

RADIANT IN-FLOOR HEATING

The popularity of radiant heating is due to the special kind of comfort it offers. Conventional baseboard heating, whether electric or hydronic, first heats the air in the room, which then circulates through convection currents. The body's direct contact with the heated air provides warmth. However, a radiant heating system doesn't heat the air. Instead, the heat moves directly to the objects in the room. The difference between the two systems is somewhat the same as warming your hands by a fire rather than using a hair dryer.

In-floor radiant heat also offers some practical advantages. Because the heat originates at your feet, temperatures can be set lower, typically 65°F instead of 70°F to 72°F.

With a radiant system the heat doesn't end up near the ceiling, well above the comfort zone. In a radiant system, the temperature difference between floor and ceiling is usually only 2°F to 3°F. Moreover, heat loss through walls and windows—precisely where baseboard units and forced-air diffusers are located—is minimized because the air in the room is carrying less heat.

Radiant heating doesn't increase air pressure in isolated rooms, which also means less heat loss through doors and windows. Furthermore, radiant heat does not greatly affect the moisture content of the air, but it does reduce the dust circulation that can be associated with forced air.

Add to these benefits a heat-retaining thermal mass such as structural concrete or lightweight, thin-slab concrete, improved boilers, circulators and controls, and the energy savings over conventional systems can approach 30%.

In-floor systems can be divided into three component segments: the heat source, usually a conventional hot-water boiler; the control segment, thermostatically activated circulators, zone valves and an electronic control panel; and the in-floor tubing, which varies in diameter from 3/8 in. to 5/8 in. in residential applications.

The real improvement over earlier systems is the tubing, which is either a plastic or synthetic rubber/plastic combination. The most popular type of PEX tubing is a tough, cross-linked polyethylene product.

The floor of a home is typically heated by two or more circulation zones, each serving several piping loops. Each zone begins with a circulator that moves the water and has a supply manifold that feeds heated water through the floor tubing and a return manifold that directs the water back to the boiler. The manifolds are simply short lengths of pipe fitted with nipples that connect the tubing loops.

If one or more loops are significantly shorter than the rest, or require different temperature settings, these loops may be controlled independently by zone valves or

manual valves that regulate the flow of water. These specialty loops are called sub-zones.

For example, while a tiled master bedroom and master bath could be operated on one zone, or even one piping loop, the same is not true if the bedroom is carpeted and the bath is tiled. While these adjoining rooms may share the same air space, each floor will transmit heat differently. In this case, it's best to heat these rooms separately, with the carpeted room getting more piping and/or hotter water to compensate for the carpet's insulation values. The temperature of the water beneath the tiled room might be 110°F, while the carpeted room might require 140°F water to achieve the same degree of comfort.