Installing an Electric Radiant Floor

Placed under a layer of tile, heat mats warm your toes without pipes and a boiler

BY TOM MEEHAN

In my 30-plus years as a tile installer, I think the greatest improvement to tile floors is electric radiant heat. That warm feeling under your feet is something you will never take for granted, and it doesn't take much energy to operate an electric radiant floor. It can be as little as the energy it takes to run a 100-watt bulb. (Keep in mind that this is a comfort system, not the primary heat source for a room.)

Several types of electric radiant heat are on the market ("Sources," p. 74). Each electric radiant system has advantages, but they all have one thing in common: Like an electric blanket, they use a matrix of wires to conduct heat. For the remodeling project shown here, I used a NuHeat Mat (www.nuheat.com; 800-778-9276). This system consists of a mat made of a woven polyester fabric in which heat wires are embedded (drawing below). The mat is laminated to the subfloor with a layer of thinset, a special type of mortar that is used to adhere tile in areas that are exposed to moisture.

Heat only the areas that are walked on

First, determine how big a mat you need. If it's an open floor plan, measure the rectangular or square area that needs to be heated for an easy, off-the-shelf purchase. For complex installations, a detailed drawing submitted with a special order should include the location for the electrical hookup and the thermostatic controls. The manufacturer will configure a custom-fit system for your room. But remember that custom mats cost more than off-the-shelf ones and that you really need the wires only in the locations where you're likely to stand. In either case, heat

THE BENEFITS OF AN ELECTRIC RADIANT-HEAT MAT

- COMES IN NUMEROUS STANDARD SIZES

- INEXPENSIVE TO OPERATE
- HEATS ONLY THE AREA YOU WANT HEATED
- CUSTOM MATS ARE AVAILABLE
- CAN BE INSTALLED OVER MOST EXISTING FLOORS
- THIN ENOUGH SO THAT IT WON'T ADVERSELY AFFECT FLOOR HEIGHT

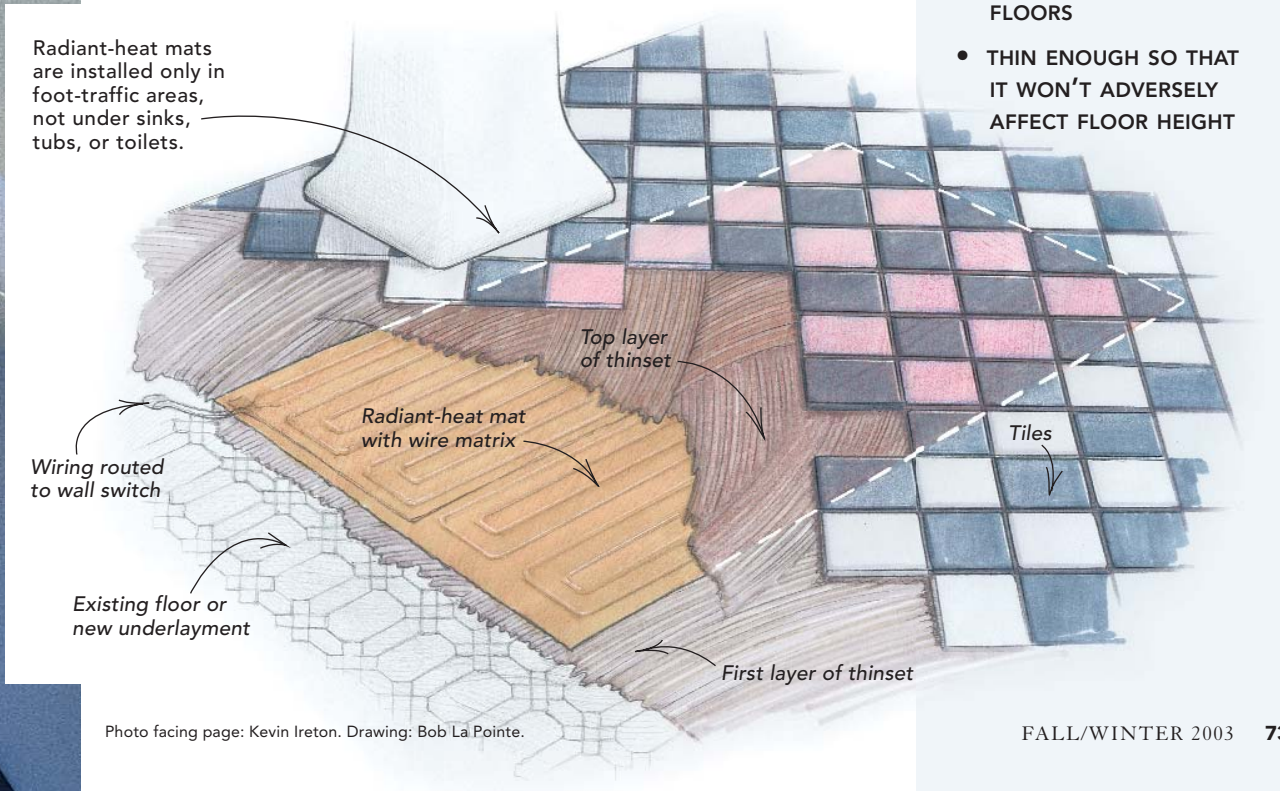

Photo facing page: Kevin Ireton. Drawing: Bob La Pointe.

