

These installation instructions are for Oiled & UV Urethane Finish.

Attention! Read Before Installing!

Please read and sign the PRE-INSTALLATION Checklist before proceeding. Please review the installation with the homeowner to ensure that they have full understanding of the document.

- Assure the Homeowner or Customer is present and has approved the planks that are laid out to be installed.
- DO NOT Install this floor if the homeowner or customer is doubtful of color variation, grading, visual or color itself.
- Sample Boards may not always match the material please have homeowners approve material before installing.

Sample Display Board, room scenes and images are intended as visual guidelines and may not be a full representation of the floor. Freshly unpacked cartons may initially vary in color from the sample. Exposure to sunlight and weather naturally ages hardwood over time. Before installation, always check and approve the flooring material.

Before starting installation, read all instructions and warranty thoroughly. Should any questions arise, please contact your local dealer. All installation instructions must be followed for warranties to be considered valid. Pre-inspect the job site prior to delivery of the floor to ensure the structure is suitable for hardwood flooring installation using the following guidelines: Installation options - Staple with glue assist or full spread glue. For Radiant Heat installation please refer to page 14. Please confirm with your local distributor or manufacturer if the product is approved over radiant heat (**Any material equal to or less than 8^{33/50}" (220mm) is considered radiant proof. Any material over 8^{33/50}" (220mm) is not radiant proof. Regardless of its length or width, American Hickory Engineered floors are not radiant proof.**)

Humidification and/or dehumidification systems is required prior to, during, or after installation to maintain an environment appropriate for the flooring specified. To ensure a successful installation, we need a general understanding of the climate zone the wood floors are being installed in and will work with the builder and property owner to determine what is necessary for the interior finishes to perform as they are intended.

Once the floor is installed it is deemed acceptable and manufacturer will not cover any cost - material or labor to removing the floor. Please mix no more than 2 production runs to minimize the color variation and make sure the production runs are within a 6 month time period.

OWNER/INSTALLER RESPONSIBILITY

- Inspect the hardwood flooring in well lighted conditions to ensure proper identification of any potential problems. Carefully inspect the flooring for grade, color, finish, sheen/gloss level and quality. Material that is subjectively viewed as unacceptable but falls within Manufacturer grading norms will not be replaced. Material with visible defects can be returned for replacement through the dealer up to 10% of the order.
- If the flooring is not acceptable, contact Manufacturer and arrange shipment of replacement material and the defective product will be replaced. Once flooring is installed, it must be deemed acceptable by either End-user/ Homeowner/Contractor.
- Temperature and Humidity is very important to control before and after installing your floors. Your skin and wood will react similarly to low humidity in your home. Below 35% humidity your skin will dry and crack, the same will happen when moisture is removed from your wood floors. Your wood floors in particular will develop hairline crack as the planks lose moisture. During excessive low humidity these cracks may become more pronounced. Your wood cabinets, moldings, and furniture may do the same. We do not warrant our wood flooring in dry area conditions when your home humidity falls outside of the 35% - 55% required standard range. Please contact a HVAC contractor about more humidification/dehumidification details.
- Prior to installation of any flooring, the Installer must ensure the job site and sub-floor conditions meet the requirements specified in these instructions.
- Hardwood flooring installation should be one of the last items completed on the construction project. Limit foot traffic on the finished wood floor.
- IF THE FLOORING AS SUPPLIED WILL NOT SATISFY THE CUSTOMER IN FULL, DO NOT PROCEED TO INSTALL. The decision not to proceed must be made within the first 5% or 100 square feet of flooring boxes opened, whichever is less. Open boxes exceeding this amount will not be eligible for return.
- Wood flooring could chip or splinter when it is not maintained properly or in the proper environment. Chips and splinters are not covered under the warranty.

- Any noise from the floor is not manufacturing related since the floor was not installed properly and any excesses movement of the planks will create a noise. If there is any movement in the planks when walking over them it will cause the floor to make noise. Staple with glue assist or Floating floor installation has a higher chance of making noise.

DISCLAIMER: SHOULD THE OWNER NOT MAINTAIN A GOOD RECORD OF THE RELATIVE HUMIDITY OF 35% to 55% IN THE INTERIOR OF THEIR HOME THROUGHOUT THE YEAR, OUR WARRANTIES WILL NOT APPLY. WE WILL USE DATA BASED ON YOUR STATE AND TOWN TO DETERMINE WHAT THE HUMIDITY LEVELS ARE.

DO NOT INSTALL OVER

- Do not install over existing resilient tile floors that are below grade
- Do not install over existing cushion-backed vinyl flooring
- Do not install over carpet
- Do not install over hardwood flooring that has been installed directly over concrete
- Do not install over stairs with sloping steps
- Do not install over rooms with sloping floors or floor drains
- Do not install over any other underlayment since the planks already have attached padding

GRADING STANDARDS

General Rules:

Flooring shall be tongue, grooved and end matched (unless otherwise indicated). Flooring will not be considered Standard Grade unless properly dried.

Grading Rules:

Like many flooring and lumber mills, we use a proprietary grade for manufacturing our floors. Proprietary grades are generally referred to as Mill Runs /Character grade. Instead of separating the lumber into traditional NOFMA/ NWFA grades, the flooring is a mix of grades. This enables us to produce wider and longer boards. Manufacturer grading rules allow for filled knots, mineral streak, open checks, tight checks, and filled checks. Bird peck, pin worm hole, and flag worm hole are acceptable (any insects are killed in drying process). Plank faces may also contain unlimited amounts of heart wood (dark portion of log) and/or sap wood (light portion of log).

