

44 HOME-ENERGY SOLUTIONS

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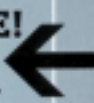
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Heat Wave

Staple-up radiant heating for warm floors.

BY MERLE HENKENIUS

ILLUSTRATIONS BY GEORGE RETSECK

The deep comfort of radiant in- floor heating has been around for many years. Unfortunately, the systems add thousands to the cost of a new home, compared to forced-air heating systems, because they typically use hydronic tubing encased in concrete. That requires designing at least a part of the house around its heating system. And that also makes it nearly impossible to retrofit an existing house.

But things are changing. Innovative methods like the staple-up system shown here are designed for

wood-framed floors. Now radiant heating can be used as easily in a retrofit as in new construction. In fact, the staple-up method can heat a room, the floor of a house or even the entire structure.

While the costs have been coming down, radiant hydronic heating is still a good bit more expensive than other methods, especially forced air. A 2000-sq.-ft. ranch house can be equipped with a forced-air heating system and a central air conditioner for \$5000 to \$8000. A professionally installed hydronic floor system for the same

If you can find a cooperative contractor, you can save money on a radiant heat system by putting the tubing in yourself.

house costs \$10,000 to \$14,000—and that's without air conditioning.

However, if you're an ambitious do-it-yourselfer and can find a heating contractor who will work with you, it's possible to shave \$2000 off that price by installing the tubing yourself. The system's design, and the installation of the boiler, its piping and controls will be handled by your contractor.

The tubing materials used for this project are the two most common types. Watts Radiant's orange tubing is a firm and slippery plastic made of cross-linked polyethylene, known as PEX. The other tubing is made of reinforced EPDM rubber, and it looks a bit like a black garden hose. For information on both, visit Watts Radiant at www.wattsradiant.com.

(Please turn to page 94)



To prevent tubing from becoming tangled as it's installed, place the roll on a spooler.



Measure and mark the floor joists to be bored. Before you bore engineered joists, consult the manufacturer.



Bore the holes through the joists with a right-angle drill and a self-feeding bit. Position yourself under the drill and behind it. Maintain a firm stance with sound footing.



Begin the process of pulling tubing by walking a double length of it to the end of the first joist bay.

THE TROUBLE WITH TORQUE

It takes a big drill and a big bit to punch hole after hole through floor joists. But even a big drill has its limits, and it can be stopped dead by a large knot or if it's pushed too aggressively. When a drill is stopped, all that torque is transferred to the person operating it. It's enough to knock you right off a ladder. If possible, rent a two-speed drill for this work, and use the lowest speed range that will get a self-feeding bit (above) through the lumber. It's even better to find one of the new right-angle drills, such as the Milwaukee Super Hawg (Model 1680-20) below. It has a clutch that slips in low speed to absorb the reactionary torque caused by a jammed bit.

—Roy Berendsohn



Use EPDM where you need to make tight-radius bends or to work around ducts and other obstacles. Pull some slack into the tubing, and feed it through the holes ahead.



To fasten EPDM tubing quickly, you need to rent a staple gun with a specially shaped nose piece. Staple the tubing in the first joist bay at 6- to 8-in. intervals. Once fastened, pull the tubing for the next joist bay.



Begin PEX installation by fastening its aluminum channels to the floor deck using self-tapping sheetmetal screws driven by a cordless drill.



8 To get PEX through the framing, pull a double length off the spool and feed it through the joists. Make the second pass by looping it back and pushing it through the same hole.



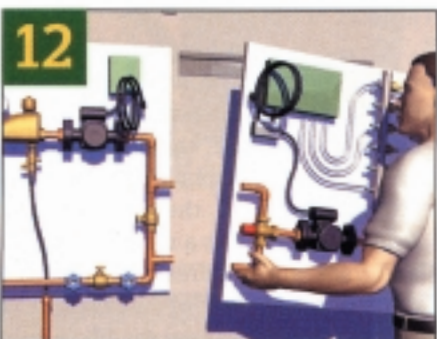
9 Prebend a loop in the PEX, then press it into its aluminum channel at the end of each joist bay.



10 Once both types of tubing are installed, insulate below with fiberglass batts. Place the foil facing up, about 2 in. below the tubing. Support the insulation with pieces of wire or manufactured supports.



11 Cut the boiler's copper tubing to length, then clean and fit the parts together with valves and other components. Solder each joint from the bottom to the top.



12 Install the heating system's control panel on wall brackets mounted near the boiler.

THE HOLE TRUTH

Before you start boring holes in your floor framing, consult your local building department and the two sources listed here. If you put a hole or a notch in the wrong place, you'll weaken the floor joist. Consult your local building department for regionally specific information. Here are some general guidelines.

Rules Of Thumb:

- 1. Notching is not permitted in the middle third of a joist's top or bottom edge.**
- 2. No notches or holes are permitted in the horizontal supporting members (chords) of engineered wood I-joists.**
- 3. Consult the manufacturer before cutting or boring in the web of wood I-joists.** Generally speaking, small holes are best placed toward the ends of the joist, larger holes in the middle, and holes up to 1 1/2 in. in diameter are okay anywhere in the joist's web.
- 4. In solid wood joists, holes must be a minimum of 2 in. from the joist's top or bottom edge.** Also, the hole's diameter cannot exceed one-third the joist's depth.

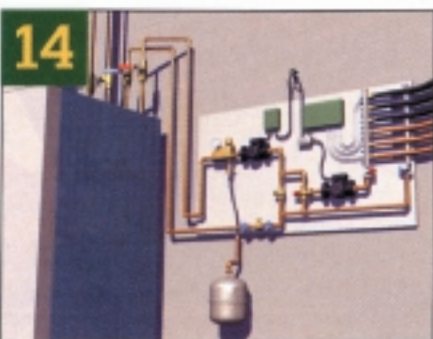
More information can be found in the "JLC Field Guide To Residential Construction, A Manual Of Best Practice," Volume 1. It covers framing, foundations, roofing and exteriors. Available from www.jlconline.com.

Another great source is "Code Check, A Field Guide To Building A Safe House." Available from www.taunton.com.

—R.B.



13 Push the tubing ends over barbed fittings on the system manifold. Fasten the PEX tubing with crimp rings, the EPDM material with spring clips.



14 A completed control panel is neat and orderly. All of its components are easily accessible for future service. A sheetmetal cabinet encloses the assembly. **PM**