

PRIOR TO INSTALLATION

Read all instructions completely and carefully before beginning any project. Final product inspection is the responsibility of the installer/owner prior to installation. Installer must use reasonable selectivity and hold out or cut off pieces with obvious defects, whatever the cause. Five percent (5%) must be added to actual square footage needed as allowance for cutting waste and errors in manufacturing. If an individual piece appears to be doubtful as to grade or manufacture, the installer should not use the piece of flooring. Installation implies acceptance of flooring.

As with all Hardwood manufacturers, if any questions arise that are not covered within our installation instructions, always refer to the National Wood Flooring Association (NWFA).

CAUTION: WOOD DUST

Sawing, sanding and machining wood products can produce wood dust. Airborne wood dust can cause respiratory, eye, and skin irritation. The International Agency for Research on Cancer (IARC) has classified wood dust as a nasal carcinogen in humans.

JOB SITE CONDITIONS:

In a new construction, hardwood flooring should be one of the last items installed. All work involving water or moisture (plumbing, acoustical ceilings, dry wall taping, etc.) should be completed prior to wood flooring being installed. Heating and air systems should be fully operating maintaining a consistent room temperature at 16°C to 27°C (60-80° F) and a constant relative humidity of 40 to 55%.

Flooring should not be delivered until the building has been closed in and cement work, plastering, painting and other materials are completely dry. Concrete and plaster should be cured and at least 60 to 90 days old. Check basements and underfloor crawl space to be sure that they are dry and well ventilated to avoid damage caused by moisture.

For proper acclimation, flooring should be at the job site at least 72 hours prior to installation or as long as necessary to meet minimum installation requirements for moisture content. **Acclimation within a closed or sealed carton may not be adequate due to lack of air movement, especially in dryer climates. Please take appropriate measures to ensure proper acclimation, which may entail removal of outer plastic wrapping or opening of cartons and peeling back of interior plastic wrapping if packaged in this manner.** (Do not open the ends of cartons only, as this can lead to tapered ends of individual flooring strips or planks).

Handle with care. Do not stand on ends. Store flooring in a dry place being sure to provide at least a four-inch air space under and around cartons.

Do not store directly on concrete or near outside walls. Cartons should be placed in the installation area.

The installation site should have consistent room temperature at 16°C to 27°C (60-80° F) and a constant relative humidity of 40 to 55% for a minimum of 5 days prior to installation of wood flooring. Note: The moisture content of the subfloor and wood flooring should be checked by an appropriate

method. There should be no more than 4% (2% on planks 3" and wider) moisture content difference between properly acclimated wood flooring and subflooring materials, taking into consideration normal living conditions and equilibrium moisture content (EMC).

APPROVED SUBFLOOR TYPES:

- APA approved $\frac{3}{4}$ " or thicker exterior plywood.
- $\frac{3}{4}$ " (23/32") OSB on 16" center floor joists properly nailed.
- Concrete slab with additional approved wood sleepers and screed system. (See NWFA's guidelines)
- Wood Floors (if installed at proper angle only).
- Resilient tile and sheet vinyl if installed over an above mentioned and approved subfloor.

NOTE: Particle board is not an acceptable subfloor.

SUBFLOORS MUST BE:

- Clean – scraped or sanded, swept, free of wax, grease, paint, oil and other debris
- Smooth/Flat – within $\frac{1}{8}$ " in 6'. Sand high areas or joints, fill low areas
- Structurally Sound – nail or screw any loose areas that squeak. Replace any damaged subflooring or underlayment
- Dry – an 8 to 10% moisture content is ideal and must never exceed 13% prior to installation of wood flooring.

REMEMBER: All moisture testing must be before wood has been acclimated 72 hours and job site requirements met.

Wood Substrates: Test the moisture of the wood substrate using a calibrated moisture meter approved for testing wood moisture according to the meter manufacturer. The reading should not exceed 13%, or read more than a 4% difference than moisture content of products being installed. (maximum 2% for planks 3 $\frac{1}{4}$ " and wider)

Concrete Slabs (regardless of existing floor covering): Must have a minimum of $\frac{3}{4}$ " plywood installed as a screed/sleeper system with a minimum of 6mil polyfilm vapor barrier secured to the slab for solid hardwood to be nailed or stapled only. Engineered may be glued directly to the concrete.

