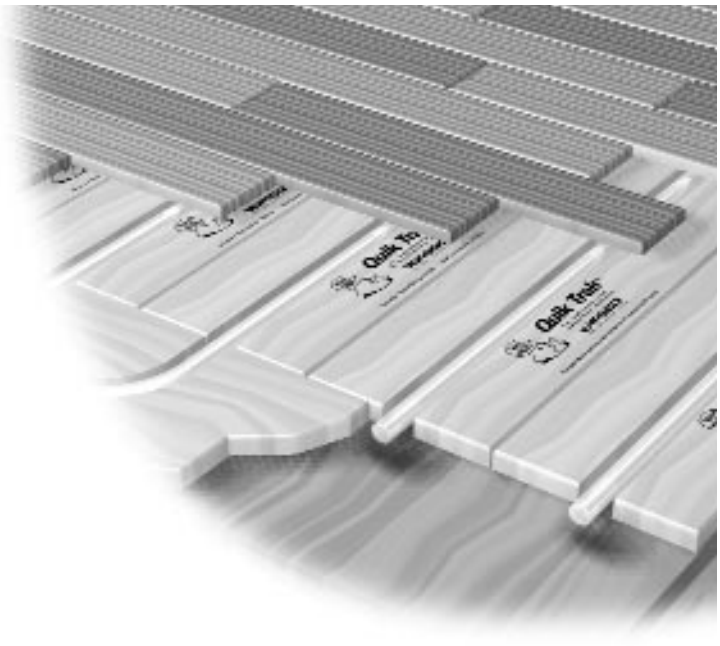

Chapter 14

Wood Floors

Wirsbo Radiant Floor Heating systems can be successfully installed in a variety of floor structures under a variety of floor coverings. Among the various floor coverings, wood floors present some unique design challenges. The designer and contractor should understand the boundaries of wood-floor coverings and the methods used to maximize effectiveness. Communication between the heating contractor and the wood-flooring installer is key to a successful installation.

As with most floor coverings, the resistance to heat transfer is the most significant factor that must be accommodated. Wood-floor covering materials are fairly resistant to heat transfer (approximate R-value = 1 per inch). Nonetheless, wood floors can work effectively in conjunction with radiant floor heating systems when designed appropriately.

Design with Wood Floors

When designing any radiant panel heating system, it is important to first verify the heating load. In particular, it is essential to be precise in determining the amount of energy necessary to heat the space served by a wood covered radiant floor. The Wirsbo software design programs can help with this task. To assist with the heat loss, the R-value of various wood-flooring materials are listed in **Appendix D**.

After the heat loss is complete, consult the appropriate chart to determine the floor surface temperature and supply water temperature necessary to meet the calculated heating load. The surface temperature of a wood floor should not exceed 80°F. Surface temperatures above 80°F may, over time, cause the wood floor to become excessively dry. Such drying may cause shrinkage and possibly exaggerate joint separation.

Wirsbo's recommended wood-floor maximum heating loads at 65°F room setpoint temperature and 80°F floor surface temperature is 30 BTU/h/ft^2. The recommended wood-floor maximum heating load at 70°F room setpoint temperature is 20 BTU/h/ft^2.

Moisture and Wood Floors — When wood absorbs moisture, it swells. When wood loses moisture, it shrinks. If moisture negatively affects a wood floor, the source of the moisture is significant.

If the moisture content of the wood is relatively high near the bottom of the plank, the plank will cup upward on the edges. Cupping due to moisture below exaggerates cracks in the wood (see **Figure 13-1**).

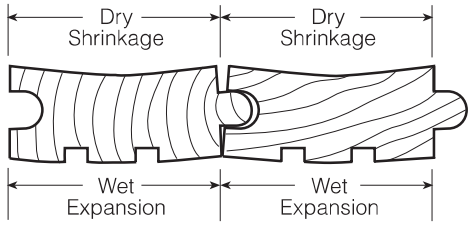

Figure 13-1

If the moisture content is relatively high near the top surface of the plank, it will crown downward on the edges (see **Figure 13-2**).

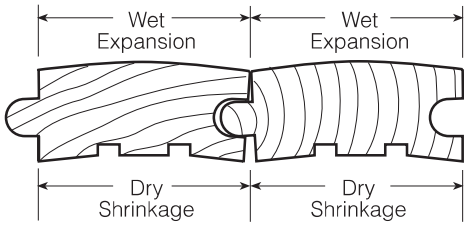

Figure 13-2

Sources of moisture from below include inadequate moisture barrier, ground water wicking through the slab or an unsealed subfloor. Moisture from above is generally the result of high relative humidity.