Note that if you don't see any of the character grade in the room scene or sample board, it does not mean it won't be in the planks. The specification grading determines what is acceptable or not. If you have any questions please ask you local distributor.

Length:

If the floor specification is random length, there is no guaranty for the exact percentage of short or long lengths. This is up to the discretion of the manufacturer.

Storage and Handling:

Handle and unload wood flooring with care. Store in a dry place; make sure to provide at least a four-inch space, using a dry 4" x 4" stickers or a dry pallet, that provides enough clearance under boxes for proper air movement. Prior to delivery of flooring, outside doors and windows must be in place. All concrete, masonry, plastering, and other "wet" work must be complete and thoroughly dry prior to flooring installation. Roofing and the exterior shell of the structure must be finished and weather tight with doors and windows installed. The wall coverings should be in place and all painting completed—except for the final coat on the base molding. Room temperature and humidity should be consistent with year-round conditions for at least one week prior to installation. When possible, install base molding after floor installation is complete.

HVAC MUST BE RUNNING WITH A ROOM TEMPERATURE BETWEEN 65° F TO 80° F AND RELATIVE HUMIDITY BETWEEN 35% AND 55%.

Climate Control

If heating and/or air conditioning with proper humidity controls are in operating condition, they need to be turned on. If it is not possible for the permanent system to operate, a temporary system that provides proper temperature and humidity conditions must be in place and remain in place until permanent climate control is operational. If there isn't a humidifier or dehumidifier in the home, then it will be assumed by the manufacturer the homeowner or end user did not follow manufacturers guidelines and the warranty will be voided.

Install Flooring Last

Hardwood floor should be the last trade in the house (before base boards are installed). All concrete, masonry, plastering/drywall, texturing, and painting/primer coats should be completed beforehand. Do not install the floor underneath kitchen islands, cabinets and fixed fixtures for floating floor installations. Covering the floor while wet trades are in the house can lead to moisture condensation on the protective paper. Moisture can pull into the paper or be trapped under the surface of materials used to cover the floor. Paper coverings also allow dents and scratching to occur.

Color Variation

Hardwood 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. Please note that the sample board will not always match the flooring material since the flooring material is a fresh batch. The sample board color might have changed because of oxidization or sunlight. 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 and deemed acceptable it will not be warranted for any color variation, texture, gloss, finish claims. Always install the floor when the homeowner/end user is present. There is no exception to this requirement.

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 ensure 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. There is a chance that the wood will chip, face check, crack and splinter after installation and this is caused by the wood floor reacting to the environment. This is not a manufacturer defect but caused by the local environment.

Damage caused by inappropriate handling, environment, installation, or maintenance issues will not be considered in relationship to grade. NOTE: DO NOT OPEN BOXES PRIOR TO INSTALLATION. Boxes to remain completely closed until time of installation.

Sub-Floor Preparation

Sub-floor must be level, dry and free of imperfections. An uneven sub-floor will make the floor feel unstable and cause premature damage and cause the floor to make noise. These are not covered by the warranty.

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. The 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 JOB SITE 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 will not accept responsibility for flooring installed with visible defects. Prior to installation of any flooring, the Installer must ensure that the job site and sub-floor meet the requirements of these instructions. Manufacturer is not responsible for flooring failure resulting from unsatisfactory job site and/or sub-floor conditions. Do not install any planks that the homeowners may not find acceptable.
- 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 sub-floor will most likely cause cupping, tip & edge raising, telegraphing of core

and subsequent gapping and finishing issues.

- 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 40-55% is recommended during installation. Humidity levels below 35% will most likely cause movement in the flooring, including gapping between pieces, 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 SUB-FLOOR REQUIREMENTS

All Sub-floors must be:

- Dry and will remain dry: Sub-floor 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, sub-floor 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 sub-floors 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 sub-floors must be fully cured, at least 65 days old, and should have minimum 6-mil polyfilm between concrete and ground. Sub-floor 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.

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 (**Only for UV Urethane finished floors. Do NOT apply tape directly on UV Cured Urethane floors for no longer than 24 hours. If the tape is left for a long period of time on the wood it will damage the finish.**)
- No mineral spirits for all oiled finish floors
- For Oil Finish Floors please use adhesives that are compatible and easy to clean such as Bostik Green Force or Titebond 771

Acceptable Sub-Floor Types:

- CDX Underlayment Grade Plywood at least 1/2" thick (use of osb sub-floor can cause potential movement and squeaking noise, which is not a manufacturer defect)
- Concrete slab (staple with glue assist or full spread glue-down only)

- Existing wood floor (staple with glue assist or full spread glue-down only)
- Ceramic tile (staple with glue assist or full spread glue-down only)
- Resilient tile & sheet vinyl (staple with glue assist or full spread glue-down only)

For Glue-Down Installation Method, You'll Also Need:

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

BEFORE STARTING YOUR INSTALLATION

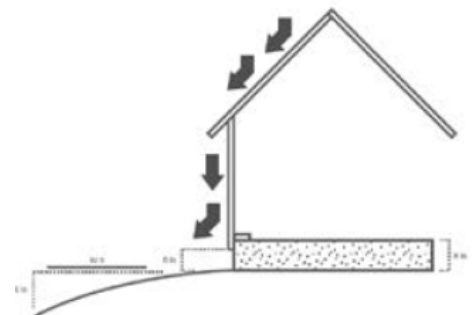
- Make sure sub-floor is tested for moisture first and is properly prepared. Since natural flooring expands with any increase in moisture content, always leave at least an expansion space between flooring and all walls. The expansion range depends on the thickness of the floor and any other permanent vertical obstructions (such as pipes and cabinets).
- Make sure to have a minimum of 10% waste.
- This space will be covered up once you reapply base moldings around the room. Use wood or plastic spacers during installation to maintain 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 the thickness of the floor 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. **DO NOT ADHERE TAPE OF ANY KIND TO OIL FINISHED FLOORS.** Use straps to hold the installed floors. Do not leave tape for longer than 24 hours on the wood finish or it will damage the UV Cured finish which is not covered by the warranty.

