

INSTALLATION INSTRUCTIONS FOR ENGINEERED TONGUE & GROOVE HARDWOOD FLOORING

Enclosed you will find installation instructions for the following products:

- Engineered Tongue & Groove (T&G) Hardwood

ATTENTION! READ BEFORE INSTALLING!

COLOR VARIATION

This flooring is a natural product and color variations are to be expected. For best visual effect, shuffle planks from several cartons and do not install boards varying greatly in color next to one another.

Dry rack the material with 3-4 cartons and make sure that the homeowner/end user approves the material before installing the floor. Once a floor is installed is it deemed acceptable and will not be warranted for any color variation, texture, gloss, finish claims. Always install the floor when the homeowner/end user is present.

ACCLIMATION

As relative humidity varies in different parts of the country, acclimation of the flooring prior to installation is the most important precaution to take in order to insure a successful installation. Proper acclimation is necessary to adapt the moisture content of the flooring to the conditions of your environment. Improper acclimation can cause the floor to buckle and/or the boards to shrink or cup after installation.

SUBFLOOR PREPARATION

Subfloor must be level, dry and free of imperfections. An uneven subfloor will make the floor feel unstable and cause premature damage.

READ THESE INSTRUCTIONS THOROUGHLY BEFORE BEGINNING INSTALLATION. IN ADDITION TO THESE INSTRUCTIONS, WE RECOMMEND THAT THE INSTALLER FOLLOW ALL INSTALLATION GUIDELINES AS SET FORTH BY THE NATIONAL WOOD FLOORING ASSOCIATION.

FLOORING MATERIAL SHOULD BE INSPECTED PRIOR TO INSTALLATION
--

Responsibility for the suitability of manufacturing flooring and accompanying products for each individual installation cannot be assumed by Manufacturer, since Manufacturer has no control over the installer's proper application. Should an individual plank be doubtful as to appearance or dimension the installer should not use this piece. MANUFACTURER will send replacement in a timely fashion.

PRE-INSTALLATION JOBSITE REQUIREMENTS

Manufacturer cannot be held responsible for site conditions.

Carefully examine the flooring prior to installation for grade, color, finish and quality. Ensure adequate lighting for proper inspection. If flooring is not acceptable, contact your supplier immediately and arrange for replacement. Manufacturer cannot accept responsibility

for flooring installed with visible defects. Prior to installation of any flooring, the installer must ensure that the jobsite and subfloor meet the requirements of these instructions. Manufacturer is not responsible for flooring failure resulting from unsatisfactory jobsite and/or subfloor conditions.

Flooring should be one of the last items installed in any new construction or remodel project. All work involving water or moisture should be completed before flooring installation. Water and wood do not mix. Installing flooring onto a wet subfloor will most likely cause cupping, tip & edge raising, telegraphing of core and subsequent gapping.

Room temperature and humidity of installation area should be consistent with normal, year-round living conditions for at least one week before installation of flooring. Optimum room temperature of 70 °F and a humidity range of 30-50% is recommended during installation. Humidity levels below 30% will most likely cause movement in the flooring, including gapping between pieces and possible cupping and checking in the face.

Store the flooring in the installation area for 72 hours before installation to allow flooring to adjust to room temperature. Do not store the boxes of flooring directly on concrete. These floors need adequate acclimation for moisture equalization prior to installation. Shuffle the boards for best visual mix of lengths and color.

PRE-INSTALLATION SUBFLOOR REQUIREMENTS

All subfloors must be:

- Dry and will remain dry: Subfloor must remain dry year-round. Moisture content of wood sub floors must not exceed 11%. Concrete must be tested for moisture content using the Anhydrous Calcium Chloride test method, a non-invasive moisture meter, or a pin/probe moisture meter.
- Structurally sound
- Clean: Thoroughly swept and free of all debris (If being glued down, subfloor must be free of wax, grease, paint, sealers, & old adhesives etc., which can be removed by sanding)
- Level: Flat to 3/16" per 10-foot radius

Wood subfloors must be dry and well secured. Screw every 6" along joists to avoid squeaking. If not level, sand down high spots and fill low spots with a Portland Based leveling patch.

