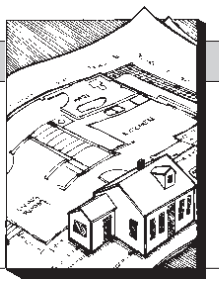
Why I Prefer Hydronic Heating

by Gordon F. Tully



Residential heating systems are nearly always designed by the installer, except on very large projects or in special cases involving indoor swimming pools, solar heating, historic houses, and so on. And even on projects designed by engineers, the installer is likely to make substantial changes on site.

Fortunately, good heating installers usually know more than you do about installing piping, boilers, controls, and pumps. They have to make hard decisions about complex issues that trouble even the experts, so don't be surprised if they don't agree with your point of view, however logical. Installers may even seem touchy and opinionated at times, but they are the ones who must guarantee the system.

In general, it's best to create a cooperative problem-solving relationship. There *are* some issues, though, about which it pays to argue with the standard practices and prejudices of heating-system installers.

Which Fuel?

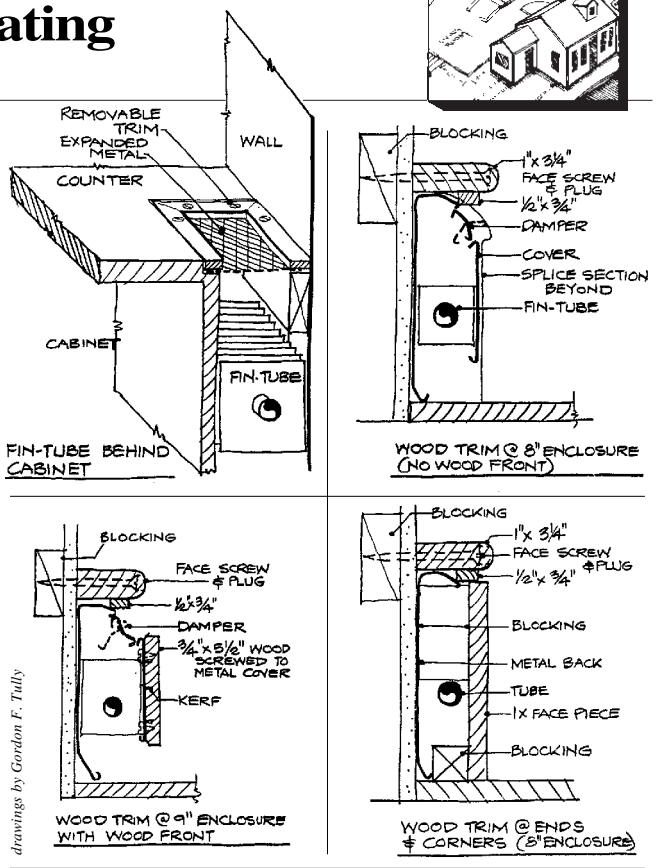
Gas is the fuel of choice. Its cost is generally close to or less than oil, it burns clean, and there are many excellent new boilers and furnaces that yield high efficiency with low maintenance. Although an occasional house blows up from a gas explosion, such events are extremely rare; driving a car is more dangerous than living in a gas-heated house.

When street gas is not available, it's a toss-up between propane and oil. Bottled gas is more of a safety and maintenance problem, but I still prefer it to oil. Even oil can backfire, coat a house with soot, and create a health hazard, so oil does not entirely resolve the safety issue. If oil is used, you can find new oil-fired boilers with good efficiencies.

Electric baseboard heating is clean, cheap, and easy to install. But its operating cost is about three times that of gas, and 2½ times that of oil or propane. If your demand is small (say, in a superinsulated solar house of 1,000 square feet), electricity is a good choice. In most cases, though, you will regret installing electric heat. The payback on a fossil-fuel system is fast.

As far as we can determine, radiant heating systems use the same amount of energy as convective systems. (Please send all letters proving that electric radiant heating saves money to our patient *NEB* editor.) Radiant heating has some advantages—a hidden source, for instance—and a lot of disadvantages—such as baked heads with overhead radiant, and lack of control with slab heating. We use it only in bathrooms.

Groundwater heat pumps bring operating costs down to or below the cost of gas, but are expensive ($10,000 to $15,000) and, therefore, cost-effective only for large houses. Air-to-air heat pumps are a little cheaper to *operate* than resistance heating in our climate, but they are expensive, require more maintenance, and need a ductwork system for distribution.



drawings by Gordon F. Tully

Which Distribution System?

