure that the outside wires of adjacent mats are within 1½" of one another to keep the wire spacing and distribution of heat consistent across the floor. Where mat edges slightly overlap, you may carefully trim off the outer edge of the overlapping fabric. Do not cut the wires as this will cause damage to the mat.




Step 3B: Prepare the sub-floor

- i) Prepare the sub-floor as you would for any tile installation — there may be some variation among different applications
- ii) Remember that NUHEAT requires a quality installation without any air bubbles
- iii) Apply a coat of acrylic or latex modified thinset using a ¼ inch square notched trowel to a small manageable section of your plywood/concrete/cement board sub-floor (this method also applies to installations over existing tile).

NOTE: For installation over vinyl or linoleum, contact your tile distributor for their recommendations on preparing the floor for tile.

Step 4B: Lay down the NUHEAT mat

- i) Roll the mat out in a manageable section of thinset
- ii) Apply another segment of thinset and continue laying your mat
- iii) Use a grout float or your hands to smooth out any air bubbles or folds in the mat while applying it to the thinset
- iv) Check the bond between your NUHEAT mat and the thinset by rolling back a corner and examining the coverage — at least 80% of your mat should have thinset adhered to it.

 **TIP:** The consistency of your first layer of thinset should be thinner than normal to allow easy bonding to your NUHEAT mat.



Step 5B: Apply a skim coat of thinset

For large rooms or areas, it may be difficult to lay thinset and tile over top of the mat immediately after the mat has been adhered to the sub-floor. NUHEAT recommends the following method:

- i) Apply a skim coat of acrylic or latex modified thinset onto the mat after it has been firmly bonded to the sub-floor
- ii) Use the flat side of your trowel to spread the thinset evenly over the mat
- iii) Place warning signs up reminding on-site trades to avoid walking or dragging objects over this area
- iv) Let the skim coat set overnight to create a hard, even surface to tile over the next day



Step 6B: Test the NUHEAT mats — #2

See Step 1B for instruction on how to perform a resistance and insulation test. For NUHEAT installations that take several days, test the mats before proceeding with the next installation phase at the beginning of each work day and document the results.

Step 7B: Lay out the lead wires

- i) Run the lead wires along the outside edges of the mats
- ii) Avoid crossing the lead wires over the mats
- iii) Use thin strips of duct tape to keep the lead wires in place — do not staple



Step 8B: Install the thermostat sensor probe wire

Follow these instructions where a Floor-sensing Thermostat with Built-in Timer is used:

- i) Run the probe wire parallel to the heating wires of the mat
- ii) Ensure that the probe tip (grey plastic cylinder) is within 12" of the mat perimeter and away from any alternate heat sources such as heat vents and windows
- iii) Center the probe tip directly between the mat wires
- iv) Use thin strips of duct tape to hold the probe wire and tip in place



Step 9B: Install the tile

- i) Apply a coat of acrylic or latex modified thinset according to the thickness required for your tile or stone
- ii) Run your trowel lightly over the NUHEAT mat and parallel to the mat wires as you apply the thinset
- iii) Ensure that your thinset bed is applied evenly over the mat
- iv) Begin laying your tile
- v) Advise the general contractor or homeowner to keep the NUHEAT floor-warming system off until the thinset and grout has properly cured according to the manufacturer specifications



TIP: Cleaning Grout Lines

Use the sponge or small plastic bristled brush to clean the grout lines as you lay your tile. **Do not use a utility knife or margin trowel — these tools can easily damage the NUHEAT mat and will void the 25-year warranty.**



Step 10B: Test the NUHEAT mats — #3

See Step 1B for instruction on how to perform a resistance and insulation test.

C-Replacing Tile Over NUHEAT

To prevent damage to your NUHEAT mat(s) while replacing a tile, follow these instructions:

Step 1C: Disconnect power to the NUHEAT mat

Turn off the power to NUHEAT at the main power box or have a certified electrician disconnect the wires from the relay or junction box.

Step 2C: Connect a multimeter to the mat lead wires

- i) Perform a continuous insulation test with your multimeter (see Step 1B — Installing NUHEAT for instruction on performing an insulation test)
- ii) Monitor the readings on your multimeter as you replace the tile to ensure that the mat has not been damaged.

Step 3C: Score the grout around the tile

Use a grout scraper to score the grout 1/8" deep around the tile to be removed — this must be done carefully by hand. **DO NOT** use a power tool.

Step 4C: Break up the tile

Take a round-head hammer and carefully break up the tile starting from the center. Use only the force required to break the tile — excessive force can damage NUHEAT.