EXTERIOR CHECKS

- Is exterior soil elevation 6" below edge of flashing?
- Does exterior slope away from foundation at a rate of 6" drop in 10' for soft-landscaped areas and 3" drop in 10' for hard-paved areas?

NOTE: Proper drainage away from the structure is absolutely critical to ensure weather-tight conditions and crucial to proper hardwood flooring performance. If structure is near a hill, the lot should be graded with a swale to move moisture off the lot and prevent it from coming in contact with the foundation. Do not leave tape for longer than 24 hours on the wood finish or it will damage the UV Cured finish which is not covered by the warranty.



CRAWL SPACE VENTILATION

- Crawl space earth (or thin concrete slab) should be covered 100% by a vapor retarder of black polyethylene (minimum 6 mil) or any recommended puncture-resistant membrane, such as Class C meeting ASTM D1745. Check local codes for any additional requirements.
- Size of available vents should equal to 1.5% of the square footage within the crawl space. Relative humidity should be consistent with interior of home. Moisture content of sub floor should not vary more than a 2% MC from the top of the sub floor to the bottom.
- It may be necessary to install temperature/humidity activated exhaust fans to create more air movement in the crawl space. Uncontrolled humidity and moisture in crawl space will lead to mold and damage to the structure, as well as the hardwood floor. In these events, a contractor specializing in dehumidifying systems will need to be contracted to keep the crawlspace humidity within proper norms. This is more likely in high humidity areas.
- Ensure that clothes driers are properly vented to the outside of the foundation. Check for signs of plumbing, both pressurized and non-pressurized/drain leaks.

NOTE: Completely sealed crawlspaces (no exterior cross-ventilation) require a dehumidification system as part of the sealed crawlspace design.



BASEMENT MOISTURE & HUMIDITY CONTROL

- Basements should be completely weather tight and have proper drainage away from the foundation walls in place to ensure that the basement remains dry.
- Rain gutters must be in place to carry moisture away from the house. French drains are recommended, and basement walls should be properly sealed.
- Relative humidity of basements should not be more than 10% higher than the upper floors.
- Humidity control of the basement is vital to help control mold and prevent damage to the structure and hardwood flooring.
- Basement walls should be inspected for cracks and excessive moisture content.
- Drains must be placed at basement windows.
- Direct sprinklers and irrigation systems away from the foundation. Sprinklers spraying the foundation edge can lead to moisture intrusion into structure. Drip irrigation systems for plant beds are recommended.



SUB FLOOR MOISTURE TESTING CONCRETE

- Since wood flooring is not compatible with wet conditions, Manufacturer does not warrant against moisture related issues or related damage under warranty. (See Manufacturer Maintenance & Warranty Guides). This is an industry standard, and Manufacturers do not offer moisture warranties. However, moisture warranties are offered by various adhesive manufactures.

NOTE: Due to the porous nature of concrete, vapor emissions are subject to change over the lifetime of the installed floor. Slab moisture emissions are a common cause of damage to hardwood

floors. Due to the potential for concrete moisture emissions to increase/decrease over time, and the absence of moisture warranties for wood flooring, choosing an adhesive system that includes moisture abatement properties is prudent.

- Adhesive Manufacturers offer moisture warranties for moisture abatement systems that will be conditional. Follow their directions closely to ensure compliance and full warranty coverage. Proper spread rate and coverage are very important. Use proper trowel size and replace trowels at the recommended square footage the adhesive Manufacturer requires to ensure proper application thickness.
- Some Adhesive Manufacturers offer adhesive/moisture abatement systems that do not require pre-installation testing of the slab to maintain a moisture warranty. Check with Adhesive Manufacturer to confirm which products they offer, that allow installation without pre-checking/testing the slab.
- The Installer is fully responsible for proper installation, and the moisture warranties are fully the responsibility of the adhesive moisture abatement system the Manufacturer chose for the job.

ADDITIONAL NOTE: Manufacturer makes no guarantees regarding the performance of any adhesive/vapor abatement system.

NWFA & INDUSTRY STANDARDS

The NWFA (Industry standard) uses the following test methods to determine optimal conditions for installation and performance of a hardwood floor. Some Adhesive Manufacturers offer systems that create a vapor barrier to protect the wood flooring from moisture emissions coming up through the slab. Many Adhesive Manufacturers require the tests listed below to be performed prior to installation of the floor. Carefully read and follow the adhesive Manufacturer's instructions.

CALCIUM CHLORIDE: ASTM F1869

Under ideal conditions, the slab should not be emitting more than 3 lbs. per 1,000 square feet per 24-hour period. Carefully follow the instructions in the test kit to ensure that you get accurate results.