Cupping and crowning also occur because of moisture loss in wood floors. If the installed wood floor has a high moisture content, the eventual drying can cause cupping or crowning regardless of the type of heating system used.

The wood flooring installer should follow the flooring manufacturer's installation manual or National Oak Flooring Manufacturer's Association (NOFMA) manual for acclimation and installation of the wood.

Note: Never use the radiant system to speed up the acclimation.

Moisture changes will affect proportionately the width of boards. Wider-cut boards will shrink more than narrow boards. Separations between boards may be cumulative (see **Figure 13-3**).

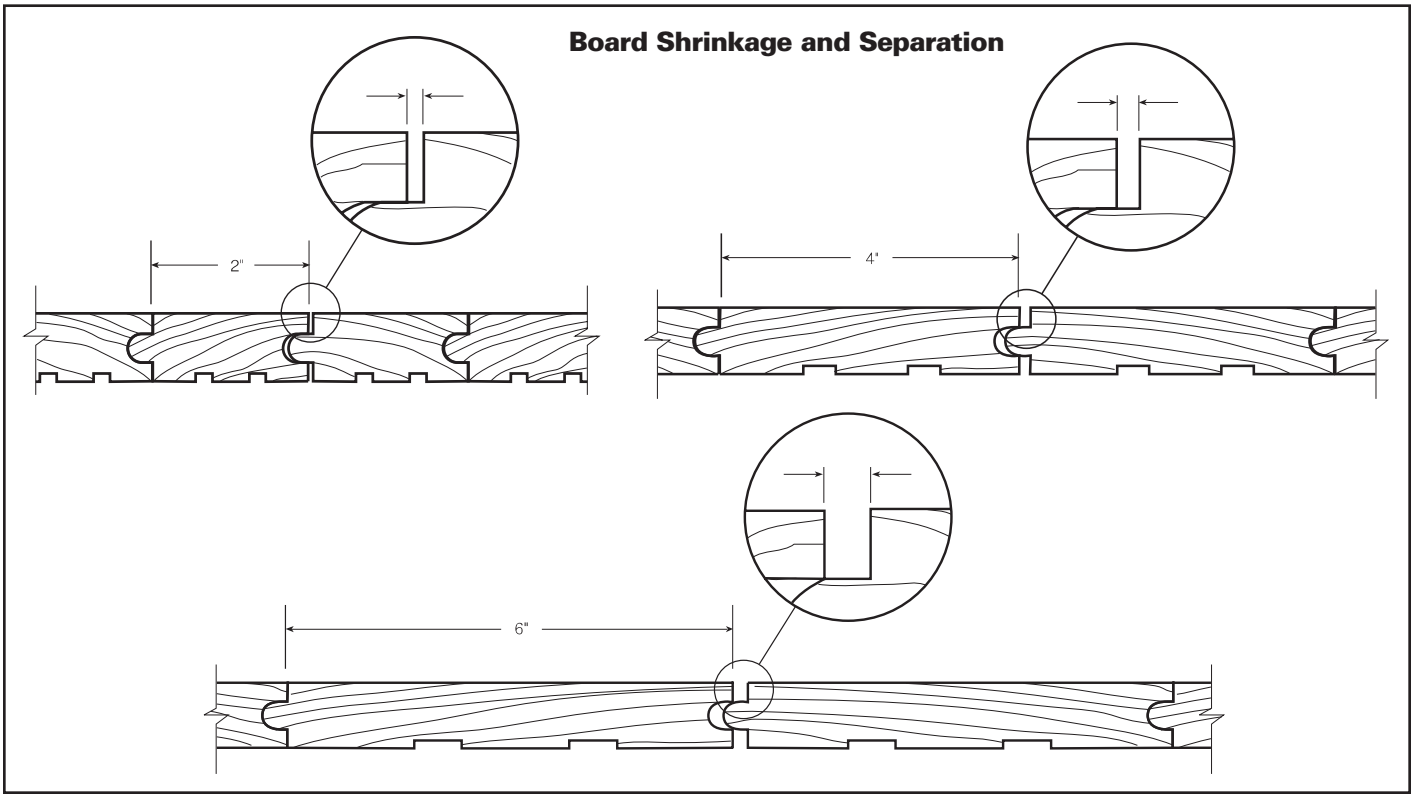

Figure 13-3

Cumulative separation can be limited by installing the boards parallel to the longer dimension of the room (see **Figure 13-4**).

