



INSTALLATION INSTRUCTIONS *RESIN INFUSED SOLID HARDWOOD FLOORING*

Thank you for choosing GreenWood Products! GreenWood Products Company strives to offer its customers the highest quality hardwood floors. Please carefully read this installation guide to ensure satisfactory results of your GreenWood hardwood floor. Carefully examine the flooring prior to installation. Ensure adequate lighting for proper inspection. If flooring is not acceptable as to grade, color, finish, and quality - do not install it. Contact the seller immediately and arrange for replacement material. **GreenWood cannot accept responsibility for the installation of any flooring with visible or objectionable defects.**

Prior to installation of any flooring, the installer must ensure that the jobsite and subfloor meet the requirements of GreenWood flooring installation instructions. GreenWood is not responsible for flooring failure resulting from unsatisfactory jobsite and/or subfloor conditions. When purchasing GreenWood flooring, add 5% - 10% to the actual square footage needed for cutting allowance depending on layout: diagonal installations may require more. The National Wood Flooring Association standard for off-quality product is 5%. Many of these off-quality planks can be used as starter pieces or fillers. GreenWood will exchange any planks in excess of 5%. The use of stain, filler or putty for the correction of defects during installation should be accepted as normal procedure.

The following is an abbreviated version of the installation instructions for **GreenWood Resin Infused Solid Hardwood Flooring**. Please note that these instructions are meant for experienced flooring installers. For more detailed information on the basics of installing hardwood flooring, please contact the National Wood Flooring Association (NWFA) at (800) 422-4556 or on the web at nwfa.org.

JOB SITE PREPARATION

STEP 1: JOB SITE INSPECTION

GreenWood flooring should be one of the last items. For new construction, the heating system must be operating for at least one week (7 days) at normal temperatures (approx. 70°F / 21°C) prior to installation.

The relative humidity level in the space must be maintained between 40%-60% throughout the year. Moisture, or lack of it, is wood's worst enemy. If relative humidity is below 40% for a prolonged period of time, the floor will contract. This contraction is considered normal when relative humidity is too low. The floor should return to its normal state once the relative humidity is back to normal (40-60%). These variations can be minimized with proper ventilation, humidifying/dehumidifying or heating. You may need to improve your humidification and/or dehumidification system in order to maintain the required 40-60% humidity levels. You can check humidity levels by using a hygrometer.

Always check the moisture content of the sub-floor. A wood subfloor should not exceed 12% and must be within 3% of the moisture content of the flooring being installed. If the moisture content of the sub-floor is too high, delay installation. Increasing ventilation and turning up the heating system will assist in drying out the sub-floor. Concrete sub-floors must be dry and should be at least 60 days old before installing GreenWood flooring.

The installer and/or owner will take full responsibility for moisture testing to ensure that the wood subfloor and the concrete slab (when applicable) are within acceptable moisture tolerance levels.

STEP 2: ACCLIMATION

Due to the resin content and high density, Solid Resin Infused Hardwoods will take longer to acclimate than solid hardwoods. Equalizing moisture content to the job-site equilibrium point before installation is paramount to stabilizing movement after installation. **There has never been a flooring failure associated with OVER acclimating. There have been too many failures caused by improper or no acclimation.** Handle and unload hardwood flooring with care and store within the environmentally controlled site in which it is expected to perform. Flooring stored upon "on-grade" concrete floors should be elevated at least four inches to allow air circulation under cartons. Hardwood flooring must acclimate outside of the plastic for as long as necessary to meet minimum installation requirements for moisture content. Using the equilibrium moisture content chart below, determine the proper moisture content for the installation. Always use a moisture meter to determine where the flooring and present job-site conditions are in relation to the projected final equilibrium point taking into account seasonal changes. Monitor the flooring and job-site conditions as they acclimate. If the flooring is neither gaining nor losing moisture, an equilibrium condition has been reached.