NOTE: The slab emissions can vary based on soil humidity and room temperature. Consult adhesive Manufacturer's directions for the moisture abatement system they recommend.

HUMIDITY PROBE & DIGITAL METER: ASTM F2170

This test determines the amount of humidity in the slab. This is an effective way to determine a slab's potential for emitting moisture. Follow all meter Manufacturer's guidelines for performing testing. Under ideal conditions, the slab readings should be 75% RH. **CAUTION:** Post Tension slabs require special care to avoid cutting cables in slab. Cutting post tension cables can cause serious structural damage and potential fatalities.

New concrete slabs require a minimum of 65 days drying time before covering them with a wood floor. The slab must be fully cured. Slab must be comprised of Portland-based mix with 2,500 PSI of compressive strength.

SUB FLOOR PREPARATION: CONCRETE

For glue down application over gypsum or lightweight concrete, the same 2,500 PSI rating is required.

NOTE: Some adhesive systems have primers and adhesives that are suitable for use over gypcrete or lightweight concrete and may have different PSI compressive strength requirement. Adhesive Manufacturer is responsible for performance of their systems over gypcrete or lightweight concrete.

Remove all paint, oil, existing adhesives, wax, grease, dirt, sealers, and curing compounds. Do not use solvent-based strippers under any circumstances, as residual solvents can prevent the satisfactory bonding of the vapor barrier and adhesive systems. It is important to ensure a long-lasting bond between the adhesive, the concrete, and the boards.

FOLLOW ALL ADHESIVE APPLICATION INSTRUCTIONS

Industry standard practice is to use a sanding system with 20 grit # 3½ open-face paper to remove loose, flaky concrete. For heavy surface contamination, it may be necessary to bead blast the concrete surface.

NOTE: Adhesive Manufacturers generally recommend prep fillers and patches to repair concrete substrates that are compatible with the adhesive system to be used. Make sure you use the prep products that are recommended by the Adhesive Manufacturer. Sub floor tolerance for a flat surface is 3/16" within a 10' radius and 1/8" in a 6' radius. These are industry standards established by NWFA. Use a straight edge to determine if the sub-floor requires grinding or filling.

NOTE: A quarter is approximately 1/16" thick and can be used as a thickness gauge. Grind high spots and fill low spots with Adhesive Manufacturer's recommended filler.

NOTE: Use the filler recommended by the Adhesive Manufacturer.

CAUTION: ASBESTOS

State and Federal agencies have determined that asbestos is a respiratory carcinogen. Avoid sanding or scraping of old vinyl, linoleum and VCT as they may contain asbestos. Take proper precautions and contact an asbestos abatement company to remove any old vinyl or vinyl tile floors containing asbestos. Cut-back adhesive and other types of adhesives can also contain asbestos.

CLEAN THE SUB FLOOR

- After all prep work is completed, sweep and/or vacuum the sub floor. Dust and dirt can affect the adhesive or vapor barrier's ability to adhere to the slab. Installing over Existing Floor Coverings on Concrete Perimeter-glued resilient vinyl, VCT and rubber tiles are not acceptable underlayment's and must be removed.
- Terrazzo, tile, and full spread glue-down vinyl's that are dry, structurally sound, and level (as described above) may be suitable as a sub floor for installation. See adhesive Manufacturer's guidelines. Manufacturer is not responsible for performance or suitability of existing flooring products that are not removed from concrete.
- As indicated above, the surface must be sound, tight, and free of paint, oil, existing adhesives, wax, grease and dirt.
- Terrazzo and ceramic tile must be sufficiently scuffed to assure adhesion. Portland based products must be used to comply with flatness requirements of 3/16" in a 10' radius or 1/8" in a 6' radius. See adhesive Manufacturer's guidelines.
- Existing vinyl, tile, or terrazzo are not considered to be vapor barriers, and can still transmit unacceptable moisture levels to hardwood flooring. Existing hardwood flooring must be removed prior to the installation of a new wood floor on concrete.

SUB FLOOR PREPARATION: WOOD

- Wood sub floors need to be well nailed or secured with screws. Nails should be ring shanks, and screws must be counter-sunk. The wood sub floor needs to be structurally sound (i.e. without loose boards, vinyl, or tiles). Sub floor tolerance for a flat surface is 3/16" within a 10' radius and 1/8" in a 6' radius. These are industry standards established by NWFA.

- Engineered sub floor panels must be ANSI-rated plywood of specified thickness to meet joist spacing specifications listed below, or sound solid lumber sub floor that is a minimum of 3/4" thick and dry.
- For panel products sub flooring, check for loose panels and re-nail or screw down loose panels securely. Nails and screws must be countersunk.
- Ensure that there is proper expansion space (floor thickness) between the panels. If panels are not tongue and groove and do not have sufficient expansion space, it may be necessary use a circular saw to create the specified space. Do not saw through joints on tongue and groove sub floors.
- Check for delamination or damaged areas to sub floor and repair those areas as needed.
- Make sure sub floor is free of debris before beginning installation.
- Acceptable Panel Sub floors: Truss/joist spacing will determine the minimum acceptable thickness of the panel sub flooring.

A. Truss/joist spacing of 16" (406cm) o/c or less, the industry standard for single panel sub flooring is a minimum of 5/8" (19/32", 15.1mm) CD Exposure 1 plywood sub floor panels 4' x 8' panels.

