

ENGINEERED HARDWOOD FLOORING INSTALLATION GUIDELINES

STOP!

CAREFULLY EXAMINE ALL OF THIS FLOORING FOR COLOR, FINISH, QUALITY, AND STYLE BEFORE INSTALLATION. IF THIS MATERIAL IS NOT ACCEPTABLE, STOP AND IMMEDIATELY CONTACT THE PERSON FROM WHOM YOU PURCHASED IT. MANUFACTURER WILL NOT ASSUME RESPONSIBILITY FOR THE ABOVE AFTER MATERIAL HAS BEEN PERMANENTLY INSTALLED.

IMPORTANT INFORMATION BEFORE YOU BEGIN

It is EXTREMELY IMPORTANT that you read and understand this information completely prior to starting. Improper installation can void the warranty. The manufacturer requires NWFA Installation Guidelines be followed, contact your dealer if you need copies.

INSTALLER / OWNER RESPONSIBILITY

Carefully inspect ALL material prior to installation for defects. Materials installed with visible defects are not covered under warranty. Remember: Wood is a natural product that can vary in color and grain. It is to be expected that wood's natural characteristics will vary from plank to plank. Manufacturer does not warrant against natural variations from any samples or from plank to plank. If you are not satisfied with the flooring prior to installation, simply return the cartons to your retailer for a full replacement. Acceptance or rejection of material must be done only on full shipments, not carton by carton or plank by plank. Material is manufactured to exceed industry standards (ANSI/HPVA EF2002).

You are urged, as the final inspector, to inspect for proper color, finish, style, and quality PRIOR to installation. Verify that the flooring is the correct material. Care should be taken at this time to remove or repair particular characteristics you do not desire. Manufacturer declines responsibility for any costs incurred when plank(s) with visible defects have been installed.

TOOLS AND EQUIPMENT NEEDED

Broom or Vacuum	Moisture Meter	Safety Glasses
Tape Measure	Hand Saw	Color Wood Filler
Chalk Line & Chalk	Electric Miter Saw	Hardwood Floor Cleaner
Hammer	Pry Bar	

CAUTION: WOOD DUST

The International Agency for Research on Cancer has classified wood dust as a nasal carcinogen. The sawing, sanding, and/or machining of wood products can produce wood dust that can cause respiratory, eye, and skin irritations. Equipment should be outfitted with a dust collector to reduce airborne wood dust. Wear an appropriate NIOSH designated dust mask to reduce exposure to airborne wood dust. Avoid contact with eyes and skin. In case of irritation flush eyes or skin with water for at least 15 minutes.

PRE-INSTALLATION: JOBSITE CONDITIONS

It is the installer / owners' responsibility to ensure that the jobsite conditions and jobsite subfloor are environmentally and structurally acceptable prior to the installation of any hardwood flooring. The manufacturer declines any and all problems with the hardwood flooring that are related to or attributed to improper jobsite conditions.

- All "wet" work (i.e. paint, drywall, concrete, masonry, plumbing) must be complete, and dry, well in advance of delivery of hardwood flooring.
- Gutters and downspouts should be in place and the exterior grade complete to allow for proper drainage of water away from the building's exterior perimeter.
- Flooring should not be exposed to extremes of humidity or moisture.
- Permanent HVAC system should be on and operational. A temperature of 65-75° Fahrenheit and relative humidity of 35-55% should be achieved and maintained for a minimum of 7 days maintaining prior to delivery, and during & after installation of the flooring. Use of humidification system may be required to maintain the proper humidity level. Failure to maintain proper humidity level can result in excessive dryness of flooring.
- Flooring must be acclimated to the job site until proper moisture equilibrium is achieved. Read these instructions thoroughly for moisture content requirements and testing instructions.

The manufacturer declines any responsibility for failures or deficiencies of hardwood flooring resulting from or related to subfloor, sub-surface, or job site environmental conditions. All substrates must be clean, flat, dry, and structurally sound.

Subfloors must be clean and free of dirt, curing compounds, sealers, drywall mud, paint wax, grease, urethane, or other materials that may affect the integrity of the flooring material or adhesives used to install the flooring.