All concrete subfloors must be tested for moisture content prior to installation of the hardwood flooring. The moisture content of the concrete subfloor must not exceed 3 lbs/1000 sq. ft emissions or contain a Relative Humidity of 75% or less, referring to ASTM F2170.

METHODS TO TEST IF MOISTURE IS PRESENT IN THE CONCRETE SUBFLOOR:

1. Use an approved calibrated concrete moisture meter as a preliminary measurement for moisture such as: Delmhorst Moisture Meter Model G Tramex Concrete Encounter. Follow manufacturer's specific calibration requirements. Generally, this type of testing will only give you an idea if moisture may be present. This does not imply a safe reading to install.

2. Perform a polyfilm test. Tape down 2' x 2' polyfilm squares (a clear garbage bag or plastic drop cloth will do) in several places on the floor. Wait 24 – 48 hours, and then check for the appearance of condensation on the inside of the bag or plastic for a darkening on the concrete subfloor. Either occurrence signals the likely presence of excess moisture, requiring a mandatory calcium chloride test or in-situ RH test ASTM C2170.

Once you have determined the moisture content, a test must be performed to determine the moisture and alkalinity emissions through the concrete slab.

- Perform a calcium chloride test according to the manufacturer's instructions. The maximum acceptable reading is 3-lbs. /24 hours/1000 sq. ft. for moisture emissions or RH in-situ probe test have a max of 75%.
- Perform a pH test according to the manufacturer's instructions. A pH reading of 6-9 on a pH number scale of 1 – 14 is acceptable.
- If the test results exceed this number the concrete slab should be sealed with appropriate sealers to correct those emissions as per the manufacturer's recommendations.

Installation on plywood and wood substrates: Do not install over particleboard. Subfloor should be constructed of 5/8" or thicker plywood when installing directly over minimum 2 x 10 floor joists 16" on center. Plywood sheets should be laid with grained outer plies at right angles to joists; adjacent rows staggered four feet and nailed every 6" along each joist with 7D or larger nails. When installing directly over old wood or strip floor, sand any high spots, re-nail old floor to eliminate squeaks or loose boards, and install new planks at right angle (perpendicular) to the old floor, or over lay old floor with 1/4" plywood underlayment. Leave a 1/8" gap at the edges and nail with 7D or larger nails every 6" at the edges and every 12" in both directions and through the interior of each sheet of plywood. The moisture content of the wood or plywood should not exceed 13%.

JOB SITE PREPARATION

- Acclimate product for 72 hours prior to installation
- Verify subfloor is level to within 1/8" in 6', and structurally sound. Repair as needed
- Undercut door casings
- Remove any existing wall base, shoe molding, quarter round, and doorway thresholds

INSTALLATION TOOLS

The following tools will be helpful, if not necessary for proper installation:

1. Moisture meter
2. Mallet
3. Table or circular saw

4. Circular Saw with a fine-toothed blade
5. Chalk-line
6. Tape measure
7. Hammer
8. Drill with 1/16" drill bit
9. Nailset
10. Jamsaw or handsaw
11. A good quality power nailer (in proper working condition, will greatly speed installation)

GENERAL GUIDELINES

GETTING STARTED

For optimal visual appeal, install parallel with the longest wall. However, to reduce subfloor sagging, the floor should be installed perpendicular to the flooring beams unless the subfloor has been reinforced. Installation should start from the straightest wall, usually an outside wall whenever possible. In at least two places, at least 18" from the corner, measure out equal distance from the starting wall and snap a chalk line. This measurement must be the sum of the width of the flooring plus an additional 3/4" to allow for expansion space and the width of the tongue. Allow 1/2" expansion when installing floating floors.

INSTALLATION – FIRST & SECOND ROWS:

For the first two rows, use boards that are among the longest and straightest. Use the widest plank for the first row for random and alternate width products. Align tongue of first row on chalk line. The groove should be facing the starting wall. Pre-drill 1/2" from back (groove) edge, 1" – 2" from each end, and at 6" intervals when possible. Fasten using 4 or 6d finishing nails or 1" pneumatic finish nails/brads. Countersink the nails.