Test the wires

Before installing the mat, check its integrity with a multimeter (volt/ohm meter) to detect any short circuits (top photo below). Because mat damage generally is caused with the trowel, it's important to check the mat throughout installation. The Loud Mouth (bottom photo) from SunTouch is a proprietary alarm that will sound if a short occurs during installation.

SOURCES

Easy Heat
800-537-4732
www.easyheat.com

Infloor Radiant Heat
800-588-4470
www.infloor.com

NuHeat
800-778-9276
www.nuheat.com

STEPWarm Floor
877-783-7832
www.warmfloor.com

SunTouch
888-432-8932
www.suntouch.net

Warmly Yours
800-875-5285
www.warmlyyours.com

EASY TO INSTALL, EVEN OVER AN EXISTING FLOOR

wires should never run under a cabinet or toilet, where the wires can overheat and possibly burn out.

Electric radiant heat can go over existing materials

The remodeling job illustrated here takes a different kind of preparation than new construction. A few years ago, I would have ripped out the old floor, right down to the subfloor. Now, I save the mess and extra cost, and install over a properly prepared vinyl floor.

The work starts with the electrician drilling a hole for the wires in an inconspicuous spot that doesn't see much traffic (photo 1) or making a hole in the wall where the baseboard will cover it. Next, I scarify the vinyl with a grinder or sander to give the thinset a surface it can bond to (photo 2). Then I nail off the floor with galvanized roofing nails 8 in. apart as if it were a piece of underlayment. This step ensures that no voids or inherent weak spots are in the floor. After nailing it off, I know this floor isn't going anywhere.

Installing the heat mat is not difficult

Before I spread any thinset, I roll out the mat to make sure it fits. Knowing that the mat is working properly, I begin spreading a high-performance latex-modified thinset with a ¼-in. notched trowel (photo 3). A high-performance thinset means it can adhere to more resilient surfaces like vinyl because it has more polymers than other thinsets. Once the floor is coated, I can unroll the mat into the thinset (photo 4).

Before and after installation, I connect the mat to a typical multimeter, which can be bought at Sears for about $30, to check for any damage to the wires. SunTouch (www.suntouch.net; 888-432-8932), another electric-radiant-mat manufacturer, has a terrific proprietary alarm system called the Loud Mouth. If a wire is damaged during installation, the alarm sounds, and I know exactly where the problem is. Then I can have an electrician troubleshoot and repair any damage.

I work the mat forward, pushing it into the thinset. The wires are fragile and must be treated carefully. After the mat is spread out, I use a clean wood float to push it tight while getting rid of any voids or air pockets (photo 5). I start from the middle of the mat and work my way out.

When the mat is set, the electrician lays the thermostat sensor between the heat wires (photo 6). The sensor can't cross any heating wires, or it won't accurately record floor temperature. Next, he feeds the wires down the hole he drilled earlier and completes the connections.

Protect the mat when setting the tile

My main concern now is protecting the heat mat from being damaged as I install the tile. By simply placing heavy cardboard wherever I work or step, I'm able to place the tile safely. I begin with a skim coat of thinset using the flat side of a trowel to permeate the fabric of the heat mat (photo 7). Then I apply more thinset and spread it with a ⅜-in. notched trowel. From this point, it becomes a typical tile installation. □

Tom Meehan, a second-generation tile installer, and his wife, Lane, own Cape Cod Tileworks in Harwich, Mass. Photos by Roe A. Osborn, except where noted.

Locate the electrical feed. *With the heat mat temporarily in place, the electrician drills in an inconspicuous spot to run wiring for the electrical feed and thermostatic control.*

Photos, p. 73 and left this page: Scott Phillips

Don't rip it up, rough it up. *The vinyl floor is roughed up so that the thinset will bond to it. The vinyl also serves as a slip sheet to prevent plywood seams from telegraphing through to the tile.*

Use a ¼-in. notched trowel to spread the thinset. *It's important to spread the thinset in one direction to allow the mat to sit evenly. Then unroll the mat at the door, pressing it into the thinset. Be careful not to work yourself into a corner while troweling thinset.*

Unroll the mat, pushing it tight to keep it flat. *Work the mat into the thinset, pressing it in while working forward. The wires in the mat are fragile, which is why setting it by hand is a good idea. The cabinets and fixtures are in place, making this installation easier.*

Start from the middle and work your way out. *To remove the voids or air pockets, a clean wood float does the trick. Be careful not to force the mat into place and possibly damage a connection.*

Placing the sensor wire properly is critical. *Once the mat is set, the electrician places the sensor wire. He will use strips of duct tape to hold it in place. It's important that the sensor wire doesn't cross the heating wires; otherwise, the thermostat won't get a proper reading.*

Now it's a regular tile job. *The thinset is troweled on with a ⅜-in. notched trowel with the trowel lines going in one direction. Take extra care when spreading thinset over the sensor wire. Once the tile is down, you might want to test the system. But wait a week for the thinset to cure before turning on the heat.*