B. Truss/joist spacing of more than 16", up to 19.2" (488mm) o/c, the standard is a minimum 3/4" (23/32", 18.3mm) tongue and groove CD Exposure 1 Plywood 4' x 8' sheets glued and mechanically fastened.

C. Truss/joist spacing of more than 19.2" (488mm) o/c up to a maximum of 24" (610mm) requires a minimum 7/8" tongue and groove CD Exposure 1 plywood sub floor panels, 4' x 8' sheets, glued and mechanically fastened.

JOIST CROSS-BRACING

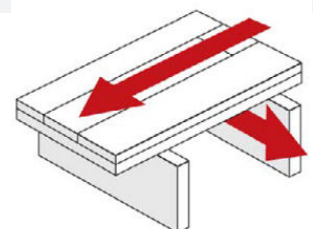
- A sub floor that is not thick enough to support the span of the joists will cause unacceptable sub floor deflection. An alternative to adding additional plywood on top of the sub floor would be to cross-brace between the joists. The cross-bracing would be done at the appropriate distance on center to meet specifications and bring the deflection within proper tolerance.
- Check with the joist or truss Manufacturer to determine if cross-bracing is allowed with that system. Should it not be compatible with the joist or truss Manufacturer, sheeting the sub floor with a second layer of CD or better grade plywood would then be the only option. (See double layer sub floors section).

DIRECTION OF INSTALLATION IN RELATION TO JOIST DIRECTION.

The best application is at a 90° angle across the joists. This provides for best stability of the floor. As an alternative, the floor can be installed at a 45° angle to the joists. The floor cannot be installed in the same direction as the joists without installing an additional sheet of plywood on top of the existing wood sub floor.

DOUBLE LAYER SUB FLOORS

- When sub floor does not meet thickness standards for span between joists, a second layer of plywood is required to stiffen sub floor.
- The second layer should consist of nominal 1/2" (15/32", 11.9mm) CD exposure 1 plywood sub floor panels, 4' x 8' sheets, depending on how much correction of deflection between joists is necessary.
- The top layer of plywood should be offset by 2' from joints in first layer of sub floor and installed in the opposite direction to the bottom sub floor panels. Glue



top and bottom layers together with construction adhesive and screw into the truss/joist system every twelve inches. Additionally, nail (ring shank) or staple layers together on a minimum 12" grid pattern.

EXISTING WOOD FLOOR –ON WOOD SUB FLOOR

When installing over an existing solid hardwood floor already attached to the wood sub floor, ensure that the existing floor is sound and firmly attached to sub floor. Install material at a 90° right angle or 45° angle (across grain) of existing hardwood floor.

NOTE: Do not install in the same direction as existing floor. Do not install over wood flooring glued to concrete.

CEMENTITIOUS PATCH - WOOD SUB FLOOR

In the event of moisture, determine source, eliminate, and allow sub floor to dry. If sub-floor is less than above specified thickness or sanded to thickness less than specified see the above standards for top sheeting.

NOTE: Particle board sheeting of existing wood sub floor and Portland based leveling compounds are acceptable for glue-down or applications only (they are NOT suitable for nail-down applications).

ACCLIMATION

Wood flooring is a hygroscopic material subject to dimensional change as a result of variations in moisture, temperature, and humidity within the surrounding environment. Wood flooring simply needs to reach a moisture content level in equilibrium with the surrounding environment (EMC) IN WHICH IT WILL BE INSTALLED, AT OR NEAR NORMAL LIVING CONDITIONS (Between 35% –55% RH). The process of reaching this equilibrium is defined as acclimation, which allows the wood to properly adjust itself to the normal living conditions within the structure; that is, the temperature, humidity conditions, and moisture content that will typically be experienced once the structure is occupied and stable indoor climate control is exercised.

NORMAL ENVIRONMENTAL CONDITIONS MUST BE MET TO ENSURE OPTIMAL PERFORMANCE

Heating and ventilating systems are designed and working to maintain an interior relative humidity level between 35% and 55% and a temperature between 65 and 80°F year-round. At manufacturing, flooring is dried to a content of between 7–9% and maintained at a relative humidity environment ranging from 35% to 55%. Ideally, the installation environment will be maintained at the same humidity range.

ACCLIMATION OF ENGINEERED PRODUCTS

- To maintain proper relative humidity levels, above 35% and below 55% RH, use of the following equipment is recommended. Failure to maintain humidity range can result in damage to the wood floor.
- Air conditioner (of proper size and in working order)
- Dehumidifier (if required) to prevent relative humidity levels above 55% Whole House Humidifier (of proper size and in working order) (if required) to maintain relative humidity levels above 35%.
- Acclimation is NOT SIMPLY A MATTER OF TIME! It is based on what the living conditions in the house will be. Check Manufacturer Climate Control & Radiant Heat Guide for more details.

A. Prior to delivery of the wood flooring, check and record the jobsite ambient conditions and the subfloor moisture to ensure they coincide with the wood flooring requirements that have been selected.

B. Upon delivery of the flooring to the jobsite, recheck and record the temperature and relative humidity in the space receiving the wood floor. The temperature and humidity must be within the manufacturer's requirements.

C. Upon delivery of the flooring to the jobsite, recheck and record the MC of the subfloor. Check with your moisture meter manufacturer to determine the correct setting on your meter for the wood subfloor being tested.