All subfloors and subfloor systems must be structurally sound and must be installed following their manufacturer's recommendations. Local building codes may only establish minimum requirements of the flooring system and may not provide adequate rigidity and support for proper installation and performance of a hardwood floor.

- The subfloor must be flat meeting a minimum of 3/16" within 10' or 1/8" in 6'.

Concrete Subfloors

Grind high spots or use a Portland-cement based leveling material (minimum compressive strength: 3000 psi) to fill all low spots. Follow the leveling compound manufacturer's instructions. Leveling compounds must be allowed to thoroughly cure and dry prior to installation of wood flooring. Follow concrete moisture content guidelines and test procedures specified by adhesive manufacturer.

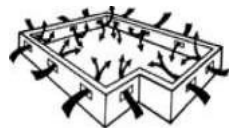
- The moisture content for concrete subfloors registered after a calcium chloride test should not be greater than 3 lbs. per 1000 square feet of area. If it exceeds these limits, DO NOT install the flooring. Before moisture testing begins, the slab must be cured for a minimum of 30 days.

Wood Subfloors

For staple down application use layers of 15 lb. felt or wooden shims to fill low spots. Staples must be able to penetrate for holding power. Whenever possible install the planks perpendicular to the floor joists for maximum stability. Our warranty DOES NOT cover any problems caused by inadequate substructures or improper installation of said substructures.

- Test wood subfloors and wood flooring for moisture content using a pin-type moisture meter. The moisture content of the subfloor should not exceed 13% and the moisture content of the wood should be within 4% of the subfloor moisture content.

- Basements & crawl spaces must be dry. Use of a 6 mil black polyethylene is required to cover 100% of the crawl space earth.



Crawl space clearance from ground to underside of joist should be no less than 18" and perimeter vent spacing should be equal to 1.5% of the total square footage of the crawl space area to provide cross ventilation.

RECOMMENDED SUBFLOOR SURFACES

Concrete Subfloors:

Concrete slabs should be of high compressive strength and constructed to prevent ground water from penetrating the concrete. Engineered hardwood flooring can be installed on, above, or below grade. In addition, it can be installed over above-ground, suspended concrete floors. The suspended concrete must be a minimum of 1-1/2" thick and must be structurally sound. The exception to this is lightweight concrete (which usually contains high amounts of gypsum) having a density of 100 pounds or less per cubic foot. Test for lightweight concrete by

using a nail to scratch the surface of the concrete. If the concrete crumbles or turns to powder, it is not sound and you should NOT install the hardwood flooring. Use the floating installation method only for lightweight concrete subfloors (for products 3" or wider).

Wood Subfloors:

Preferred Wood Subflooring:

3/4" (23/32", 18.3mm) CDX grade Plywood subfloor / underlayment (Exposure 1), 4'x8' sheets or 1/8" (23/32", 18.3mm) OSB subfloor / underlayment grade, PS2 rated, sealed side down, joist spacing of 19.2" (475) on center or less.

Minimum Wood Subflooring:

5/8" (19/32", 15.1mm) CDX Plywood subfloor / underlayment (Exposure 1), 4'x8' sheets, maximum 16" on center joist construction. Follow panel manufacturer's recommendations for spacing and fastening. Typical panel spacing and fastening for joist systems, 1/8" (3.2mm) around perimeter and fastened every 6" (150mm) on bearing edges and every 12" (300mm) along intermediate supports. Installation of flooring should not be made over joists spacing greater than 19.2" on center or parallel to the joists unless the subfloor has been properly strengthened. Applying a second layer of underlayment may be necessary to bring the overall subfloor thickness to 1-1/8".

- Test the moisture content of the wood subfloor and wood flooring with a pin type moisture meter. Wood subfloors must not exceed 13% and the wood flooring should be within 4% of the wood subfloor.
- For existing wood floors install new flooring at right angles to the existing flooring.
- Do not glue, staple, or nail down hardwood flooring over particle board, floating application is acceptable (for products 3" or wider).
- Do not install over existing glue down hardwood floors.