NOTE: Equilibrium points vary dramatically throughout the country, from the dry desert areas of the Southwest to moist areas along the Gulf of Mexico. In addition, a wide range of relative humidity can be experienced between individual job-sites within the same basic locale. Different heating/air conditioning systems can also dramatically alter on-site relative humidity. As a result, no one fixed moisture content is right for all situations, and it is up to the individual installer to establish the proper moisture content for each installation.

Equilibrium Moisture Content Chart

| Temp. | Relative Humidity, Percent | | | | | | | | | | | | | | | | | | | |
|-------|----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|
| | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 98 |
| 30°F | 1.4 | 2.6 | 3.7 | 4.6 | 5.5 | 6.3 | 7.1 | 7.9 | 8.7 | 9.5 | 10.4 | 11.3 | 12.4 | 13.5 | 14.9 | 16.5 | 18.5 | 21.0 | 24.3 | 26.9 |
| 40°F | 1.4 | 2.6 | 3.7 | 4.6 | 5.5 | 6.3 | 7.1 | 7.9 | 8.7 | 9.5 | 10.4 | 11.3 | 12.4 | 13.5 | 14.9 | 16.5 | 18.5 | 21.0 | 24.3 | 26.9 |
| 50°F | 1.4 | 2.6 | 3.6 | 4.6 | 5.5 | 6.3 | 7.1 | 7.9 | 8.7 | 9.5 | 10.3 | 11.2 | 12.3 | 13.4 | 14.8 | 16.4 | 18.4 | 20.9 | 24.3 | 26.9 |
| 60°F | 1.3 | 2.5 | 3.6 | 4.6 | 5.4 | 6.2 | 7.0 | 7.8 | 8.6 | 9.4 | 10.2 | 11.1 | 12.1 | 13.3 | 14.6 | 16.2 | 18.2 | 20.7 | 24.1 | 26.8 |
| 70°F | 1.3 | 2.5 | 3.5 | 4.5 | 5.4 | 6.2 | 6.9 | 7.7 | 8.5 | 9.2 | 10.1 | 11.0 | 12.0 | 13.1 | 14.4 | 16.0 | 17.9 | 20.5 | 23.9 | 26.6 |
| 80°F | 1.3 | 2.4 | 3.5 | 4.4 | 5.3 | 6.1 | 6.8 | 7.6 | 8.3 | 9.1 | 9.9 | 10.8 | 11.7 | 12.9 | 14.2 | 15.7 | 17.7 | 20.2 | 23.6 | 26.0 |
| 90°F | 1.2 | 2.3 | 3.4 | 4.3 | 5.1 | 5.9 | 6.7 | 7.4 | 8.1 | 8.9 | 9.7 | 10.5 | 11.5 | 12.6 | 13.9 | 15.4 | 17.3 | 19.8 | 23.3 | 26.0 |
| 100° | 1.2 | 2.3 | 3.3 | 4.2 | 5.0 | 5.8 | 6.5 | 7.2 | 7.9 | 8.7 | 9.5 | 10.3 | 11.2 | 12.3 | 13.6 | 15.1 | 17.0 | 19.5 | 22.9 | 25.6 |
| | | | | | | | | | | | | | | | | | | | | |

From the U.S. Dept. of Agriculture "Wood Handbook — Wood as an Engineering Material"

Step 3: SUBFLOOR PREPARATION

Plywood Sub-Floor

GreenWood recommends that all floors be installed with a minimum of 5/8" A.P.A. approved, C.S.P/D.F.P. stamped plywood, or 3/4" OSB with underlay grade PS2-92 rated. Consult your flooring contractor for recommendations on your specific sub-floor application. Any failure of GreenWood flooring relating to improper sub-floors, or sub-floor preparation is not the responsibility of GreenWood and **will not** be covered under warranty. Be sure to sweep and vacuum sub-floors. Ensure that old carpets, oils, foreign particles, protruding staples, carpet glues, etc., are removed. For wood sub-floors, make sure they are level, clean, dry and securely fastened. Repair and/or replace any section that is rotted or damaged.

