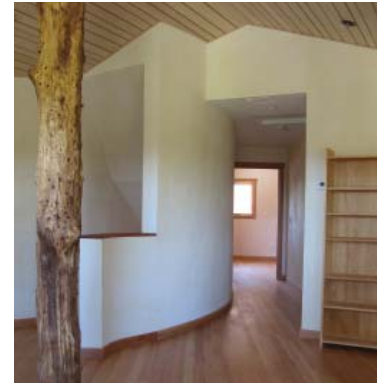




Installing Solid Wood Flooring Over Warmboard

The application of solid hardwood floors installed over a radiant heated floor is approved by many hardwood manufacturers and trade organizations. Warmboard installed with hardwood floors is a proven successful technology. If you would like to research this topic, please check out the following:

| | |
|-------------------------------|--|
| Radiant Panel Association | www.radiantpanelassociation.org |
| The Hardwood Council | www.hardwoodcouncil.com |
| National Wood Flooring Assoc. | www.woodfloors.org |
| Launstein Floors | www.launstein.com |
| Lumber Liquidators | www.lumberliquidators.com |
| Carlisle Wide Plank Floors | www.wideplankflooring.com |



First and Always...

Follow the specifications and recommendations of the wood floor manufacturer.

Also follow all installation specifications and guidelines documented by the National Wood Flooring Association.

- The hygroscopic nature of wood is actually why wood moves.
- The changing atmosphere of humidity will cause **hardwood** to **expand** and **contract**.
- These changes that finish hardwood floors can experience from humidity swings are referred to as “**gapping**” and “**cupping**.”

Avoiding Gapping and Cupping of Hardwood Floors

Type of Lumber

Use a wood species that is dimensionally stable. There are three types of cuts from the tree: Quartersawn, Riftsawn, and Plainsawn. Quartersawn is nearly all vertical grain lumber which is a better quality cut and dimensionally stable. Riftsawn is the next best choice. Anything wider than 3 1/4” is referred to as plank flooring. Anything narrower than this is called strip flooring. In general, strip flooring is more dimensionally stable. However, plank flooring has been installed over Warmboard successfully in many projects with widths of up to 12” on occasion.



Acclimate Wood

Low moisture content of the wood strips is an important condition for stability. It is crucial to acclimate the wood. Bring the wood strips to the job site and sticker them. This means pull them out of their boxes and set them up so air can circulate around them. Acclimation time can vary, but two weeks is recommended. The wood flooring should not be delivered on the job site until the interior plastering is completed and dry.

The radiant floor heating should be in good operation also before the hardwood arrives. It is best to operate the radiant floor system for a few weeks to help bring down the moisture content of the Warmboard Subfloor. This procedure should take place no matter what time of year the hardwood is being installed.

Humidity control on the job site is crucial in some areas of the country. It may be required to operate the air conditioner to control the indoor humidity a few days before the wood is delivered. Keeping the indoor humidity between 30%-50% will keep the wood stable.

The hardwood should not experience any large swings in humidity or temperature once it arrives on the job site. It is best to keep the ambient temperature in the house between 60° and 80° and keep the indoor humidity between 30%-50% range. To meet these specifications, it will be required to operate the radiant floor heating or the air conditioner during wood acclimation and after hardwood installation.

Hardwood floor installers will often test the moisture content of the subfloor and the wood finish floor prior to an installation. The moisture content of Warmboard should be at 12% or less. The moisture content of the finish hardwood should read within 4% of the Warmboard reading. The ideal reading of the hardwood would be between 6%-9%, however, this reading can vary in your climate zone.

It is difficult to get a proper moisture content reading from the Warmboard subfloor due to the aluminum skin. For an accurate moisture reading from the top side of the Warmboard panel, use a moisture meter with insulated contract pins that have hammer probes. An example of this meter is model J4 or J2000 which is available at www.delmhurst.com.

Be aware of any moisture or humidity intrusion that may take place on a project. For example, a crawl space under Warmboard that is dry in the summer and experiences water intrusion in the winter months could cause large humidity swings and movement of the finished hardwood floor (gapping and cupping).



Installing Traditional Strip and Plank Hardwood to Warmboard

We recommend three different installation options (all methods are very common)

- 1) Nail the hardwood directly to the Warmboard.
- 2) Nail and glue the hardwood directly to the Warmboard.
- 3) Glue only, with the use of an interior plywood underlayment (1/4") installed under the hardwood.

First and Always...

Follow the specification and installation recommendations provided by the Hardwood Manufacturer. Also, follow installation specifications and guidelines documented by the National Wood Flooring Association.

Nail the hardwood directly to Warmboard

Hardwood should be nailed directly to the Warmboard. The required vapor retarder is built into the Warmboard panel itself, the aluminum. Do not install any material between the Warmboard panel and the hardwood.

Installing the hardwood perpendicular to the tubing pattern is the easiest method. It is important to see the tubing as the planks are nailed to avoid tubing damage. It is recommended to tongue nail at a 45 degree angle at 6" on centers and use 2" flooring nails. Occasionally, the plank flooring will run the same direction as the tubing. When this occurs, either glue with Bostik's Best (bostik.com), SikaBond T35 or T55 urethane adhesive (sikaconstruction.com), or face nail the plank.

Hardwood can be nailed down parallel to the tubing pattern, this method will require extra labor. Strategic planning with the layout can avoid face nailing and gluing in many locations. When gluing is required apply a hardwood urethane adhesive such as applying Bostik's Best (bostik.com), SikaBond T35 or T55 urethane adhesive (sikaconstruction.com).