Step 5C: Remove the tile from the thinset

Position a cold chisel at a steep angle and begin removing the tile from the thinset. When you find a NUHEAT mat wire, move the chisel parallel to it remembering that wires are spaced apart by approximately 1 1/2" — never cross the wires directly with your chisel.

Step 6C: Break up the thinset from the mat

Use a round-head hammer to break up the remaining thinset over the NUHEAT mat. Remember to use only the force required to break the thinset — excessive force will damage NUHEAT. Do not hit any of the NUHEAT wires with your hammer.

Step 7C: Remove the thinset from the mat

- i) Locate a wire on the NUHEAT mat
- ii) Position a cold chisel beside the wire
- iii) Run your chisel parallel to the wire line to remove the thinset — never cross the wire(s) with your chisel



- iv) Remember that the mat wires are spaced apart by approximately 1 1/2"
- v) Carefully remove the remaining grout around the bare space with your cold chisel to ensure that the replacement tile fits properly




Step 8C: Test the NUHEAT mat

- i) See Step 1B in the Installing NUHEAT section of this manual for instruction on how to perform an insulation test
- ii) Document your test results
- iii) Remember to run these tests continuously through-out the tile replacement process to ensure that the NUHEAT mat has not been damaged

Step 9C: Apply a layer of acrylic or latex modified thinset

Run your trowel parallel to the wires of the mat as you lay your thinset



 **TIP:** To lay your replacement tile evenly to the surrounding tiles, try grinding down the back of the tile to remove some of the depth.

Step 10C: Lay down the replacement tile

Apply a coat of thinset to the back of the replacement tile. Set the tile into place and ensure that it is level with the floor.



Step 11C: Test the NUHEAT mat

See Step 1B in the Installing NUHEAT section of this manual for instruction on how to perform an insulation test and remember to document your test results.

Step 12C: Reconnect the NUHEAT system

Remember that only a certified electrician can connect NUHEAT to power. Be sure to advise the electrician and homeowner to keep the NUHEAT floor-warming system off until the thinset and grout has properly cured according to the manufacturer specifications.

D-Connecting NUHEAT to Power

Electrical Requirements

Failure to comply with the following guidelines will void the NUHEAT 25-year warranty. These guidelines do not replace national or municipal regulations or rules for safe electrical practices.

1. Only a certified electrician who is familiar with residential/commercial electrical installation codes and practices can connect NUHEAT
2. The NUHEAT system must be on a dedicated circuit
3. All NUHEAT mats and circuits must be on a Ground Fault Circuit Interrupter (GFCI) installed at the electrical panel or wall junction box — the NUHEAT Floor-Sensing Thermostat with Built-in Timer has a GFCI built into it
4. All wiring must comply with the specifications set out in the *US National Electric Code, Part 1 of the Canadian Electric Code* and all local/municipal electrical regulations and standards
5. All first-time installers of NUHEAT must call the NUHEAT Head Office prior to the installation at 1-800-778-WARM (9276) for instruction — failure to comply with this policy will void the NUHEAT 25-year warranty
6. A total of three resistance and insulation tests must be performed during the installation process:
 - i) When the mats arrive at the jobsite
 - ii) After the mat has been installed by the tile setter before laying tile
 - iii) After the tile has been installed

Failure to conduct all three resistance and insulation tests will void the NUHEAT 25-year warranty.

NOTE: All NUHEAT Certified Installers must have a multimeter on hand through-out the course of the tile installation.



Determining Power Consumption & Circuit Requirements

The wattage consumption of all standard mat sizes is listed at the back of this manual and on the NUHEAT product brochure. All NUHEAT mats come with a tag attached to the lead wire that indicates the total amperage and ohms of the mat as well. Use this information to determine the number of circuits and thermostats you require for each application. NUHEAT uses approximately 12 watts per square foot at full power.

You can put approximately 110 square feet of NUHEAT on a 15 Amp circuit by code and 145 square feet on a 20 Amp circuit. These calculations are based on the NUHEAT 110V system.

NOTE: The NUHEAT Floor-sensing Thermostat (FTGF1P) can handle up to 16 Amps at 120V. However, NUHEAT is rated for 110V so you must allow a 10% amperage draw ($16 \times 0.9 = 14.5$ Amps). We recommend loading only 14.5 Amps to the FTGF1P for safety.



Handling Power Capacity

When the power draw required for one room exceeds the capacity of one control/thermostat, there are two options:

1. Use multiple controls
2. Utilize one control with relay(s)

A relay is a device or switch that can be used to turn on multiple circuits. By using one NUHEAT control and just one relay, you can operate up to three 20 Amp circuits. Remember that each circuit must have its own Class A GFCI. Using relays is great for large rooms where the use of multiple controls would be difficult or unwanted.



See your electrical distributor for more information on the operation and installation of relays or call NUHEAT at 1-800-778-WARM (9276).