1. Take MC readings of the wood subflooring at a minimum of 20 test locations per 1,000 square feet, and an additional 4 readings per 100 square feet thereafter, and average the results. In general, more readings will result in a more-accurate average. Any unusually high or low moisture readings should be isolated and addressed individually. Record, date, photograph, and document all results.
2. Concrete subfloors must be moisture tested, and adequate moisture control systems should be in place prior to installation of any solid wood floor.
3. Any unusually high or low subfloor moisture readings should be isolated and addressed prior to wood floor installation.

D. Follow the flooring manufacturer's moisture testing, acclimation, installation, and maintenance instructions to retain all warranty coverage.

E. When the wood flooring is to the expected in-use (e.g., normal living) and manufacturer's required ambient conditions within the facility, and this coincides with the subfloor moisture conditions, and these conditions are being maintained, the flooring may be installed immediately.

GLUE DOWN INSTALLATION

Make sure sub-floor is tested for moisture content first and is properly prepared. On concrete sub-floors, 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 sub-floor 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 expansion space(thickness of the floor) between flooring and all walls or thickness of the plank 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.

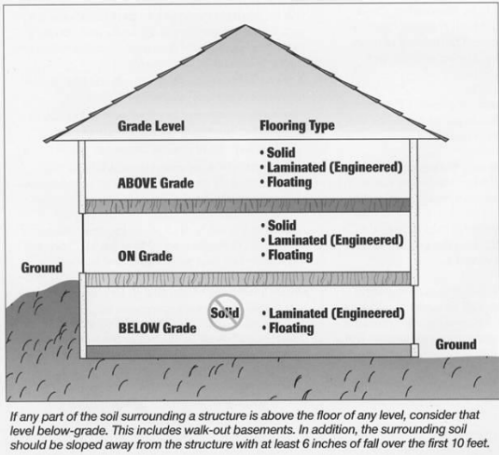
- Never let flooring adhesive dry completely on the finished surface. Walk each section of flooring in order to make sure it is well bonded to the sub-floor with the adhesive working time. Flooring planks on the perimeter of the room may require weight on them until adhesive cures enough to hold them down.

STAPLE DOWN (WITH GLUE ASSIST) INSTALLATION:

Installation Tools

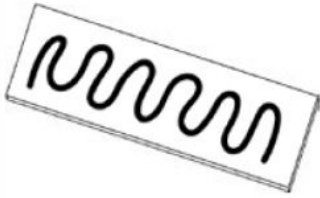
STAPLE DOWN Tape measure, pencil, chalk line, table saw, cut-off saw, jamb saw, tapping block, pull bar, spacers, hammer, safety glasses, hearing protection, utility knife, wall spacers, straight edge, broom, speedy square, hardwood floor cleaner, pin/finish nails, glue, air compressor, and shop vacuum. **CAUTION:** Do not strike the finished edge or surface of the plank. Flooring mallets are intended to activate the nail gun. Striking the edge of the plank with flooring mallets, hammers, or rubber mallets can damage the edge of the planks.

Proper placement of fasteners is critical to the performance of the floor. Overshooting the fastener weakens the tongue and the damage can telegraph to the surface. Care must be taken not to damage the edge of the plank with mallets or the edge of the nail gun. Improper placement will create a noisy floor.

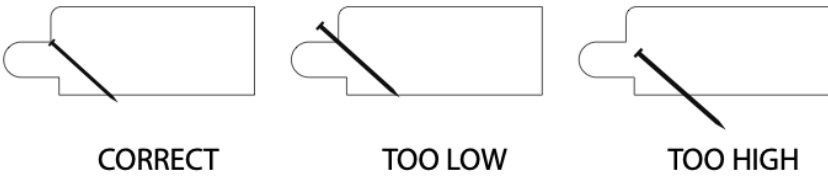


Glue Assist

You must account for moisture in any installation. In the event the sub-floor 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 a coat of moisture barrier over the entire sub-floor to create a moisture retarder. During installation of the wood, you can then run a minimum 1/2" bead of approved adhesive (ie Bostik's Best or and Titebond 771 in a caulking tube) on a serpentine motion as shown on the diagram. Make sure that the floor is secured to the subfloor and there is no movement in the planks.



1) Before you start, make sure to test the substrate for moisture according to appropriate moisture testing procedures, 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.



2) 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.

3) Expansion space should be left around the perimeter. Measure out from the starting wall the width of one flooring plank plus the appropriate expansion space equal to or greater to the thickness of flooring. Mark two points toward each end of the starting wall and snap a chalk line along the full length of the wall through the marks.

4) Only 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.

5) Trowel spread the adhesive on the subfloor along the chalk line wide enough to allow the first row of flooring to be installed, being careful not to cover the line. A proper roller can also be used if recommended by the adhesive manufacturer. Before proceeding to the next step, follow the adhesive manufacturer's recommendations for wet lay times.

6) Lay the tongue side of the first row of flooring along the chalk line. Face nail (top nail) the first row of flooring in place. Place the fasteners approximately $\frac{3}{4}$ " from the wall side (groove side) of the board every 4" to 6". Once the face nails are set, use 6-d finish stapler or the pneumatic finish stapler to blind/edge nail along the tongue of the first row, every 4" to 6" and every 1" to 3" from every end joint. Check to make sure the first row is still straight along the chalk line before proceeding.

7) Trowel spread enough adhesive to install 2-3 more rows.

8) Install the second row by sliding the groove side on to the tongue of the first row. Blind/edge stapler it in to place, with fasteners every 4" to 6" and 1" to 3" from each end joint. Stagger end joints by at least 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).