Ceramic Tile and Terrazzo:

All wax and sealers must be removed with an appropriate cleaner / stripper. Ceramic tile and terrazzo should be abraded to allow for proper adhesion. Check for loose tiles by tapping and re-adhering. Fill grout lines with a cementitious latex fortified leveling compound.

Resilient Tile, Resilient Sheet Vinyl:

Material must be full spread and secured to the subfloor. Do not install over perimeter glued floors. Do not install over more than one layer that exceeds 1/8" in thickness.

Nail / Staple Down Only:

If old flooring is unsuitable to install new flooring then overlay with new underlayment. Test to conclude that the staples / cleats are able to properly penetrate and secure the flooring to the subfloor.

Glue Down Only:

Do not install over more than one layer that exceeds 1/8" in thickness. Clean flooring with an appropriate cleaner and allow to thoroughly dry. If necessary degloss the floor using an abrasive pad to enhance the bonding of the adhesive, if wax or other coatings are present, completely remove the material with a

quality stripper, rinse the floor and allow to dry. Always check for proper adhesion bond prior to installing.

Acoustic Cork Underlayment:

Install cork underlayment according to manufacturer's instructions. The cork underlayment must be fully adhered to the subfloor. The cork underlayment should be of pure granulated cork combined with a polyurethane binder with a minimum density of 11.4 lbs. per cubic foot and not to exceed 13 lbs. per cubic foot.

CAUTION: DO NOT SAND any existing resilient tile, sheet vinyl flooring, or flooring felt as they may contain asbestos fibers that are not readily identifiable. Inhalation of asbestos dust can cause serious bodily harm. Check local, state, and federal laws for handling hazardous material before attempting the removal of these floors.

Radiant Heated Subfloors:

Prior to installation of flooring over a radiant heat system it is important that these guidelines are followed in strict accordance. Failure to follow the guidelines may produce unsatisfactory results.

JOB SITE REQUIREMENTS & INSTALLATION

- Subfloor must be flat to 3/16" in 10' or 1/8" in 6'.
 - Concrete must be allowed to properly cure and dry for a minimum of 4 weeks prior to operation of a radiant heat system.
 - It is highly recommended that the radiant heat system be designed specifically to accept a wood floor. Follow the manufacturer's installation instructions.
 - Use of an in-floor temperature sensor as well as a separate thermostat for the individual room is required.
 - An outdoor temperature sensor should be used to adjust water temperature according to anticipated heat loss.
 - Radiant heat system should be set to run at 2/3 maximum output for a minimum of 2 weeks prior to installation of flooring to further allow moisture from concrete to dissipate and reach a final moisture content. This must be done in both heating and non-heating seasons.
- Reduce to a temperature of 65° Fahrenheit for at least 4 days prior to flooring installation.

- Prior to flooring installation moisture testing must be conducted and documented per ASTM test method 1869-89 for concrete or using a pin type meter for wood subfloors.
 - The moisture content for concrete subfloors registered after a calcium chloride test must not be greater than 2 lbs. per 1000 square feet of area. If it exceeds these limits, DO NOT install the flooring.
 - Wood subfloors may not exceed 13% and must be within 4% of the wood flooring.

AFTER INSTALL & SEASONAL OPERATION

- 48 hours after completion of flooring installation slowly raise the temperature of the heating system to its preferred operating level over a period of 5 days. Do not allow the surface temperature to exceed 82° Fahrenheit.
- Relative humidity of the jobsite must be maintained

between 35-55% relative humidity.

- Surface checking can be expected if the humidity level is not properly maintained between 35-55% R.H. or if the floor's surface temperature exceeds 82° Fahrenheit.
- Seasonal gapping should be expected.
- Refer to our Radiant Heat Precautions document for other important information.

PRE-INSTALLATION: JOB PREPARATION

Inspect the Flooring:

Inspect material for color, finish, milling, and grade. Hold out pieces that may not be acceptable once installed. PLEASE NOTE: Manufacturer does not accept responsibility for any costs incurred when plank(s) with visible defects have been permanently installed.

Undercut Door Casings:

Undercut all door casings 1/16" higher than the thickness of the flooring being installed. To do this, use a scrap piece of flooring as a guide, lay it on the substrate and cut the casing with a handsaw or use a power jamb saw set at the correct height.

