

## Appendix H

### Radiant Heat Installations

With radiant heat, the heat source is directly beneath the flooring, so the flooring may dry out faster than a similar floor in a home with a conventional heating system. Wood flooring can be installed over radiant heat as long as you understand radiant heat and how it can impact wood flooring, what precautions to take, and what type of wood flooring to use.

Types of wood flooring that are best suited-for radiant heat subfloor are products that possess improved dimensional stability such as these:

1. Engineered wood flooring is more dimensionally stable than solid wood flooring.
2. Certain species are known for their inherent dimensional stability such as North American oak, and others. Denser species such as maple and Brazilian cherry are less stable.
3. Quarter sawn and rift-sawn wood flooring is more dimensionally stable in width than plain sawn wood flooring.
4. Narrow boards expand and contract less than wider width boards.

#### General Radiant Heat Installation Guidelines

1. To minimize the effect that rapid changes in temperature will have on the moisture content of the wood floor, NWFA recommends that an outside thermostat be installed. If one is not present; suggest to your customer that this should be considered. Unlike conventional heating systems, which switch on as needed, radiant systems work most effectively and with less trauma to the wood floor if the heating process is gradual, based on small incremental increases in relation to the outside temperature.
2. Subfloors should have proper moisture tests according to the moisture testing procedures outlined in Chapter 3, Moisture Guideline and Vapor Retarders.
3. The essential requirement in proper applications of wood flooring over radiant heated systems is to avoid penetration of the heating element. Radiant-heated subfloor systems can be concrete, wood or a combination of both. The type of subfloor as described in the previous chapters determines subfloor preparation.
4. If the subfloor is concrete and it has cured, turn the heat on, regardless of season, and leave it on for at least 5-6 days to drive out residual moisture before installation of the wood flooring. Some installation systems, particularly glue-down applications, require the heat to be reduced or even turned off before installation of the flooring begins, so the adhesive does not cure excessively. Test concrete in accordance with Chapter 3, Moisture Guideline Testing and Vapor Retarders.
5. With water-heated radiant-heat systems, a pressure test must be performed and documented by a qualified plumber or the system installer prior to beginning the installation of the wood flooring. Electric under floor systems should also be tested prior to floor installation. Check heat system manufacturer guidelines.
6. If flooring materials that conduct heat at different rates are on the same circuit or heating zone, check with the HVAC mechanical engineer and Radiant Panel Association ([www.radiantpanelassociation.org](http://www.radiantpanelassociation.org)) before proceeding.
7. Radiant heat is dry heat. A humidification system may be necessary to maintain wood flooring in its comfort zone.

The following installation and subfloor systems can be used successfully over radiant heat:

1. Glue-down, engineered or solid parquet.
2. Floating engineered.
3. Direct-nail, solid wood or engineered wood flooring to wood subfloor.
4. Solid T&G floor direct-nailed to sleepers.
5. Single layer of plywood on sleepers.
6. Double plywood floating subfloor.
7. Loose-lay single layer of  $\frac{3}{4}$ " plywood cut in 16" planks staggered with  $\frac{1}{2}$ " gap between, laid perpendicular to wood direction.

### **Glue-Down, Engineered or Solid Parquet**

Note: Follow manufacturer's installation instructions.

Install over approved subfloor. See Chapter 7, Parquet Installation, and Chapter 8, Engineered Wood Flooring Installation.

1. Use an adhesive approved by the manufacturer.
2. The heating system has to be turned off before installation.
3. The maximum allowable subfloor surface temperature is 85° F (29.44° C).
4. Expect some heating season shrinkage.

### **Direct Nail, Solid Wood or Engineered to Wood Subfloor**

Note: Follow manufacturer's installation instructions.

1. Install over approved subfloor. See Chapter 8, Engineered Wood Flooring Installation, and Chapter 9, Solid Strip and Plank Flooring Installation.
2. Always check for subfloor moisture. See Chapter 3, Moisture Guideline Testing and Vapor Retarders.
3. Solid wood must be properly acclimated to normal living conditions.
4. All other installation procedures are the same as outlined in Chapter 8, Engineered Wood Flooring Installation, and Chapter 9, Solid Strip and Plank Flooring Installation.
5. Be sure fasteners are not so long as to penetrate of heating tubes or heat sources.
6. Maximum subfloor surface temperature is 85° F (29.44° C).