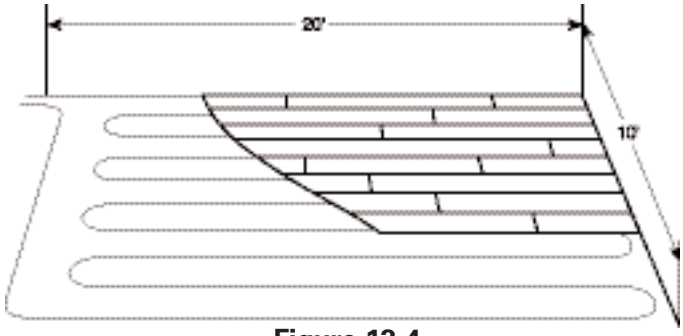

Figure 13-4

Selecting a wood floor with beveled edges helps reduce the appearance of shrinkage cracks (see **Figure 13-5**).

Figure 13-5

Panelization — Panelization is a phenomenon that occurs as a result of the wood planks bonding to adjacent planks within the floor. Bonding results from the adhesive or surface finish hardening between the planks. When shrinkage occurs, the bonding causes larger than normal cracks because the combined shrinkage of several planks is concentrated in fewer separations or cracks (see **Figure 13-6**).

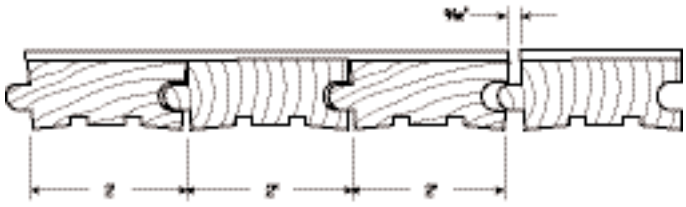

Figure 13-6

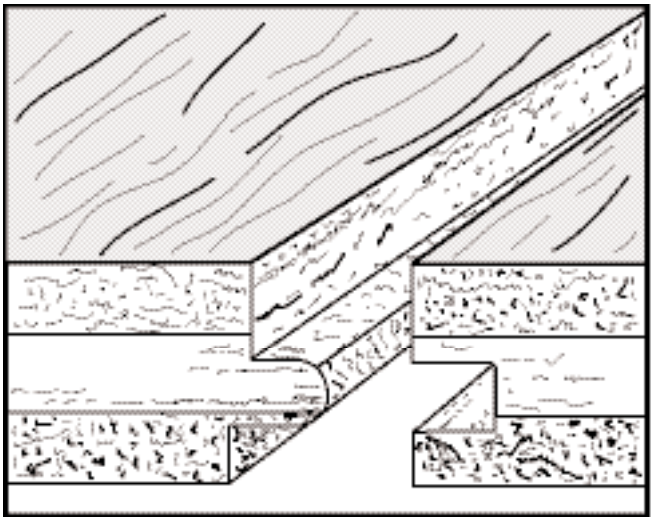

Figure 13-7

Laminate Floors — Laminate wood-floor systems provide solutions to the potential problems associated with ¾-inch solid wood floors. The most significant advantage of laminate floors is their ability to resist shrinkage. The shrinkage, cupping or crowning that occurs with solid wood floors is not likely to occur with laminate wood floors because they are biaxially oriented (similar to plywood). Also, laminate wood floors are typically thinner than ¾-inch solid wood floors, and have less resistance to the radiant heat (see **Figure 13-7**).

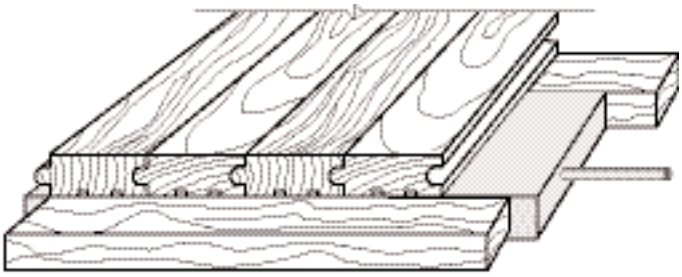

Figure 13-8

Installation

Wood floors can be installed over many different types of radiant floor constructions.