Concrete Sub-Floor

The surfaces of any concrete subfloor should be clean, dry, smooth (maximum 1/8" variance over 8 lineal feet) and free of dirt, wax, oil, paint, curing agents and other contaminants that would interfere with adhesive bond. Old resilient floors can be covered provided above conditions apply. All cracks and holes should be filled with a cementitious patching material (Ardex or equal). All concrete sub-floors shall be tested for moisture and not exceed three (3) pounds

per 1,000 square feet using the calcium chloride test. Be sure to sweep and vacuum all sub-floors. Ensure that old carpets, oils, foreign particles, protruding staples, carpet glues, etc., are removed.

GreenWood Resin Infused Solid Hardwood Flooring can be installed on grade or above grade only. This flooring can also be glued down or stapled/nailed down.

TOOLS AND ACCESSORIES REQUIRED FOR INSTALLATION

Basic Tools and Accessories

- Rubber Mallet
- 3M Blue Tape
- Broom
- Chalk Line
- Pencil
- Tape Measure
- Table Saw or Band Saw
- Jamb Saw or Hand Saw
- Hammer
- Calcium Chloride Test (may be required for measuring moisture in cement slab)
- Leading brand of hardwood floor cleaner
- Quality moisture meter with appropriate settings

Additional Tools for Staple-Down Installation

- Drill with 1/16" Drill Bit
- Nail Set
- Leading Flooring Stapler (Stanley Bostitch, HighPro, Bosch, Portanail, Spotnail, Powernailer)
- Moisture Barrier (minimum 6 mil polyethylene film)

Additional Tools for Glue-Down Installation

• Moisture Sealants

The following are sealer and glue systems that offer a warranty from their manufacturers for sub-floor moisture intrusion. GreenWood highly recommends the use of these products when gluing down to concrete.

- Franklin Titebond 531 Epoxy Moisture Control System - Used to seal the sub-floor along with the use of a Franklin Moisture Cured Urethane Adhesive. *See website for details.*
- Bostik MVP (Moisture Vapor Protection) – Used to seal the sub-floor along with the use of a Bostik Moisture Cured Urethane Adhesive. *See website for details.*
- Sika Primer – Used to seal the sub-floor along with the use of Sika T55 Adhesive. *See website for details.*
- Dri Tac MCS 7000 Concrete Moisture Control – Used to seal the sub-floor along with the use of a Dri Tac 7600 Moisture Cured Urethane Adhesive. *See website for details.*

There are many leading brand concrete and glue systems that offer moisture vapor protection and warranties. Always check with the manufacturer of the sealer system to investigate what protection and warranties are offered. All moisture warranties come directly from the sealer manufacturer and not from GreenWood Products Company.

• Approved Urethane-based Adhesives

The following adhesives provide a “bond warranty only” and do not necessarily provide a warranty against moisture.

- Franklin 811, Franklin 811 Plus
- Bostik’s Best, Bostik Fast Tack, Bostik’s BST Urethane
- DriTac 7600
- Sika Bond T55

- **Trowel**

Always use the correct trowel as suggested by the adhesive manufacturer.

- **Urethane Adhesive Cleaner**

Many leading adhesive manufacturers make their own adhesive cleaners. Please use the cleaner recommended by the adhesive manufacturer.

GLUE DOWN – STEP BY STEP INSTRUCTIONS

For glue down application, the sub floor must be free of wax, oil, paint, adhesives, sealers, curing agents or any debris. Ensure surface is level by using leveling compound as recommended by the compound manufacturer. Also ensure the leveling compound is cured and dried prior to installation

Step 1: MARK YOUR STARTING LINE

GreenWood recommends that your flooring be installed parallel to the longest, straightest wall in the room. Establish a starting point by leaving a minimum 1/2" expansion gap around all vertical obstructions (walls, kitchen islands, doorways, etc). Measure this distance out from the starting wall in at least 2 places along that wall as close to the opposite corners of that starting wall as possible. Mark these points and snap a working chalk line parallel to the starting wall allowing the required expansion space between the starting wall and the edge of the first row of flooring. This will eliminate any ripping of material at the end of the job for the last row. To maintain the required expansion gap throughout the installation, use 1/2" spacers (cut from pieces of flooring) between the floor boards and walls or vertical objects. Your first row of starter boards will butt against these pieces, so make sure that the strips are in line with the chalk line because this will determine how straight your floor will be.