Concrete subfloors must be fully cured, at least 60 days old, and should have minimum 6-mil polyfilm between concrete and ground. Subfloor should be flat and level within 3/16" per 10' radius. If necessary grind high spots down and level low spots with a Portland leveling compound.

All concrete should be tested for moisture prior to installation using the Anhydrous Calcium Chloride test method, a non-invasive moisture meter, or a pin/probe meter. When using a Calcium Chloride Test, the result must not exceed 3 lbs per 1000 sq. ft. in a 24 hour period. A moisture test must be performed to ensure that the concrete slab is dry. Remember, a concrete slab on/below grade that measures dry today may become moist in the

future due to rising groundwater. Installing a moisture barrier now may be viewed as an insurance policy against concrete becoming wet in the future. Manufacturer is not responsible for site related moisture issues.

For additional protection, you may want to consider applying moisture barrier compound system.

INSTALLATION TOOLS

For all installation methods:

- Tape measure
- Tapping block (trimmed piece of flooring)
- Pencil
- Pry bar or pull bar
- Chalk line
- Wood or plastic spacers (3/8")
- Crosscut power saw
- 3M Blue Tape (DO NOT ADHERE TO OIL FINISHED FLOORS)

For glue-down installation method, you'll also need:

- Recommended flooring adhesive
- Trowel per flooring adhesive Manufacturer's recommendations.

Acceptable subfloor types:

- CDX Underlayment Grade Plywood (at least ½" thick)
- Underlayment grade particleboard (floating/glue-down only)
- Concrete slab (floating/glue-down only)
- Existing wood floor
- Ceramic tile (floating/glue-down only)
- Resilient tile & sheet vinyl (floating/glue-down only)

STARTING YOUR INSTALLATION

Make sure subfloor is tested for moisture first and is properly prepared.

Since natural flooring expands with any increase in moisture content, always leave at least a 3/8" expansion space between flooring and all walls and any other permanent vertical obstructions, (such as pipes and cabinets). This space will be covered up once you reapply base moldings around the room. Use wood or plastic spacers during installation to maintain this 3/8" expansion space.

Work from several open boxes of flooring and "dry lay" the floor before permanently laying the floor. This will allow you to select the varying grains & colors and to arrange them in a harmonious pattern. It also allows you the opportunity to select out very dark/light pieces for use in hidden areas in order to create a more uniform floor. Remember, it is the installers' responsibility to determine the expectations of what the finished floor will look like with the end user first and then to cull out pieces that do not meet those expectations.

Begin installation next to an outside wall. This is usually the straightest and best reference for establishing a straight working line. Establish this line by measuring an equal distance from the wall at both ends and snapping a chalk line. The distance you measure from the wall should be the width of a plank plus about 3/8" for expansion space. You may need to scribe cut the first row of planks to match the wall in order to make a straight working line if the wall is out of straight.

You may want to dry lay a few rows, (no glue or nails), before starting installation to confirm your layout decision and working line. When laying flooring, stagger end joints from row to row by at least 8". When cutting the last plank in a row to fit, you can use the cut-off end to begin the next row. If cut-off end is 8" in length or less, discard it and instead cut a new plank at a random length and use it to start the next row. Always begin each row from the same side of the room. To draw planks together, always use a tapping block (a short piece of flooring), as tapping the flooring itself will result in edge damage. For best results, flip the tapping block upside down and use the groove edge to tap the tongue edge of the plank being installed. Fit end joints tightly together before tapping long edges together. When near a wall, you can use a pry bar to pry close the side and end joints. Take care not to damage edge of flooring. **DO NOT ADHERE TAPE OF ANY KIND TO OIL FINISHED FLOORS.**

INSTALLATION FOR ENGINEERED HARDWOOD FLOORS NOMINAL 5" WIDE AND GREATER

Before you begin using the following instructions, please refer to the Pre-Installation Job Prep information above.

NOTE: Our products are not warranted against squeaking, popping or crackling when using staple-down or nail-down installation methods. Some squeaking, popping or crackling is normal and possible when using staple-down or nail-down installation methods. These symptoms may be aggravated in arid areas or during dry conditions.

