

# CONTRACTOR

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## Design, control strategies help avoid complaints

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While reading the Letters to the Editor section in a recent edition of a home improvement magazine, I noticed the comments of four readers on the subject of radiant heating. Three of the letters were very positive.

The writers proclaimed all the virtues of radiant heating, such as the heating of objects and not just air, the energy efficiency of such a system and the convenience of having one's floor as the radiator, eliminating baseboard and ducting which can limit furniture placement.

These are facts that we all know. And since I'm in the radiant heating business, I enjoy seeing such comments.

The letter that interested me most, however, was from a homeowner who was not at all happy with his radiant system. The three writers who were happy with their systems were from Maine, Minnesota and Connecticut, where a bright sunny day in December or January can mean outside temperatures of 40°F. The unhappy homeowner was from San Jose, Calif.

Here's his letter:

"I just finished reading your article about the benefits of in-floor heating. I have lived with it and am in the position to know that you are wrong - it is the worst form of heating ever invented: The floor is hot, and the room is cold. Air circulation is absent.

"For those of us in the 'Sun Belt of California,' the system does not provide the quick heat we need in the morning and the cool off we need in the hot part of the day.

"I lived with radiant floor heating in

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Marin County for eight years. I was never warm when it was cold. You cannot have rugs, because they block the heat flow. Wall-to-wall is a no-no for sure.

"The system needs bleeding regularly. The water becomes fetid and smells when you do the bleeding.

Bubbles will shut off entire sections of the system for no good reason.

"As the system ages, galvanic corrosion steps in to make each new day an adventure. Good old hot water or cast-iron pipe-connected radiators, with some forced air to move things around, are much better options for the highly seasonal requirements of most of the United States. My wife and I had a laugh about the 'wonders' of your various installations.

"Edward M. Barrall II, San Jose, Calif."

In San Jose, large temperature fluctuations on a daily basis are the norm. One might need heating at 5:00 a.m. and air conditioning at noon. What this homeowner was complaining about was the slowness of his system to respond to outside temperature fluctuations.

Listen to his complaints and you can deduce much of what's wrong. He was never warm when it was cold, the floor overheated, the system would not cool down when the day heated up and there were noises in the piping. I am convinced that he had a high intermittent circulation, copper-tubing-in-concrete radiant system that was not designed for the heating requirements in that section of the country.

Design Flaw #1: Never use high water temperature intermittent circulation control strategies. Constant circulation with weather responsive temperature modulation is a must, especially for high-mass concrete radiant systems.

Ninety percent of his problems would be solved by installing a mixing valve between the heat source and the floor distribution manifold, controlled by an actuator and outdoor reset control with room temperature feedback.

The airlock problems are also dramatically reduced with constant circulation. Replacement and proper sizing of the expansion tank will also take care of that problem.

Assuming that the tubing layout in the slab has been performed properly, i.e., tubing spacing and maximum circuit length, we can guarantee Mr. Barrall, after making the above mentioned corrections, that he'll get a well functioning radiant

system that should turn him into another satisfied radiant believer.

His comment on wall to wall carpeting is definitely valid. Proper selection of carpet and pad, keeping both combined R-values at less than 2.5, is important. That limits his carpet choices.

The corrosion issue, whether due to galvanic action or oxygen permeation, is nonexistent with the use of high-quality pex barrier tubing.

Whenever you're dealing with woodframe construction, it's also advisable to resort to fast responding low mass, dry system construction methods. A low-mass system overcomes the flywheel effect that he complained about and simplifies controllability of the system.

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