Blending of Cartons:

To achieve a uniform appearance across the entire floor, you are urged to open / work from several cartons at a time, and to dry-lay the flooring, mixing the planks from several cartons. This will allow you to blend the planks for maximum aesthetic appearance. Make certain the room is well lit to ensure color is consistent and that any visual defects can be seen and removed.

Match Transition Moldings:

For best appearance, blend all transitions and moldings to planks that have similar color and graining. Set them aside for use as needed.

Layout of Flooring:

- Expansion space at vertical surfaces around the perimeter of the room is required and should be equal to the thickness of the flooring material. For glue down installation, allow 1/4-3/8". For staple / nail down installation, allow 3/8-1/2". For floating installations the minimum is 1/2" regardless of the thickness of the material. For commercial installations use a minimum of 1/2" expansion.
- Select a starter wall. An outside wall is best as it is most likely to be straight and square with the room. Measure out from this wall at each end: The overall width of the plank (including the tongue), plus the necessary expansion space. After determining the direction to run the planks, measure the width of the room (the dimension perpendicular to the direction of the flooring). The last row of the flooring should be no less than 1-1/2" wide; if it is less, cut the width of the starter row to avoid a narrow last row. If the first row requires ripping, then measure from the wall the width of the ripped board plus expansion space.
- Snap a chalk line (using a brightly colored chalk) from these points.
- Insert spacers at walls to maintain the expansion space between the flooring and the wall.

- Prior to installing the flooring, secure a straight edge (starter board) inside the chalk line to act as a guide and to prevent the row of planks from shifting during installation. The straightedge could be a straight piece of lumber or piece of flooring. This is temporary and will be replaced as the floor is completed. **NOTE:** Proper alignment is critical. Misaligned starter rows can cause side and end gaps to appear in proceeding rows of flooring.



- Before securing the planks, dry lay the first two rows of flooring working from left to right. Install planks so that the groove faces the starter board (tongue facing you).

- “Racking the floor” is essential to achieve a random appearance. The goal is to avoid a patterned appearance (particularly H patterns) by randomly installing different lengths. Start by using random-length planks found in the carton, or by cutting four or five planks in random lengths, differing by at least 6”. Stagger end joints of boards row to row a minimum of 6” for strip flooring, 8-10” for 3” to 5” plank, and for plank wider than 5” inch, stagger as much as possible with minimal or no H joints. Never waste materials; the end cuts from starter rows should be used at the opposite side of the room to complete rows or to start the next row. If a piece is less than 8” long, cut a new plank in half and use that to start the next row.

- Lay the remainder of the planks in the second row. Make sure that the rows are straight and no gapping exists on the sides or ends. Once you have dry laid the first two rows, remove all the planks in order. You are ready to begin.

- If needed, use a tapping block to help engage the boards together until the tongue-and-groove is flush and tight and no gaps are present between adjacent planks. Never strike a rubber mallet or hammer directly on the flooring to engage the tongue and groove. This practice can damage the flooring and/or finish.

- Some installers use tape to secure planks during installation. Use of tape is not recommended as improper use can damage the flooring. If you choose to use tape during installation, use only “3M ScotchBlue™ WALLS + WOOD FLOORS” and carefully remove it within 24 hours. Do not allow adhesive contact for a longer duration.

- As you approach the end wall, it may be necessary to cut the width of the last row. Be sure to allow for the expansion space along the end wall. Once the final cuts are made, set planks into place.

- After the floor layout is complete, remove the starter board and install the last row using the pry bar.

Adhesive Precautions:

Immediately remove any excess adhesive from the surface of the installed flooring as you work. Use a clean cloth dampened with water. **DO NOT USE DENATURED ALCOHOL.** Frequently change towels to avoid leaving a haze on the flooring surface. **CAUTION:** Adhesive that is allowed to dry on the finish can be difficult to remove and may leave a haze. In this case, use mineral spirits instead of water.

In typical climates, the new floor can accept foot traffic within 24 hours. In areas where additional curing time is required, more time may be needed.