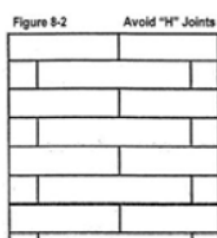
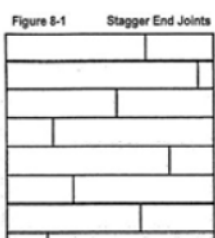
9) Continue nailing and gluing 2-3 rows at a time in this manner across the room. Avoid creating "H" patterns (where an end joint is adjacent to another end joint in the second to last row installed). Use cut ends to start the subsequent row, discarding any pieces shorter than 8".

10) Most adhesives require that the Installer clean the adhesive off the flooring boards during the installation. Follow the adhesive manufacturer's recommendations for this procedure.

11) Trim the last row of flooring to maintain the minimum expansion space at the far wall.

12) At the far (finish) wall, it may be necessary to face-nail the last 2-3 rows due to the angle of the stapler/nailer. The last row or two of flooring may need to be pulled together using a pulling bar.

13) Complete the installation by reinstalling or installing new base moldings.



14) Do not allow foot traffic on the floor for 24 hours after installation is complete.

INSTALLATION OVER RADIANT HEAT

All required pre-installation testing and preparation must be completed before proceeding. If moisture problems were detected during the pre-installation phase, an approved moisture barrier must be in place. Flooring failures due to improperly installed hydronic radiant heat systems are not covered by the manufacturer warranty. It is the Owner/Purchaser & Installer's responsibility to ensure that the hydronic radiant heat system is installed per the radiant heat manufacturer instructions and operating properly before proceeding to the flooring installation. For radiant heat systems we only approve floating (glue T&G) and full spread glue installation method. Staple is not approved. Radiant heat is not approved for dry climates areas so please contact your local distributor or dealer to confirm if this is product is approved in your market. **Note: Any material equal to or less than 8^{33/50}" (220mm) is considered radiant proof. Any material over 8^{33/50}" (220mm) is not radiant proof. Regardless of its length or width, American Hickory Engineered floors are not radiant proof.**

Approved Radiant Heat Type

- Hydronic radiant heat systems only

Installation Methods

- Floating Installation (Glue T&G)
- Glue Down Installation

Acceptable Subfloors

- CDX Plywood
- Concrete – With a minimum compressive strength of 3000 PSI.

Underlayment Recommendation

- Cork

Heating Control Requirements

Radiant heat installations must have a heat control system that helps maintain a constant baseline temperature and prevents overheating. Radiant heat temperatures that exceed 80 degrees will damage the hardwood flooring and void the manufacturer warranty. Radiant heat cannot be the only source of heat for the house. Your HVAC needs to be on while you have the radiant heat on. HF Design requires that an exterior thermostat be installed and working at all times. Unlike conventional heating systems which switch on as needed, radiant systems work most effectively with hardwood flooring if the heating process is gradual with small, incremental increases in relation to outside temperature.

Radiant Heating System Acclimation Process

The hydronic radiant heating system must be operational and heated for at least 7 days prior to the installation of HF Design engineered oak flooring. Use an incremental control strategy that brings the subfloor through temperature changes gradually. This incremental strategy should include being turned on at least 3 days prior to installation at a temperature of 70 degrees; then, raised to 80 degrees for a period of 3 more days. The installation site should be aired out every day to allow excess humidity to exit the structure. Once the radiant heat acclimation process is complete and the flooring is ready to be installed, turn off the radiant heat system to let the subfloor cool down to room temperature for 3 to 4 hours.

Preparing for Installation

Before installation begins, it is the Owner/Purchaser & Installer's responsibility to ensure that the radiant heating system is functioning properly and is not on the same circuit for other floor covering types (that may allow higher temperatures). Failure to do so will cause excessive heat damage and shrinkage in the hardwood flooring and void the manufacturer warranty. Heating pipes must be covered with 1 1/4 of concrete or minimum of 1/8" below bottom side of plywood subfloor. Radiant heating systems create a dry heat that can lower interior humidity levels. HF Design LLC recommends adding a separate humidifier

Approved Hydronic Radiant Subfloor Systems

- Aluminum Hangers
- Channel Aluminum Board
- Sleeper Systems
- Lightweight Thermal Mass Concrete with min 3000 PSI compressive strength
- 1 1/8" T&G Warmboard

Not Approved for Radiant Heat Subfloor Systems

- Electric Heat Mats System

to the HVAC system to maintain the required indoor humidity levels of 35%-55%. Installer should test the hydronic heating system and check that all radiant heat requirements have been met before proceeding to installation: **Note: Any material equal to or less than 8^{33/50}" (220mm) is considered radiant proof. Any material over 8^{33/50}" (220mm) is not radiant proof. Regardless of its length or width, American Hickory Engineered floors are not radiant proof:**

- | | | |
|---|---|---|
| <input type="checkbox"/> Hydronic Radiant Heat System | <input type="checkbox"/> Exterior Thermostat Installed | <input type="checkbox"/> Separate HVAC Humidifier |
| <input type="checkbox"/> Engineered Oak Product | <input type="checkbox"/> Sensor Attached to Heating Unit | <input type="checkbox"/> Radiant Heating System |
| <input type="checkbox"/> Floating Installation Method | <input type="checkbox"/> Radiant Heat Acclimation Completed | Working Properly |

Starting Installation

NOTE: Make sure to allow 1/2" between the heating system and the floor planks by using an acceptable underlayment.