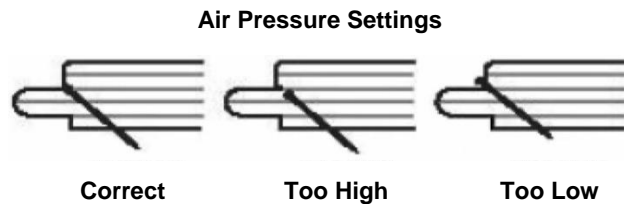
Set Up and Use of Pneumatic Staplers and Nailers:

Minor occasional noises within the flooring are inherent to all staple/nail-down installations and can change as environmental changes occur. This is not a manufacturing defect and is therefore not covered under our warranties. You can help reduce squeaking, popping, and crackling by being sure that the subfloor is structurally sound, does not have any loose decking or joists, and is swept clean prior to installation. You should also be sure that your stapler or nailer is setting the fastener properly, not damaging the planks, and that you are using the correct nailing schedule. When used improperly, staples or cleats can damage wood flooring. If the tool is not adjusted properly the staples/cleats may not be positioned at the proper angle and cause blistering, peaking, squeaking, or crackling of the floor. Some models may require the use of an adapter to adjust for proper thickness. Test the tool on a piece of scrap material first - set the stapler/ nailer flush on the tongue side of the plank and install a staple/cleat.

Be sure not to over-drive the fastener past the nail slot, this can lead to a condition known as a telegraphing fastener. A telegraphing fastener is the visible effect of excessive pressure being placed on the wood fibers which causes the appearance of a bump to occur just above the fasteners. This condition becomes most apparent when natural or artificial light reflects across the surface of the floor causing the bump to become visible to the eye. This condition can sometimes be difficult to see, so make sure to thoroughly examine the first few rows of flooring to make certain telegraphing does not exist. The manufacturer does not warrant against this condition since telegraphing fasteners are not manufacturing related. If you should encounter this condition immediately stop the installation and contact your local distributor or manufacturer of the nailer for technical advice. It is essential that the flooring installer make sure that the

nailer/stapler is properly adjusted for the particular floor that is being installed i.e. the fastener(s) MUST enter the nail slot at the correct angle and height, do not over-drive the fastener(s) so as not to cause damage to the board e.g. telegraphing fasteners, broken or split tongues, peaking, squeaking, or crackling noises to occur.

All wide plank engineered floors nominal 5" wide and greater are required to be installed with either a full spread adhesive, rated for the proper width of the material being installed, or if nailing or stapling, a glue assisted installation.



Full Spread Installation: You must account for moisture in any installation. Consult the manufacturer or the NFWA for concrete installations. For installations over a sub floor, prime the floor with an approved adhesive primer with moisture vapor retarder. This will increase adhesion and provide the proper moisture transfer from the subfloor. Use an approved hardwood flooring adhesive for the width to be installed with the proper trowel for the material to be installed. Follow adhesive manufacturers' installation procedures.

Glue Assisted Installation: You must account for moisture in any installation. In the event the subfloor is not within acceptable moisture tolerance range. Two suggested ways to provide a moisture vapor retarder is to install an underlayment paper. Cut a 1/2" channel, in the paper perpendicular to the direction of the floor to be laid, every 12" on center. A second option is to roll on a coat of moisture barrier over the entire subfloor to create a moisture retarder. During installation of the wood you can then run a minimum 1/4" bead of approved adhesive (ie Bostik's Best in a caulking tube) every 12" on center perpendicular to the direction of the wood. Use a normal nailing pattern for the dimensions of the wood installed per NFWA installation procedures.

During installation of the wood you can then run a minimum 1/4" bead of approved adhesive (ie Bostik's Best in a caulking tube) every 12" on center perpendicular to the direction of the wood. Use a normal nailing pattern for the dimensions of the wood installed per NFWA installation procedures.