GLUE DOWN INSTALLATION GUIDELINES

Additional tools & material needed:

Urethane Wood Flooring Adhesive
Trowel* Terrycloth Towels Mineral Spirits

*** Refer to the Urethane Wood Flooring Adhesive label, manual or other manufacturer provided instructions to select the correct trowel.**

NOTE: With wood flooring adhesive, you **MUST** install the hardwood flooring by using the “off the floor” technique. In other words, you **MUST** be working from the subfloor and **NOT** standing or walking on the newly installed flooring during installation. Failure to follow this procedure can result in the planks moving during installation, creating gaps at both end and sidejoints.

Before proceeding with the following instructions, refer to the pre-installation & subfloor information, as well as the sections titled “Layout of Flooring” and “Adhesive Precautions”.

Spreading the Adhesive

1. Using the proper trowel, hold the trowel at a 45° angle to ensure proper spread rate of adhesive. Apply pressure to allow the trowel to leave ridges of adhesive on the substrate with little adhesive left between the ridges. This will help to achieve the proper spread rate of the adhesive. Temperature and air flow across the adhesive can have an effect on the open time of the adhesive. Urethane wood flooring adhesive will have a longer open time in areas of low humidity and will have a shorter open time in areas of high humidity. (See adhesive label for further information).

Installing the Floor

2. Once you’ve determined your layout, spread adhesive from the chalk line / straight edge out to approximately the width of two planks. Install the first row of starter planks along the chalk line / straight edge and secure into position with the groove facing the starter board (tongue facing you).
3. When you are certain the first two starter rows are straight and secure, spread adhesive 2-3’ wide across the length of the room. As a general rule, never spread more adhesive than can be covered in 30-45 minutes. If the adhesive has skinned over remove dried adhesive and trowel new adhesive.
4. Continue to install planks and push them into place.

NAIL OR STAPLE DOWN INSTALLATION GUIDELINES

Additional Tools and Material Needed:

Drill Air Hose 15 lb. Roofer’s Felt Tapping Block In-Line Air Regulator Compressor
Pneumatic Nailer / Stapler

Narrow crowned staple or flooring cleat designed for engineered flooring

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

Before proceeding with the following instructions, refer to the pre-installation & subfloor information as well as the section titled “Layout of Flooring”.

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 vary as environmental changes occur. This is not a manufacturing defect and is therefore not covered under our warranties (see warranty document for complete details). Reduce squeaking, popping, and crackling by ensuring that the subfloor is structurally sound, does not have any loose decking or joists, and is swept clean prior to installation. Also, ensure 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. Should the staple / cleat penetrate too deeply reduce the air pressure; if the staple / cleat is not deep enough then increase the air pressure using an in-line regulator. The crown of the staple / cleat should sit flush within the nail pocket to prevent damage to the flooring and to reduce squeaking. The flooring manufacturer is not responsible for damage caused by mechanical fasteners.

AIR PRESSURE SETTINGS



IMPORTANT: Only use manufacturer's recommended staples or cleats.

- For 3/8” thick products the minimum length staple / cleat is 1”
- For 1/2” thick products the min. length staple / cleat is 1-1/4”
- For 5/8” thick products the min. length staple/cleat is 1-1/2”

Read and follow the manufacturer's instructions for complete set-up and operation of equipment.

Getting Started

1. After the subfloor has been properly cleaned and prepped, cover the subfloor with 15 lb. asphalt felt paper. This material will help to keep the floor clean and help to retard moisture from below (there is no complete moisture barrier system for staple or nail-down applications).

Installing the Floor

2. Once you've determined your layout, install the first row of starter planks. Secure planks with 1" finishing nails (ideally in the dark grain) approximately 1" from the back edge of the board. Denser species may require pre-drilling. Countersink nails and fill with appropriate colored wood filler. Remove excess filler from surface with a clean cloth and proper cleaner.
3. Blind nail at a 45° angle through the tongue 1-2" from the end joints and every 6" in between along the length of the starter boards. Depending on the width of the flooring it may be necessary to do this for the first few rows prior to using a pneumatic stapler / nailer.
4. Continue to install the flooring making sure to staple / nail 1-2" from the ends and every 3-4" thereafter. Make certain the tool is adjusted properly to ensure that the fastener is at the proper angle and is flush within the nail pocket.
5. The last few rows will need to be fastened by hand. To fasten the final planks into place, you must either manually blind nail and or face-nail through the surface on the final planks. Blind nail at a 45° angle to the floor using 1" finishing nails. Denser species may require pre-drilling. Alternatively, install with 1" finishing nails in the face (ideally in the dark grain) every 6". Countersink nails and fill with appropriate colored wood filler. Remove excess filler from surface with a clean cloth and proper cleaner.