Wiring Steps

Step 1D: Install the circuits

- i) Determine the number of circuits you require based on the amperage draw of your heating system
- ii) Install the circuit(s) at the electrical panel
- iii) Remember that each circuit must have a Class A GFCI installed at the panel or junction box — the NUHEAT Floor-sensing Thermostat has a built-in GFCI

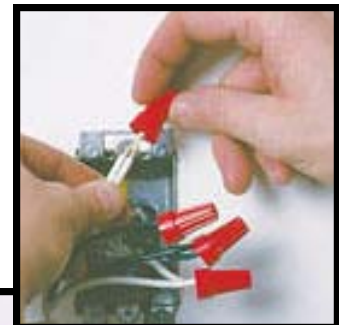


Step 2D: Test the mats

NUHEAT must be tested prior to making any connections. The mats must be tested a total of three times during the tile installation (see guideline #6 under *Electrical Requirements*). For instruction on performing the resistance and insulation tests, see Step 1B under *Installing NUHEAT*.

Step 3D: Make the final connections (using the NUHEAT Floor-sensing Thermostat)

- i) Connect the black line wire to the black control wire (line side)
- ii) Join the white line wire to the white control wire (line side)
- iii) Fasten the black mat lead wire to the black control wire (load side)
- iv) Connect the white mat lead wire to the white control wire (load side)
- v) Join the braid wire to the copper ground wire in the junction box
- vi) Fasten the thermostat probe wires to the two bottom screw terminals at the back of the Floor-sensing thermostat
- vii) Place the wires and control into the junction box



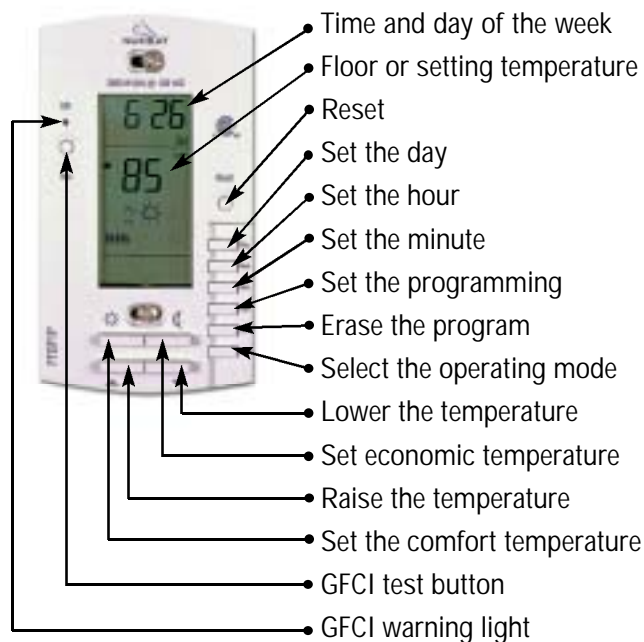
Your NUHEAT floor-warming system is ready for operation.

For more information contact NUHEAT toll free at 1-800-778-WARM (9276), e-mail nuheat@nuheat.com or visit our web site at <http://www.nuheat.com>

Operation of NUHEAT Controls

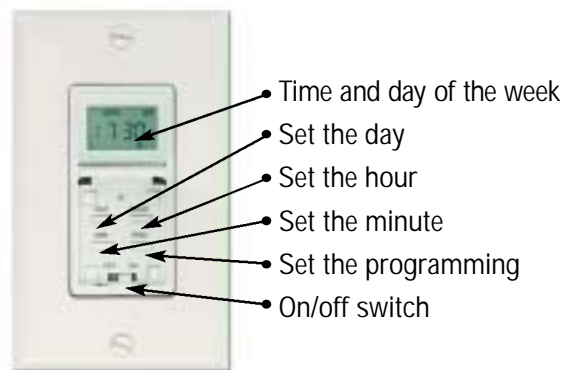
FLOOR-SENSING THERMOSTAT WITH BUILT-IN TIMER AND GFCI (FTGF1P)

This control does it all! Set the temperature to your comfort level. Program specific days and times that you want your NUHEAT system on or off. This unit features one-touch set back “comfort” and “economic” settings and a built-in GFCI.



7-DAY PROGRAMMABLE TIMER (TIMER6)

The 7-day programmable timer allows you to set your NUHEAT floor-warming system on and off at various times during the day.



DIMMER SWITCH (DIMMER)

Adjust the level of warmth with a simple sliding switch, suitable for rooms under 50 square feet. Usually combined with a programmable timer.

Each NUHEAT system must be installed with a Ground Fault Circuit Interrupter (GFCI), to maximize safety. Also available.