

# CONTRACTOR

THE NEWSMAGAZINE OF MECHANICAL CONTRACTING

Reprint from October 1998

## How you install tubing affects radiant heat output

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About 100 million ft. of radiant pex tubing will be installed in the United States this year. The installation costs mostly involve laying out and fastening large amounts of tubing to the floor. For every 1,000 sq. ft. of floor space, 1,000 ft. to 1,500 ft. of pex tubing are required, depending on the application, to achieve sufficient Btuh output.

Many tubing installation techniques are being practiced today, in part due to the number of pex tubing suppliers.

Once the designer has determined the tubing layout pattern, tubing diameter and spacing, the contractor's task is to properly fasten the tubing to the floor structure in preparation for the concrete or gypsum concrete pour.

In dry, wood-frame floor installations where no cement-like materials cover the tubing, completely different mounting methods have to be applied.

Whether it's a wet or a dry system, selection of the proper mounting technique is critical for the longevity and performance of the system.

The ideal tubing environment in wet systems is total encasement within the slab. Tubing that sticks out of the bottom of the slab and the subsequent air pockets are potentially weak links in the system which can cause tubing failures, especially with non-cross-linked tubing materials that tend to migrate into these voids.

The only place where the tubing should penetrate the slab should be at the manifold where all supply and return runs must be sleeved with plastic elbows. The main purpose of a good fastening method is to keep the tubing inside the slab at an even horizontal level and evenly spaced for uniform slab surface temperature and heat distribution.

**The big advantages of heat transfer plates are that the tubing is evenly spaced and the system is fast responding.**

### Wet systems

When you're attaching tubing to wire mesh or rebar, use plenty of plastic nylon ties (every 2 ft.) to prevent the tubing from floating up to the surface during the pour. Make sure the

ties are strong enough so they don't snap off while the tubing is being blasted by 4-in. concrete pump nozzles.

Other plastic fasteners can be used. These include U-tracks, which are ideal for metal decking on commercial projects, and plastic wire mesh clips for residential slabs. For residential slabs, you can eliminate wire mesh entirely by using screw clips for foam board insulation to hold the tubing.

If the system is going onto a plywood subfloor with a gypsum pour on top, attach the tubing with U-staples and a pneumatic staple gun. The most important feature for this method is the ability of the staple gun to accurately control the depth of the staple penetration into the plywood. It is imperative that the staple does not touch the top of the tubing. Ideally a 1/8-in. gap between the top of the tubing and staple allows the tubing to float up during the pour and be fully encased by gypsum concrete.

This creates a perfect long-term tubing environment. These specialty staple guns are being offered by most systems manufacturers.

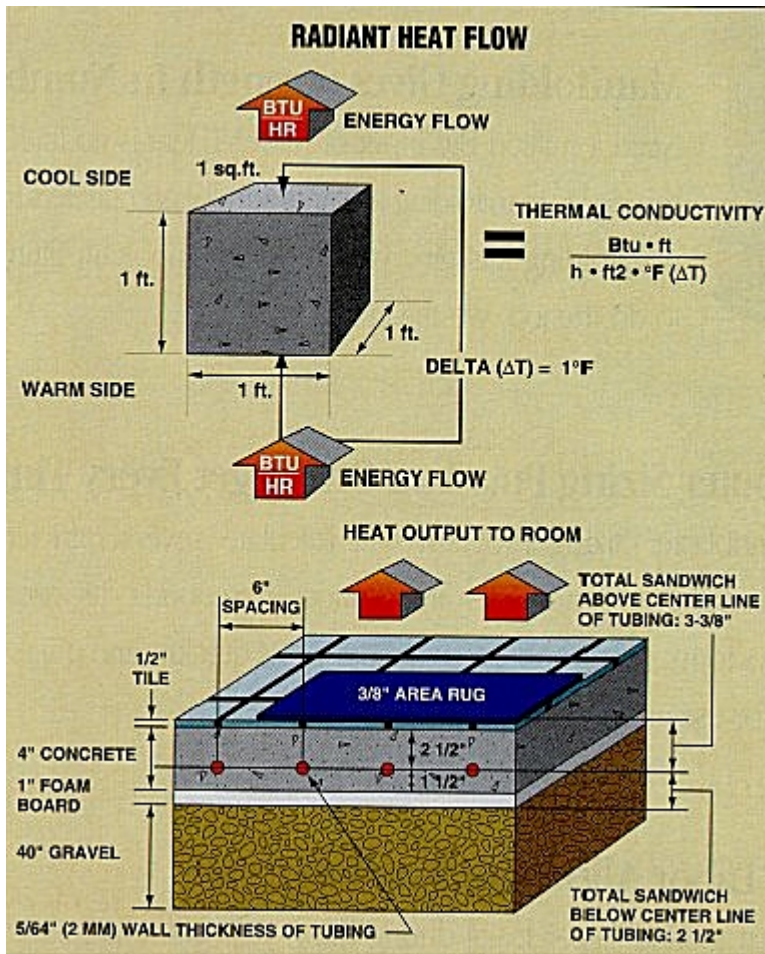
### Dry systems

At least 50% (and growing) of all residential wood-frame floor systems installed today in the United States and Canada are not using cement-like materials. In most

cases, metal plates are used to provide the proper heat transfer from the tubing to the subfloor. This can be done from below the subfloor between joists or on top using wooden sleepers between the tubing runs.

subfloor securely and use silicone between the tubing and plates.

The Btuh output performance of heat transfer plate systems is as good as wet systems or better.



The most efficient method is determined by the type of job and where the tubing is going: is it retrofit, remodel or new construction? Will floor build-up be a problem? Is it going over a crawl space or in a full basement? Are you heating the first or second floor?

The big advantages of heat transfer plates are that the tubing is evenly spaced and the system is fast responding. Also, the plates have low floor build-up, low weight and do not introduce moisture into the wood structure. It is ideal for hardwood flooring.

A common concern with dry systems is tubing expansion and contraction noise that can annoy the homeowner. To eliminate this problem completely, fasten plates to the

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