Step 2: SPREAD THE ADHESIVE

Do not use latex or water based glues. Apply the recommended adhesive with a trowel according to the manufacturer's installation instructions (found on adhesive pail) for the specific adhesive that is being used. SPECIAL NOTE: Open time on the pail of adhesive vary from manufacturer to manufacturer so read instructions carefully before starting. Opening time can also be affected greatly depending on the temperature and humidity. The trowel should be held at approximately a 45 degree angle to the floor when spreading the adhesive. This will give you the recommended spread rate as quoted by the adhesive manufacturer.

Step 3: INSTALL THE FLOORING

You should inspect each piece of GreenWood flooring before installation. Boards that you may not like the look of, or with a flaw that you think will affect the look of the floor should be used as the cut pieces for your start and/or end pieces. You may also choose to put these pieces in less conspicuous areas such as in closets or under couches, etc. Start your first piece with the tongue facing the area that will be completed last. Line up the tongue of the boards against the holding pieces and then press the board into the adhesive. Working from left to right, lay the next board and continue working towards the right until you reach the wall and require a cut piece. Choose one of the pieces set aside for cutting and cut the desired length. NOTE: If you are cutting a piece that has not been set aside for cutting, make sure it is long enough to yield your next rows starting piece. Leave 1/2" (13mm) between the wall and the end of each strip in each row. Start the second row with a strip of at least 6" (150mm) longer or shorter than the strip used in the first row. This will eliminate unsightly "step-like" effects. The remainder of the floor should follow this rule to insure an aesthetically pleasing floor. Minimize glue from getting into the tongue or groove, otherwise the strips of the flooring may not fit tightly. If glue gets on the finished side of the flooring strips, clean immediately with appropriate cleaning products - see your Authorized GreenWood Dealer. GreenWood flooring pieces may require slight tapping in order to ensure a tight fit. You may also use 3M's blue tape (if required), to hold pieces together until glue bond has developed.

IMPORTANT: As the work proceeds, take care to leave the expansion gap along the walls and around any obstacle (pipe work, foot of stairs, post, fireplace etc.).

Step 4: INSTALLATION OF ACCESSORIES & CLEANING

After the floor has dried, you may install the moldings. **NOTE:** Always keep left over flooring pieces for future use. Flooring may become damaged over time and require replacing certain pieces. It's a good idea to have product from the same production dates put aside. Use a vacuum to pick up any dust and loose fibers. Then clean your floor using Zep Hardwood Floor Cleaner or Bona Kemi's Bona® Swedish Formula® Hardwood Floor Cleaner.

STAPLE/NAIL DOWN APPLICATION – STEP BY STEP INSTRUCTIONS

Special Note For All Staple-Down Applications: It is important to use a leading brand flooring stapler with an adjustable heads for ½" to 9/16" flooring. Acceptable models include those from Stanley-Bostitch, HighPro, Bosch, Portanail, potnail and Pneumatic Powernailer. Be sure to consult your **Authorized GreenWood Dealer** for the appropriate stapling equipment.

NOTE: GreenWood strongly recommends that the resin infused hardwood be installed using the glue-down method. The flooring is extremely dense and may require pre-drilling the planks to allow penetration of the fastener.

