Hardwood Floors
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Technical Notes

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HARDWOOD FLOORS and RADIANT

"Can wood floors be installed over radiant heating systems?"
Absolutely!
A warm, friendly wood floor is a thing of pleasure on a cold winter's day. It is not only beautiful to look at; it adds a high degree of comfort to the room.

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Click here for Wood Floor Test Results

According to Mickey Moore, Technical Director of the National Oak Flooring Manufacturers Association, the temperatures used in floor heating will not damage the wood in any way. Temperature is only a factor when gluing wood directly to a subfloor. Some mastics are temperature sensitive.

While floor-heating temperatures will not harm the wood, variances in moisture content will cause it to move in numerous ways. When installing soft or hard wood floors in any situation, moisture content is a key factor to successful floor performance. Adding heat to the floor makes attention to moisture even more critical. The wood floor installer and the heating contractor both need to be aware of the special considerations required when combining floor heating and wood floors.

Gapping, Cupping, Warping, Checking.

It is important to note that almost all movement in a wood floor is due to moisture and that movement will happen in all wood floors. Therefore, the more constant the moisture content is maintained, the less likely there will be any problems with the floor. Gaps between the boards and checks (cracks in the board) are a result of the moisture content being too low. Warping or cupping is the result of the moisture content being too high or uneven. In either case, it is usually a result of not allowing the wood to adjust to its environment before it is installed.

Simple Rules

Here are three simple rules for the heating contractor to follow:

1. Low Temperature - Keep the subfloor temperature as low as practical while still heating the space. (an outdoor reset control can help here)

2. Even Heat - Spread the heat in the subfloor as evenly as possible.

3. Acclimate - Make sure the subfloor and the wood flooring are normalized or acclimated to the finished room before the wood is installed. The subfloor or slab must be dry.

While temperature does not harm the wood, it does affect its moisture content. As the temperature goes up, the moisture content generally goes down. Heating the wood too much will cause it to shrink and gaps will occur between the boards. Once the temperature is lowered, the moisture returns and the gaps close up.

In most climates, winter air is dryer than summer air. This can cause seasonal gapping between boards and will occur regardless of whether or not there is a floor heating system installed. If an indoor humidity control is not present, occupants should expect some seasonal gapping on any wood floor with or without radiant heating.

While cupping of boards can be a result of improper wood floor installation, it can also be a result of uneven heating of the floor. Low, even temperature distribution is the key to avoiding this problem.

A moisture barrier between the wood and the subfloor is a must over concrete or gypsum floors and not a bad idea even over a wood subfloor. The barrier helps maintain an even moisture balance in the floor.

Wood Flooring Types

There are a number of types of wood flooring that can be used over heated floors. They are listed here in order of stability, the first being the most dimensionally stable and least likely to be affected by moisture content. The last is most susceptible to moisture problems.

1. Laminated flooring. These products generally have a plastic laminate surface, designed to look like real wood, which is bonded to a pressed wood or plywood sub-board.

2. Engineered wood flooring. This floor consists of several layers of wood bonded together with the grain of the wood at biased diagonals. The top finish layer is usually a hardwood.

3. Solid wood flooring. There is a wide variety of wood species, each reacting differently to moisture content. Width and cut of the board also determines how stable the solid wood floor will be.

a. More stable woods are American Cherry, American Walnut, Mesquite, Teak, Oak, etc.

b. Less stable wood examples are Maple, Brazilian Cherry, etc.

c. Softwoods are generally less stable, but can be mechanically held in place easier than hard woods.

d. Quarter or rift-sawn wood is more stable than plain sawn wood flooring.

e. Narrow boards (2 1/4" or less) are recommended for hardwood floors.

Wood Flooring Installation

Wood floors can be installed in a number of ways. The choice is usually a result of a combination of the type of building construction and wood flooring to be installed.

Glue Down - (generally restricted to laminated or engineered wood products) Wood flooring is direct glued to the subfloor, be it a concrete slab, gypsum underlayment, or wood construction. The heating element is either embedded in the slab or applied to the underside of the subfloor.

Direct Nail - Wood flooring is nailed directly to a wood subfloor. This method is generally used when the heating system is applied to the underside of a wood subfloor. Care must be taken so that the nails don't penetrate the subfloor and damage the heating system.

Nail to Sleepers - Sleepers (such as 2x3" Group 1 density, pressure treated, kiln dried lumber) are attached to the subfloor. Sleeper material should be dense enough to sufficiently hold the wood flooring nails. Soft pine is a poor choice to hold hardwood flooring.

The heating system is placed between the sleepers and uses the air space or metal fins to transfer the heat to the underside of the wood floor. Space between the sleepers can also be filled with a cementitious material to aid heat transfer.

Wood floor strips can be nailed directly to the sleepers or to a layer of plywood attached to the sleepers.

Floating floors - There are a number of manufacturers that provide pre-finished floors which do not attach to the subfloor, but float over it as one piece. These floors can be tongue and groove glued, clipped together, or attached to a double layer of plywood constructed to make one large floating sub-base. The method depends on the manufacturer.

Whatever type of wood or method of installation is used, abiding by the three simple rules (1. low temperature, 2. even heat, 3. acclimate) will assure a successful wood floor heating system.

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