Part I: Acceptable Jobsite Conditions and Jobsite Checklist

A. Refer to NFWA Installation Guidelines Chapter 1, Jobsite Conditions.

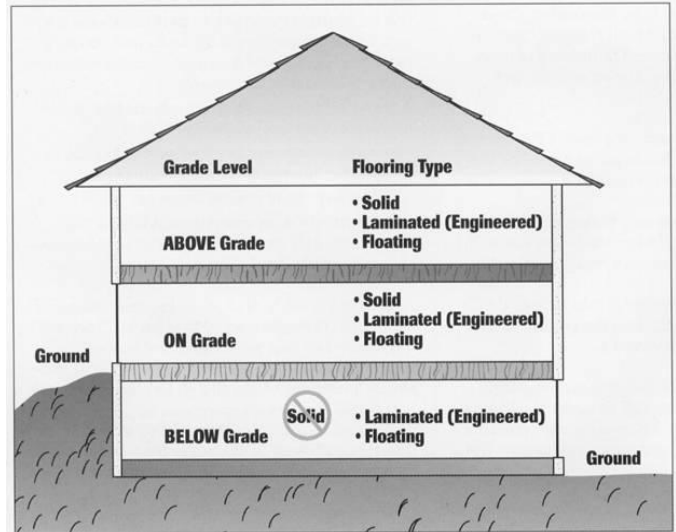
Part II: Acclimation Guidelines

A. Refer to NFWA Installation Guidelines Chapter 2, Acclimation and Conditioning of Wood Flooring.

Part III: Appropriate Grade Levels

A. Engineered wood floors can be installed successfully on, above or below grade level. Engineered wood floors can be installed directly to a concrete or wood subfloor.
B. The entire flooring level is considered to be below grade where soil is present along any perimeter wall and

is more than 3" above the installed wood flooring level. Ground should be sloped away from the house for proper drainage. (Check local building codes. Local building codes prevail. Follow local building codes.)



If any part of the soil surrounding a structure is above the floor of any level, consider that level below-grade. This includes walk-out basements. In addition, the surrounding soil should be sloped away from the structure with at least 6 inches of fall over the first 10 feet.

Part IV: Subfloors – Wood Joist Systems

A. Refer to NFWA Installation Guidelines Chapter 4, Wood Subfloor Guidelines.

Part V: Subfloors – Concrete Slab

A. Refer to NFWA Installation Guidelines Chapters 5, Concrete Subfloor Guidelines, and Chapter 6, Installing a Subfloor Over Concrete.

Part VI: Engineered Flooring Installation Methods

- A. Engineered wood flooring can be installed directly to screeds, provided the engineered flooring is a minimum of 3/4" thick. For engineered flooring less than 3/4" thick, the screed system must be overlaid with proper subflooring. Refer to NFWA Installation Guidelines Appendix I, Installation Over Screeds.
- B. Note on random-width plank.
 1. Random-width plank is laid out with alternating courses varying by widths. Start with the widest board, then the next width, etc., and repeat the pattern.
- C. Choose a starting wall.
 1. Choose a starting wall according to the most aesthetically or architecturally important elements in the room, taking into consideration fireplaces, doors, cabinets and transitions, as well as the squareness of the room. The starting wall will often be the longest unbroken wall in the room.
- D. Glue-down engineered strip and plank.
 1. There are several different ways to start the installation of glue-down engineered wood flooring. The following has proven successful. However, where instructions differ from manufacturer recommendations, manufacturer recommendations prevail.
 2. Test the substrate for moisture according to appropriate moisture testing procedures in Chapter 3, Moisture Guideline and Vapor Retarders. Excessive/elevated moisture should

not be present. The subfloor should be within acceptable moisture content as per adhesive and wood manufacturer's recommendation before installing.

3. Expansion space should be left around the perimeter in accordance with the manufacturer's recommendation.
4. Snap a working line parallel to the starting wall, the width of the board, plus the tongue and recommended expansion space.
5. Install a starter board along the edge of the working line and begin installation. Alternatively, lay one row of plank in the adhesive along the length of the working line.
6. Follow manufacturer instruction for tongue and groove direction and placement.
7. Use an adhesive approved by the flooring manufacturer. Follow the installation procedure recommended by the adhesive manufacturer, which includes subfloor moisture content, spread rate, trowel size, open time, working time and flash time as necessary. Spread the adhesive as instructed up to and along the working line.
8. Distribute lengths, avoiding "H" patterns and other discernible patterns in adjacent runs. Stagger end joints of boards row to row a minimum of 6" for strip flooring, 8"-10" for 3" to 5" plank, and 10" for plank wider than 5". (See Figures 8-1 and 8-2.)