Pre-drill and blind-nail at a 45° angle through the tongue of the first row every 1" – 2" from the ends and spaced in 8" to 10" intervals. To ensure flush engagement of groove with the following row(s), countersink the nails. Continue blind nailing using this method with following rows until stapler can be used. Alternatively use a pneumatic finish nailer and install nails/brads at the same intervals with a minimum length of 1 1/2"-2". To ensure the desired overall appearance, stagger end-joints of adjacent rows at a minimum of 4" to 6" when possible. Please see nailing patterns chart at end of document.

INSTALLING THE FLOOR:

Always use the recommended fastener for the specific product being installed. Use a minimum 1 1/2" fastener recommended by the stapler manufacturer 1" to 2" (2.5 – 5cm) from the ends spaced at 8" to 10" intervals.

Set compressor at 70 PSI. If tongue damage occurs, lower air pressure. Fasten several sacrificial boards to the floor. Check for surface damage, air pressure setting, tongue damage, edge blis-

tering, etc..., before proceeding. Make all adjustments and corrections before installation begins. Once proper adjustments have been made, remove and destroy the boards. Work from several cartons when installing the floor to vary the depth and color of the overall look. The last 1 to 2 rows will need to be face-on the tongue side, following the nailing pattern used for the first row.

GLUE-DOWN INSTALLATION

GETTING STARTED

The maximum adhesive working times for urethane adhesive is 60 minutes. When not in use, keep the adhesive container tightly closed to prevent thickening. Thickening will cause difficulty in spreading the adhesive. Open times and curing times of ALL adhesives vary dependent upon subfloor porosity, air movement, humidity and room temperature. Urethane adhesive has a shortened working time in high humidity environments, whereas the working time for polymeric resin adhesives will be lengthened. In areas of low humidity, open time will be longer with urethane adhesives and shorter with polymeric resin adhesives. Adjust the amount of adhesive spread on the subfloor accordingly. The adhesive should not be applied if subfloor or room temperature is below 60° F (16° C). Working time will vary depending on job site conditions.

Hold trowel at a minimum 45° angle firmly against the subfloor to obtain a 40 to 60 ft. per gallon spread rate. The trowel will leave ridges of adhesive and very little adhesive between the ridges. This will allow you to still see the chalk lines between the ridges and provide the recommended spread rate. For additional application instructions, follow the recommendations on the adhesive container. Proper ventilation within the room must be provided. An electric fan is helpful.

SPREAD THE ADHESIVE:

Spread sufficient amounts of the recommended adhesive with the recommended trowel in an area that can be covered in 60 minutes. If necessary, nail a sacrificial row with 1" nails on the dry side of your chalk line to help hold the first row in place.

NOTE: Avoid installing on the surface of the flooring. If necessary, distribute weight using a kneeler board.

INSTALLING THE FLOOR:

Use the longest, straightest boards available for the first two rows. For random and alternate width products, use the widest plank for the first row. The first row of planks should be installed with the edge of the groove lined up on the chalk line. The tongue should be facing the starting wall. The first row must be aligned and seated in the adhesive, as all additional rows will be pushed back to this original row. Remove tongue to allow for expansion space, if necessary, on the row adjoining the wall.

When installing products wider than 3-1/4", apply a bead of recommended wood glue to all of

the end grooves prior to installing adhesive. When installing pieces, engage the end-joint first, as close to the side (long) tongue and groove as possible, then slide together tightly to engage the side (long) joint tongue and groove. To avoid adhesive bleed-through and memory pull-back, avoid sliding pieces through the adhesive as much as possible when placing them in position.

During the installation occasionally remove a piece of flooring from the subfloor and inspect the back for proper adhesive transfer. Adequate adhesive transfer is necessary to ensure sufficient holding strength. If the adhesive skins over and fails to transfer, remove and spread new adhesive to achieve proper bonding.