Wood Floor Over Poured Floor — The wood flooring is nailed to 2x2 sleepers placed between the PEX tubing loops. The underlayment is poured to the top of the 2x2 leaving an exposed nailing surface to secure the wood floor. Follow the underlayment or wood manufacturer's recommendations on sealing their product prior to the installation of the wood product (see **Figure 13-8**).

Wood Floor Glued to Underlayment — Underlayment must be dry and sealed prior to the attachment of the adhesive. Follow wood floor manufacturer's installation manual for specifics on vapor barrier or sealer prior to the installation of their product (see **Figure 13-9**).

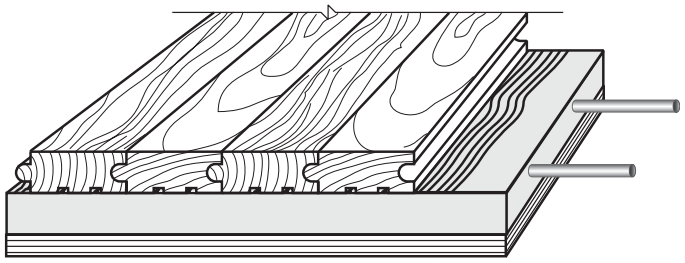

Figure 13-9

Wood Floor Nailed to Subfloor — Wood must be acclimated to the subfloor. Check the wood-floor manufacturer's installation manual for requirements on vapor barriers or sealers. If the tubing is mounted to the subfloor, the contractor must mark the tubing location so the wood floor installer does not puncture the tubing with nails (see **Figure 13-10**).

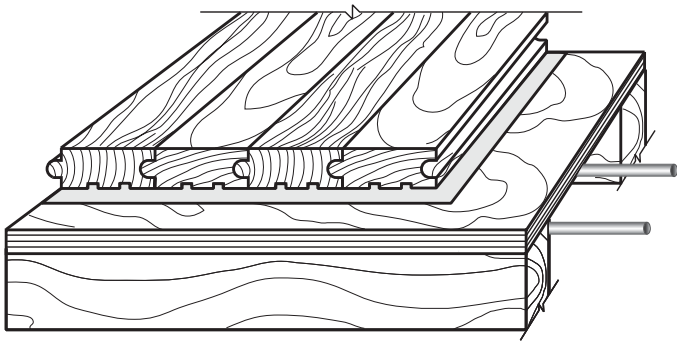

Figure 13-10

Wood Floor Over Quik Trak — Please refer to the Quik Trak Design and Installation Manual for information.

Wood Floor Over Concrete — Wood floors installed directly on concrete slabs above grade typically require a vapor barrier and/or adhesives resistant to heat. Check with adhesive manufacturer for specific instructions regarding the application of heat during the curing process (see **Figure 13-11**).

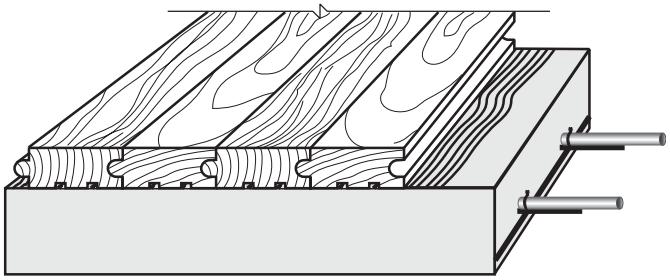

Figure 13-11

Floating Wood Floor Over Concrete or Underlayment — Check the wood floor manufacturer's installation manual for requirements on vapor barriers or sealers (see **Figure 13-12**).

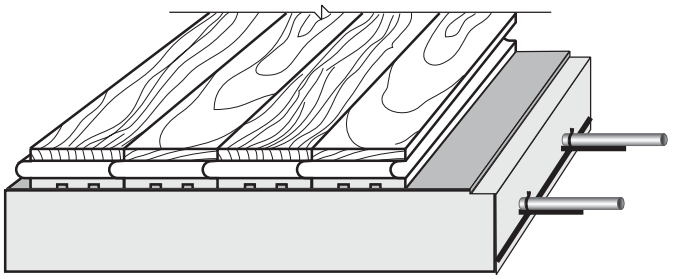

Figure 13-12