Figure 8-1 Stagger End Joints

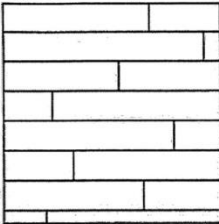
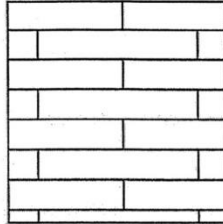


Figure 8-2 Avoid "H" Joints



9. If recommended by the manufacturer, use tape or tensioners to maintain a tight floor.
10. If recommended by the adhesive manufacturer, roll the floor with the proper roller.

E. Mechanically fastened strip and plank.

1. If necessary, add a vapor retarder.
2. Snap a working line parallel to the starting wall, allowing expansion space as specified by the manufacturer.
3. Lay one row of plank along the entire length of the working line.
4. Top-nail and blind-nail the first row (hand-nail if necessary), using appropriate fasteners. Denser species may require pre-drilling. Each succeeding row should be blind-nailed wherever possible.
 - a. Typical: Narrow crowned (under 3/8") 1"-1½" staples or 1"-1¼" hardwood flooring cleats designed for engineered flooring, spaced as recommended by the manufacturer.
 - b. Typical: Every 3"-4" with staples, every 4"-6" with cleats, and within 1"-2" of end joints. Use appropriate size fastener for top nailing first row, last row and any area where blind nailer will not fit.

5. Add each additional row of flooring. Distribute lengths, avoiding "H" patterns and other discernible patterns in adjacent runs. Stagger end joints at least three times the width of the boards, as product allows.
6. During installation of flooring pieces, push or gently tap boards flush to the previous row. Tap against the tongue; tapping the groove may damage the edge. To prevent damage to the finish, avoid tapping the face of the board with a rubber mallet.

F. Floating engineered flooring.

1. Subfloor flatness is critical to the success of a floating floor installation. (Refer to NWFA Installation Guidelines Chapter 4, Wood Subfloor Guidelines, and Chapter 5, Concrete Subfloor Guidelines.)
2. Test the substrate for moisture according to appropriate moisture testing procedures in Chapter 3, Moisture Guideline and Vapor Retarders. Excessive/elevated moisture should not be present. The subfloor should be within acceptable moisture content as per manufacturer recommendation before installing.
3. If necessary, add vapor retarder. (Refer to NWFA Installation Guidelines Chapter 3, Moisture Guideline and Vapor Retarders, Part III, Acceptable Vapor Retarders Over Wood Subfloors.)
4. Expansion space should be left around the perimeter or in accordance with manufacturer's recommendation.
5. Typical: Subfloors are covered with a resilient material, foam underlayment or cork. Follow manufacturer's instructions for correct materials and thickness.
6. Typical: Floating engineered flooring is edge-glued or edge-attached with a self-locking mechanism.
 - a. For edge-glued products, use a glue approved by the flooring manufacturer.
 - b. Apply glue at the spread rate to the side grooves and/or ends as recommended by the flooring manufacturer.
7. Starter boards should be aligned with the groove side and end against the starting wall. Tapping block should be used against tongue only.
8. Stagger end joints per manufacturer's recommendation.
9. You cannot float all Engineered Hardwood floors. Please contact the manufacture to confirm which products can be floated. Any 3/8" Thick and 5" Wide Engineered hardwood product cannot be floated.

GLUE DOWN INSTALLATION

Make sure subfloor is tested for moisture content first and is properly prepared.

On concrete subfloors, which are on or above grade (ground level), always assume the worst even if they measure dry. We recommend taking the following installation steps to ensure a trouble-free installation:

- Testing and documenting moisture content prior to installation
- Applying a sealer to the subfloor as needed

Follow adhesive Manufacturer's instructions for proper trowel size, minimum temperature, adhesive set time and open times before beginning installation of flooring. Once the spread adhesive has setup sufficiently per adhesive Manufacturer's instructions, lay the first row of flooring with groove facing the wall, and continue laying flooring. Always check your working lines to be sure the floor is still aligned. Use tapping block to fit planks together but be careful not to let installed floor move on the wet adhesive while you are working. Always leave at least a 3/8" expansion space between flooring and all walls and vertical objects (such as pipes and cabinets). Use wood or plastic spacers during installation to maintain this expansion space. Remember to stagger end joints from row to row at least 8" apart.