FLOATING FLOOR INSTALL GUIDELINES

(Products 3/8", 1/2", and 5/8" thick & 3" or wider only)

Additional tools & material needed:

Tapping Block & Spacers

T&G Wood Flooring Adhesive Terrycloth Towels

Foam Underlayment Pry / Pull Bar

6 mil Poly Plastic Sheeting

- 6 Mil Polyethylene not required over a vinyl, wood, or a wood product subfloor.
- 6 Mil Polyethylene required over concrete type subfloors on grade or below grade.
- **Do not install over carpet.**
- If installing over vinyl, ensure that the vinyl is secure to the subfloor. Do not install over perimeter glued vinyl.
- If installing over an existing wood floor, install the flooring at right angles to the wood floor.
- Secure creaking and loose floorboards with screws.
- Do not install over wood flooring glued to a concrete subfloor.

Before proceeding with the following instructions, refer to the pre-installation & subfloor information, as well as the sections titled "Layout of Flooring" and "Adhesive Precautions".

Getting Started

1. Remove all doors and shoe moldings. Undercut all door casings 1-1/16" higher than the thickness of the flooring and underlayment to be installed. Place a scrap piece of plank and a sheet of underlayment against the door casing to act as a guide and cut the door casing with a hand saw or power jamb saw set to the correct height.

2. Install underlayment: Unroll the 6 Mil Poly sheeting overlapping edges 4" and seams with clear plastic tape. Allow the poly to run 2" up. Seal the wall and trim back after installation of flooring. Install 1/8" foam underlayment. **A floating floor 2-in-1 underlayment may be used. Carefully follow the manufacturer's installation instructions.**

Installing the Floor

3. Once you've determined your layout, begin gluing the boards. Run a continuous bead of tongue & groove adhesive in the groove along the length and width (butt) of each plank.
4. If needed, use a pry bar at the end wall to pull the ends of the planks tight.

DO NOT USE LAMINATE STRAPS AS THEY MAY DAMAGE THE FLOORING

COMPLETING THE JOB

(ALL INSTALLATIONS)

1. Clean the floor with hardwood floor cleaner (Refer to our Hardwood Flooring Care & Maintenance document for recommendations)
2. After the floor has been cleaned, inspect the floor for nicks, scratches, gaps or planks that may have moved during installation, as well as any other imperfections that need attention. Touch up nicks and scratches with touch-up products and fill any minor gaps with appropriate color wood putty.
3. Install transition pieces (i.e. thresholds, t-moldings, base), boards and quarter round once adhesive (if applicable) has dried. Nail moldings to wall, not to the floor. Repeat the prior steps as needed.
4. Leave Warranty and Maintenance information with customer. Unused material should be left with owner and stored in a dry place in case future repairs are needed.
5. Use plywood or hardboard when moving heavy appliances or furniture across floor.

FLOOR PROTECTION DURING CONSTRUCTION

Always protect the surface of the installed flooring during construction by laying a quality rosin paper, or other paper that will allow the floor to breathe, over the flooring, taping it to the baseboards. Never use plastic or polyethylene sheeting to cover the floor since they will trap moisture that will damage the flooring.

MOLDINGS AND TRANSITIONS

Reducer-One Sided



Reduce / transition down to flat surfaces (i.e. vinyl sheet flooring).

Baby Threshold



Transition to carpet or other floor coverings which have a slight vertical height difference. Also used at sliding door areas. This most versatile trim piece can be adapted with the use of a table.

T-Molding



Used to transition one floor covering to another. Typically ceramic tile with the same vertical height.

Quarter Round



Installed after the floor against existing baseboard to allow proper expansion space.

Stair Nosing



Used for step construction when using plank or strip on stairs.