Nail and glue the hardwood directly to the Warmboard

Hardwood should be nailed directly to the Warmboard. The required vapor retarder is built into the Warmboard panel itself, the aluminum. Do not install any material between the Warmboard panel and the hardwood except the glue.

For glue down application trowel on the adhesive directly over the Warmboard using Bostik's Best (bostik.com), or SikaBond T35 or T55 urethane adhesive (sikaconstruction.com).

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Installing Traditional Strip and Plank Hardwood to Warmboard (con't)

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Glue Down Method

Warmboard has a vapor retarder built into the panel itself, therefore no additional vapor retarder is required.

For glue down applications we do recommend the installation of 1/4" interior A-C rated plywood (or equal) to be installed directly over the Warmboard.

This plywood should be fastened securely with screws (construction adhesive is optional). See page 19 of this manual to review the best method to avoid tubing damage by using a quick stencil system.

Follow by troweling Bostik's Best (bostik.com), or SikaBond T35 or T55 urethane adhesive (sikaconstruction.com) over the plywood. Complete with installation of hardwood planks. Follow all installation details documented by the glue manufacturer.

Operating the Radiant Heating System

We recommend circulating low water temperatures for the first few days of operation under newly installed wood floors. Then, gradually bring the water temperature up to the designed set point. For example, start with 90° water and after a few days, bring it up to 100°. Then, finalize a set point of 110°.

It is ideal for the heating system to be designed with a control strategy referred to as Outdoor Reset. This technology sets up a heating curve that will gradually change the delivered water temperature based on the current heat loss of the house. This is an excellent strategy for gradually heating hardwood floors.

Important - Surface temperatures of the installed hardwood should not exceed 85°F.



Hardwood Manufacturers

| Company | Phone | Website | Engineered Products Approved for Radiant | Solid Wood Products Approved for Radiant |
|--------------------------------|--------------|-----------------------------------|--|--|
| Anderson Wood Floors | 864-833-6250 | www.andersonfloors.com | some | no |
| Armstrong, Bruce, Robbins | 800-233-2823 | www.armstrong.com | some | no |
| Arrigoni Woods | 888-423-6668 | www.arrigoniwood.com | yes | yes |
| Authentic Pine Floors | 800-283-6038 | www.authenticpinefloors.com | yes | yes, 6" wide and less |
| Award Hardwood Floors | 715-849-8080 | www.awardfloors.com | yes | yes |
| Bellawood Hardwood Floors | 800-HARDWOOD | www.bellawood.com | yes | yes |
| Boen Hardwood Floors | 888-897-0800 | www.boen.com | yes | N/A |
| BR-111 Exotic Hardwood Floors | 800-525-2711 | www.br111.com | yes | no |
| Broad-Axe Beam Company | 802-257-0064 | www.broad-axebeam.com | N/A | yes |
| Carlisle Wide Plank | 800-595-9663 | www.wideplankflooring.com | N/A | yes |
| Columbia Forest Products | 800-654-8796 | www.columbiaflooring.com | yes | no |
| Goodwin Heart Pine Company | 800-336-3118 | www.heartpine.com | N/A | yes |
| Hallmark Hardwood Floors | 888-551-0888 | www.hallmarkhardwoods.com | yes | yes |
| Heartwood Pine Flooring | 800-524-7463 | www.heartwoodpine.com | yes | yes |
| Heritage Wide Plank Flooring | 877-777-4200 | www.heritagewideplankflooring.com | N/A | yes |
| Homerwood Hardwood Flooring | 814-827-3855 | www.homerwood.com | yes | yes |
| Junckers Hardwood Flooring | 800-878-9663 | www.junckersh hardwood.com | most | yes |
| Karelia Hardwood Floors | 888-840-3435 | www.kareliafloors.com | N/A | most |
| Launstein Floors | 888-339-4639 | www.launstein.com | yes | yes |
| Lauzon Hardwood Flooring | 877-427-5144 | www.lauzonltd.com/index_en.html | yes | no |
| LM Flooring | 972-417-9900 | www.lmflooring.com | some, floating only | N/A |
| Mannington Wood Floors | 856-935-3000 | www.mannington.com | yes | yes |
| Max Windsor Hardwood Floors | 909-477-6698 | www.maxwindsor.com | most | N/A |
| Mercier Wood Floors | 800-463-7048 | www.mercierwoodflooring.com | most | most |
| Mirage Floors | 800-463-1303 | www.miragefloors.com | yes | most |
| Mountain Lumber | 800-445-2671 | www.mountainlumber.com | yes | yes |
| Muskoka Hardwood Flooring | 800-461-5386 | www.muskokaflooring.com | yes | no |
| Mohawk Hardwood Flooring | 800-266-4295 | www.mohawk-flooring.com | yes | no |
| Nordstar Hardwood Flooring | 207-799-0010 | www.nordstar.net | some | N/A |
| Satin Finish Hardwood Flooring | 800-60-SATIN | www.satinfinish.com | yes | no |
| Shaw Hardwood Floors | 800-441-7429 | www.shawfloors.com | some | no |
| Southern Wood Floors | 888-488-7463 | www.southernwoodfloors.com | yes | no |
| Swedish Flooring | 360-752-0350 | www.swedishflooring.com | yes | N/A |
| Tarkett Wood Floors | 800-842-7816 | www.tarkett-floors.com | some | no |
| The Woods Company | 888-548-7609 | www.thewoodscompany.com | N/A | yes |
| Torlys | 800-461-2573 | www.torlys.com | yes | N/A |
| What It's Worth | 512-328-8837 | www.wiwpine.com | N/A | yes |
| Zickgraf Hardwood Company | 800-243-1277 | www.zickgraf.com | N/A | yes, less than 5" |

For technical assistance call Warmboard toll-free 1-877-338-5493