### **Solid T&G Floor Direct Nail to Sleepers**

Note: Follow manufacturer's installation instructions.

1. The use of solid wood flooring 4 inches and wider is not recommended over sleepers.
2. Wood flooring must be properly acclimated.
3. Do not use shorts.
4. Maximum subfloor surface temperature is 85° F (29.44° C).

### **Single Layer of Plywood on Sleepers**

Note: Follow manufacturer's installation instructions.

1. Wood flooring must be properly acclimated.
2. Use extreme caution to prevent penetration of heating tubes or heat sources.
3. Maximum subfloor surface temperature is 85° F (29.44° C).

### **Double Plywood**

Note: Follow manufacturer's installation instructions.

1. Wood flooring must be properly acclimated.
2. Maximum subfloor surface temperature is 85° F (29.44° C).

### **Floating Engineered**

Note: Follow manufacturer's installation instructions.

1. Install over approved subfloor. See Chapter 8, Engineered Wood Flooring Installation.
2. A 6 mil or better polyethylene vapor retarder should be installed over concrete subfloors. In some cases, this may be part of the flooring underlayment.
3. A foam or resilient underlayment recommended by the flooring manufacturer must be installed prior to application of the wood flooring.
4. Use an adhesive approved by the manufacturer for side and/or end joints.
5. Maximum subfloor surface temperature is 85° F (29.44° C).

## Appendix I

### Installation Over Screeds

1. Note: Solid  $\frac{3}{4}$ " and  $33/32$ " tongue-and-groove strip flooring may be installed directly to screeds.
2. Note: Engineered wood flooring less than  $\frac{3}{4}$ " thick, thin-classification strip flooring (including  $\frac{1}{2}$ ") and solid plank flooring (3" or wider) cannot be installed directly to screeds.
3. For engineered flooring less than  $\frac{3}{4}$ " thick, thin-classification strip, and for solid plank (3" and wider), the screed system must be overlaid with proper subflooring. The screed system must be overlaid with  $23/32$ " (18.3mm) Exposure 1 plywood subfloor panels, or  $19/32$ " (15.1mm), Exposure 1 plywood subfloor panels or  $23/32$ " (18.3mm) OSB Exposure 1 underlayment properly spaced and oriented perpendicular to screed direction, and across two or more spans.

#### Installation Method

Note: The following method does not apply to screed systems over radiant heat.

1. Abrade or scrape the concrete slab to ensure it is clean of paint, sheetrock mud and general construction residue and dry of moisture.
2. Check slab for flatness with 6' minimum straight edge.
3. Fill low areas or dips in slab with concrete underlayment compound.
4. Break out or grind down concentrated high areas of slab.
5. Pour hot tar (where building codes allow) or a urethane adhesive to cover the slab completely.
6. Install short lengths (approximately 24") of 2" x 4" or 1" x 4" screeds in the hot tar or urethane adhesive, perpendicular to the direction of the flooring. Screeds should be placed on approximately 6" to 7" centers, to provide approximately 50% coverage. Screed joints should be staggered, easily accomplished by alternating full and half pieces on the starter wall. Note: Treated screeds are preferred only if they are kiln dried after treatment (KDAT). Otherwise, yellow pine, fir or other kiln dried framing species is acceptable. With treated screeds, stainless-steel fasteners are required.
7. Allow adequate time for the tar or adhesive to properly cure.
8. Check screeds for flatness with 6' minimum straight edge.
9. Sand or plane the high areas of the screeds. Shim the low areas of the screeds with your preferred shimming material. Masonite or thin layers of plywood work well. Sand or plane shims to feather out transitions.
10. Cover screeds with an impermeable vapor retarder, such as 6-mil poly membrane.
11. Rack out flooring.