Begin laying the first row of flooring with the groove side facing the starting wall. Use wood wedges at walls or obstructions to maintain the required 1/2" expansion space from the hardwood flooring plank. Use a hammer and tapping block to tap against the tongue side to pull planks together to ensure a tight fit. When near a wall, use a crow or pull bar to close end joints. Never tap against the groove side or the end joints of the plank as doing so will damage the flooring finish and void the manufacturer warranty. To ensure that plank end joints are not too close to each other in adjacent rows, it is best to rack out 3 to 4 rows as installation proceeds. Allow a minimum of 10" to 12" between end joints in adjacent rows. Apply a quality T&G glue in the top portion of the groove along the side and end joints of each plank to ensure a strong bond between them.

As each plank is installed, check for and remove excess T&G glue or other spills immediately. Failure to remove excess T&G glue or spills from the flooring surface will damage the factory finish and void the manufacturer warranty.

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.

When wiping up excess T&G glue or spills, use a dry or damp soft cloth. Do not use paint thinner or harsh adhesive removing chemicals on the hardwood flooring surface as doing so will damage the finish and void the manufacturer warranty. As installation proceeds, cut the last plank in each row allowing for the required 1/2" expansion space. Use a crow or pull bar to install the last plank ensuring a tight fit.

IMPORTANT! Adhesive/masking tape applied directly to hardwood floor surface will damage the factory finish and void the manufacturer warranty. Once installation is complete, turn the radiant heating system on immediately to achieve further acclimation of the flooring to the installation site. Leave expansion space wedges in place for a minimum of 8 hours to allow the T&G glue to fully dry. Do not allow foot traffic for a minimum of 8 hours and allow a minimum of 24 hours before heavy furniture is moved onto the hardwood flooring.

Finishing the Job

Remove the 1/2" expansion spacers from the perimeter. Install or reinstall base and/or quarter round moldings to cover the expansion space. Install transition pieces such as reducer strips and T-moldings as needed. Clean and remove all dirt and debris from your new floor by dry dust mopping. Follow "Floor Care and Maintenance" instructions to ensure the longevity and lasting beauty of your new HF Design LLC® Hardwood Floor. Oil finish hardwood flooring installed over hydronic radiant heat may require more frequent oil touch-up. See "Oil Finish Care & Maintenance" for these guidelines.

Protection During Construction or Remodeling

If your hardwood flooring is installed while other trades are working at the jobsite, or afterwards, when doing any kind of remodeling or wall painting, it should be completely covered by a clean, dry, plain uncoated cardboard or heavy bond paper product.

IMPORTANT! Do not cover HF Design LLC hardwood floors with plastic, red rosin, felt, wax paper or previously used cardboard. Damage to the factory finish caused by the use of improper floor covering materials will void the manufacturer warranty. Before covering the hardwood flooring, it should be cleaned to remove grit, dust and other abrasive debris and thoroughly dry. Do not use a wet cloth or wet mopping to remove drywall dust as doing so will create a pasty residue that will damage the factory finish and void the manufacturer warranty. When covering the hardwood flooring area, the proper covering material should be overlapped 4 inches to the adjoining paper, secured with masking tape applied to the covering material only and then secured at perimeter walls or baseboards to prevent the covering from moving or shifting, and ensure that the tape itself, construction debris, dry wall dust and/or wet paint does not penetrate to the flooring below. **IMPORTANT!** Adhesive/masking tape applied directly to hardwood floor surface will damage the factory finish and void the manufacturer warranty.

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 if your floors are Oiled Finished (blue tape 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
- Do not place the tape on the wood directly for more than 24 hours.

LOW MOISTURE / HIGH MOISTURE WARNING SYSTEM

Adverse Conditions Warning: It is possible at the time of install to place a device/devices in the floor that will warn the consumer when the floor is getting too dry or too damp. It logs the data from the floor and the indoor environment continuously. It is installed within the floor at time of installation.



Fidbox, which is a data logging device that is commonly used worldwide. The device is Blue Tooth connected and the consumer can track the condition of the floor. This gives the consumer the ultimate in control of the indoor environment. It is like a check engine light that can warn of pending trouble. Then adjustments can easily be made to the climate control to prevent damage to the floor.

Since proper climate and humidity control is required as a standard by the manufacturer and the entire wood floor industry, this device while optional, can make the difference between a successful installation and a site induced/non manufacturing related failure of the wood floor.

See Fid Box application instructions at fidbox.net for full instructions on installation and use.

NOTE: The space needs to be acclimated to the engineered wood flooring, more than the other way around. Remember: 40 to 55% RH and 65° to 80° F is the target for indoor conditions.

DO NOT USE BLUE TAPE OR OTHER TAPES FOR OILED FINISHED FLOORS.

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 between 65° F - 80° F and relative humidity is 35% - 55%. In very dry climates, the use of a humidifier might be necessary.

Photo-sensitivity: 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, recommend using felt underlayment
- 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.
- The flooring finish can wear off overtime in areas of high foot traffic i.e. kitchen and hallways. It is recommended to place a rug as a preventative measure.

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 will not guarantee replacement flooring that 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 guidelines, please refer to NWFA (www.nwfa.org)

Please note that our Care & Maintenance Instructions are not general for all products, they do apply to each individual product specifically. Please refer to the individual care and maintenance instructions for each product specifically to properly take care of your floors.