Step 1: MARK YOUR STARTING LINE

GreenWood recommends that your flooring be installed parallel to the longest, straightest wall in the room. Establish a starting point by leaving a minimum 1/2" expansion gap around all vertical obstructions (walls, kitchen islands, doorways, etc). Measure this distance out from the starting wall in at least 2 places along that wall as close to the opposite corners of that starting wall as possible. Mark these points and snap a working chalk line parallel to the starting wall allowing the required expansion space between the starting wall and the edge of the first row of flooring. This will eliminate any ripping of material at the end of the job for the last row. To maintain the required expansion gap throughout the installation, use 1/2" spacers (cut from pieces of flooring) between the floor boards and walls or vertical objects. Your first row of starter boards will butt against these pieces, so make sure that the strips are in line with the chalk line because this will determine how straight your floor will be.

Step 2: INSTALL THE FLOORING

NOTE: Although GreenWood Products Company takes every precaution to ensure that each and every piece of flooring is graded and shipped to industry standards, we suggest you inspect each piece before installation. Boards that you may not like the look of, or contain a mark that you think will affect the look of the floor should be used as cut pieces for your start/end pieces. You may also use these pieces in less conspicuous areas such as in closets or under couches, etc. Face-nail the first row of strips with the grooved side facing the wall. Put the nails as close to the wall as possible, this way the quarter round will cover the nail heads. Then manually nail at 45 degrees on the tongue the next two rows or until there is enough room to use the staple gun. These first couple of rows often must be nailed down by hand rather than with a hardwood staple machine because of the vertical wall obstruction. When clearance allows the use of the hardwood staple gun, you may start using this gun. Fasteners should be spaced at a minimum 4" (100mm) from both ends of the boards, and spaced 4-6" (100-150mm) apart across the middle of each board. Measure and cut the strip to the required length to finish the first row. The remaining section should be used to start the second row, in order to minimize cut waste. The flooring piece selection for completing the first row must be long enough to yield a remaining section of adequate length. Leave 1/2" (13mm) between the wall and the end of each strip in each row. The subsequent rows must be installed in the same manner. Don't be afraid to waste a few strips in order to adjust and test the staple machine. When you reach the last few rows, you may not be able to complete these rows with the staple gun, again due to vertical obstructions. Toe nail, face nail, or glue the last remaining rows.

NOTE: You may have to rip the last strips along the wall in order for them to fit properly. Don't forget to leave 1/2" (13mm) minimum space for expansion. Finally, install the transition pieces, or moldings. Following the initial installation, vacuum thoroughly and clean the floor with the approved Hardwood Floor Cleaner. Attention to detail during manufacturing on the part of GreenWood Products Company ensures exceptional QUALITY in the finished

product. However, the longevity of hardwood floors is directly related to proper installation and lifetime commitment to appropriate care and maintenance.

RADIANT HEAT

GreenWood's Resin Infused Hardwood flooring may be installed over hydronic systems **ONLY** (not approved for any electric radiant system). These systems must have in-floor sensors as well as an exterior thermostat. The system should have a heat point control that will monitor the flooring's temperature. This point control should either reduce the system water temperature or temporarily cycle the system off to prevent over-heating the floor in case of equipment malfunction.

It is vital that the relative humidity level in the space be maintained between 35 and 60 percent. Excessive humidity can lead to cupping while excessive dryness or rapid heat increase can cause cracking. **Failure to maintain proper humidity levels will void the warranty. Humidifiers and/or dehumidifiers are strongly recommended.** Gaps between planks (seasonal) and surface checking can be expected in radiant heat installations.

Allow new concrete to cure for a minimum of 30 days before operating the radiant system.

The radiant system must be operational for a minimum of ten (10) days before installation. Acclimate the flooring during this time. The moisture content of concrete sub-floors, as measured by the Calcium Chloride test, must not exceed 2 lbs. per 1,000 sf. The moisture content of wood sub-floors should not exceed 12 percent.

GreenWood recommends the glue down installation method. Turn off the system 24 hours prior to and during installation to prevent rapid adhesive curing. Allow 2 days after installation before slowly increasing (over 5-7 days) the temperature to the desired level.

After installation, the maximum surface temperature should not exceed 75°F. The system must remain on at all times and the temperature should not deviate more than 15°F.