

## Wood Flooring Over Radiant Heating

**R**adiant heating is a growing source of heating in North America, both in residential and commercial installations. Consequently, it's important for installers to understand how radiant heating works with hardwood flooring installations.

Radiant heating does not heat air directly as do more conventional forms of heating, such as baseboard convectors or forced air circulation. Radiant heat is "omni-directional." Unlike warm air, which tends to rise, radiant energy tends to travel in all directions. A large area of mild surface temperatures, such as a warm floor, is capable of transferring as much heat as a small surface area, such as a steam radiator, at high surface temperatures.

Radiant heat beneath wood flooring involves tubing in concrete, or tubing under plywood subfloors.

The most important factor in a successful wood flooring installation over radiant heat is a dry slab and a dry subfloor. **The only sure way to dry a slab and subfloor system is to turn on the radiant heating system before installing the wood flooring.** If this isn't done, moisture left in the slab will enter the wood flooring as soon as the heat is turned on. The result is floors that will expand, contract, shrink, crack, cup and bow excessively. If the heat can't be turned on, then everyone involved — down to the homeowner — should understand and accept the compromises that will appear down the road.

Opinions on the amount of time required vary widely. Some say the heating system should be turned on at least 72 hours before installation, with a preferred time of five to six days. That assumes that the slab has been in place for at least 60 days. (See "Testing concrete" on page 16.) If the slab is relatively new, the recommendation is to have the heating system turned on for 30 to 60 days before installing wood floors. As always, follow the recommendations of your wood flooring manufacturer.

Wood dries rapidly when the heat is first turned on. It dries to a lower moisture content toward the end of the heating season. When the radiant heat is turned off, moisture once again starts to seep into the wood subfloor and radiant slab. Abruptly turning on the radiant heat in the fall will subject wood flooring to rapid and easily noticed movement: Evidence of this movement will be cupping or crowning of the boards. Finally, shrinkage cracks will appear between individual floor boards. Alternatively, gradually turning the heat on before the first really cool day will begin the seasonal movement more gradually. Thus, the movement of the floor will be much less noticeable. As always, humidity controls can help offset flooring expansion and contraction.

Not all species of wood are good candidates for an installation over radiant heating. It's best to follow the manufacturer's recommendation for a species' suitability over radiant heat. When possible, choose a

species that is known for its stability. Quartersawn or rift-sawn flooring is preferable to plainsawn in the search for stability. Strip flooring is also a better choice than plank flooring, because narrow boards expand and contract less than wide boards do. Using narrow boards also means there are more seams in a floor to take up movement. Because of its dimensional stability, laminated flooring is another good choice.

Radiant heating systems are currently designed to run cooler than they did years ago, although water supplied to the systems generally range from 90 degrees to 140 degrees. In years past, when water temperatures exceeded 140 degrees, wood fibers were repeatedly traumatized, causing stress fractures, gaps and twisting. Repeated heating and cooling also broke down the adhesive that bonded the hardwood to the slab.

But today, a set of thermostat controls can help avoid those problems. It is recommended to have three thermostats — one to control the tubing water supply temperature; one to control the room temperature with different zone controls; and one for outside the house. This three-thermostat system is kindest to wood flooring, because it moderates the floor temperature. People tend to crank up the heat when they're cold, but with three thermostats, the system adapts itself to conditions both inside and out. The outside thermostat gears up the system for the arrival of colder weather, and a thermostat adjusting the control water temperature on the tubing will keep the temperature at the homeowner's comfort level.

### Four Types of Radiant Heat Installation