When first section is finished, continue to spread adhesive and lay flooring section by section until installation is complete. Use a damp cloth to **IMMEDIATELY REMOVE ANY ADHESIVE** that gets on the flooring surface. If adhesive cannot be completely removed with a damp cloth, use the Manufacturer's recommended adhesive remover. Never let flooring adhesive dry completely on the finished surface. Walk each section of flooring in order to make sure it is well bonded to the subfloor with the adhesive working time. Flooring planks on the perimeter of the room may require weight on them until adhesive cures enough to hold them down.

AFTER INSTALLATION

- Flooring should be one of the last items installed in a project. In order to protect the floors while other trades are finishing their work prior to final cleanup and turnover to the owner, use rosin paper. DO NOT use Blue Tape to adhere to the floor (blue tapes may damage the finish). Clean the floor thoroughly before laying the rosin paper to ensure that no debris is trapped underneath. DO NOT USE plastic film or other non-breathing coverings as this can cause the floor to become damaged from humidity buildups.
- Remove expansion spacers and reinstall base and/or quarter round moldings to cover moldings to cover the expansion space.
- Dust mop or vacuum your floor to remove any dirt or debris.
- Install any transition pieces that may be needed (reducers, T-moldings, nosing, etc.).
- If using glue-down method, do not allow foot traffic or heavy furniture on floor for 24 hours

PROTECTION AND MAINTENANCE OF YOUR FLOOR

Lasting beauty can be achieved through purchasing a quality floor covering and providing proper on-going maintenance.

Fading: Natural floors contain organic pigments and are subject to fading when exposed to direct sunlight. Where possible, use drapes or other systems to protect your floor from excessive light.

Joints: Natural flooring reacts to the conditions in the environment. Natural flooring plank systems expand and contract in response to fluctuations in temperature and humidity. Controlling the environment, maintaining an adequate temperature and relative humidity will minimize the visible effects of normal contraction and expansion.

Optimum recommended temperature is 70°F and relative humidity is 30% - 50%. *In very dry climates, the use of a humidifier might be necessary.*

Photosensitivity: Hardwood floors are photosensitive and will change color as they age or are exposed to U.V. light. In some species the natural pigmentation will be lost and can develop a "bleached" appearance. In many exotic hardwood species (i.e. Tigerwood), the flooring develops a rich patina that will darken the appearance and enhance the natural beauty of the material.

As this is a natural occurring phenomenon, accelerated with exposure to U.V. light, it is not considered a material defect and is excluded from coverage under the provisions of Manufacturer's Limited Warranty.

Tips to Minimize Fading/Discoloration

- Avoid rubber-backed mats and rugs, as the backing may discolor your floor.
- Change the location of your rugs periodically. Rearrange more frequently if they are placed in front of doors and windows.
- Use light filtering window treatments (i.e. blinds, drapes, window film) that will help prevent sunlight exposure.
- Rearrange furniture seasonally to allow the flooring to darken and age uniformly.

If completing a flooring extension or board replacement after the original installation has been down for a period of time, the new flooring will have a lighter appearance. As the material is exposed to natural light, it should eventually blend in with the surrounding areas.

However, due to the age of your flooring, surface wear (and/or) exposure to U.V. light, Manufacturer cannot guarantee replacement flooring will be a 100% match to your existing product.

Remember that color variation is to be expected with natural products. However, should an individual plank be doubtful as to appearance or dimension the installer should not use this piece.

- **Follow the instructions on this installation guide as well as the guidelines listed out by the NWFA.**
- **For further detailed installation guideline, please refer to NWFA (www.nwfa.org)**
- **Oil finished floors require a coat of WOCA Refresher immediately after installation to bring out the beauty of your new floor and maintain warranty.**