In the '70s, we designed a lot of warm-air systems integrated with solar, and found that a good air system—one with returns in every room, large ducts, and low-temperature air delivered constantly at low velocities—costs almost twice as much as a good hydronic system. This is for large houses; the difference is probably smaller for small houses.

Concealing ductwork with dropped ceilings and chases adds costs—particularly in custom houses—and hampers design flexibility. You end up designing around the ductwork. Inexpensive air systems generally use big, noisy fans, and periodically blast the occupants with 140-degree air driven at high speeds through small ducts. Such cheap *hot-air* systems are unpleasant to live with.

We now use hydronic exclusively, except for the rare case where someone wants air conditioning. Even then, we often use a hydronic system in combination with a partial AC system (serving only one or two rooms) with a hydronic coil in the duct.

Hydronic systems need devices to distribute the heat. Ordinary baseboard convectors are the obvious choice, since cast-iron baseboards, old-fashioned radiators, and cabinet heaters are all expensive by comparison. A classy system can be designed using fan-coil units but, again, the units, their electrical connection, and associated ductwork add a lot to the system cost. Small fan-coil units (so-called kick-space heaters) are routinely used in kitchens. These can be noisy, and they get clogged with hair, so buy good ones and keep them clean.

Selecting and Laying Out Baseboard Convectors

These hateful devices need careful attention. Buy sturdy units to prevent the covers from coming apart under ordinary use and cleaning. Slant-Fin (Greenville, N.Y.) makes a Series 15, a Series 30, and a Series 80. Avoid the 15s, even though they are smaller; the 30s are a good compromise. The 80s are sturdy but also bulky looking—3½ inches thick and 9 inches high, compared to 2¾ inches thick and 8 inches high for the 30s—and a good deal more expensive. The 80s have a higher output, which sometimes makes them the best choice.

Baseboard convectors are at their worst at joints. Splices, inside corners, and outside corners look awful. They are constantly being knocked off by cleaning or random kicks, so it helps to screw the loose pieces to the cover. The fins can be cleaned (more or less) with a narrow vacuum wand without removing the cover. Once a year, unscrew the covers and forage for lost pencils and rubber bands.

Try to locate baseboards on walls without furniture, since heavy furniture will block air movement. Also, an unpleasant space is left behind any furniture pushed up against a convector. I always draw a plan showing furniture, electrical work, and heating together. Short runs of high-output convectors are the best choice.

I usually end up locating baseboards under windows, where there is not likely to be furniture. But don't let the units be covered by lined draperies, as the heat will get trapped behind them. Under sliding doors, use units that recess into the floor, with a metal grille cover.

Building in Baseboard Convectors

Whenever I have the budget, I box in the covers with wood trim. It is possible—but undesirable—to leave the covers off and enclose the fins with wood. First, this leaves the fins unprotected during construction. Second, there is nothing to keep the wood from warping. Third, you are mixing trades in an expensive way.

It is better to install the covers and then add wood. The most important trim piece is the one on top. Face-screw a substantial piece of trim onto a piece of blocking, and plug the holes. Add a scotia (or other) molding to fill the gap between the top of the cover and the wood trim. This top piece must be secured properly, but needn't be strong enough to stand on.

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The convector splice pieces must be modified so they can be installed from the front. Cut off the back flanges and face-screw them to the front covers. Paint the covers and the splice pieces a dark color to make them "disappear" under the wood trim.

The top trim goes a long way toward making the convector covers look built in, but to get a really attractive job, you need a piece of wood on the front. If you use heavy-duty covers, kerfed wood boards can be screwed right onto them, leaving air slots at the floor and at the outlet. Intermediate sizes will probably support a piece of wood, but I haven't tried them.

Another improvement can be made (see drawing). Whether you use wood or metal front covers, the ugly metal corners and end pieces can be replaced with wood.

Fin-tubes can be recessed into walls or behind cabinets. This detail is especially useful in kitchens and on staircases where exposed covers are kicked regularly. Most builders don't like the coordination involved, but the extra trouble is usually worth it. To get return air to the convector, a simple hole at the bottom is fine. In a kitchen base cabinet, just leave an open slot at the kick space. Cover the opening at the top with painted, flat expanded metal. And be sure to keep the fin-tubes inside the insulation and vapor barrier! ■

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