NOTE: Clean adhesive from the surface of the floor frequently, using the recommended adhesive cleaner. Urethane adhesives become extremely difficult to remove when cured. Do not use tape before adhesive is removed from the surface. Use clean towels, changed frequently, to prevent hazed and adhesive residue.

Check for a tight fit between all edges and ends of each plank. End-joints of adjacent rows should be staggered 4" to 6" when possible, to ensure a more favorable overall appearance. To eliminate minor shifting or gapping of product during installation, use house wrap tape to hold the planks together. After installation is complete, remove all of the house wrap tape from the surface of the newly installed flooring. Do not let the tape remain on the flooring longer than 24 hours. Avoid the use of masking or duct tape, which leaves an adhesive residue and may damage the finish. If necessary, use weights to flatten boards with bows until adhesive cures, in order to prevent hollow spots. Boards that cannot be flattened should be cut in length to reduce the bow, or not used. Be sure not to spread adhesive too far ahead of your work area. Complete the installation using the same technique for the remainder of the floor. Avoid heavy foot traffic on the floor for at least 24 hours. Lift the furniture or fixtures back into place after 24 hours.

FLOATING FLOOR INSTALLATION

GETTING STARTED

Floating floors can be installed over any structurally sound surface that meets or exceeds local building codes. Any width of flooring can be installed in this manner but wider widths are preferred. Plan the floor layout (in width) to avoid having to rip the last row narrower than 1". This may require ripping the first row to assure the last row is at least the minimum width. Allow 1/2" expansion around all vertical obstructions.

INSTALLING THE UNDERLAYMENT

Acceptable Vapor Retarders Over Wood Subfloors:

- Always follow local codes and manufacturers instructions for acceptable vapor retarders.
- An acceptable vapor retarder is a vapor resistant material, membrane or covering with a vapor permeance (perm rating) of greater than or equal to .7 and less than or equal to 50 when tested

in accordance with ASTM E-96 Method A. Installation of a vapor retarder reduces the potential for moisture or vapor related problems, but does not guarantee elimination of moisture or vapor related problems. Install a vapor retarder over wood panel or board sub-floors prior to installing nail down solid strip or plank flooring. Over-lap seams a minimum of 4 inches or more as required by manufacturer or specifier and local building codes.

- Some examples of acceptable vapor retarders over wood subfloors include:
 1. An asphalt laminated paper meeting UU-B-790a, Grade B, Type I, Style 1a.
 2. Asphalt-saturated kraft paper or #15 or #30 felt paper meeting ASTM Standard D-4869 or UU-B-790, Grade D.

NOTE: A vapor retarder has some extra benefits in that it eliminates wood-on-wood contact, wood strips slide more easily when positioned, minimizes the impact of seasonal humidity change and may reduce dust and noise levels. However, by today's standards, asphalt saturated kraft or felt paper may not be an effective vapor retarder in all applications. The 2006 International Residential Code requires a vapor retarder on the warm-in-winter side of exterior floors (a floor over a vented crawl space, for example), with a vapor permeance of 1 perm or less in Zones 5 and higher.

Over a wood subfloor, do not use an impermeable vapor retarder material with a perm rating of .7 or less, such as 6 mil polyethylene film or other polymer materials, as it may trap moisture on or in the wood subfloor.

Do not use common red rosin or building paper which is not asphalt saturated. They are not vapor retarders as their perm rating is far greater than 50.

INSTALLING THE FLOOR (*Floating installations only - NOT click*)

Select the first board. All installations should begin with the groove side against the wall using the longest boards available. Apply a continuous 1/8" glue bead to the inside bottom of the groove on the end of the board. Do not apply glue to the groove side at this time. Products with the end tongue on the left should be installed right to left, opposite tongues should be left to right. If a sacrificial board was used DO NOT glue the first row to it. Complete the first row. Cut the last board allowing for 1/2" clearance between the wall and the floor. (Use the remaining end of the cut board as a starter board for any row following row three).

Install a wedge on the end of the board between the hardwood flooring and the wall, allowing 1/2" expansion space. Avoid installation of any boards shorter than 16" in the first four rows. Use a pull bar to pull the last board into place from the opposite end. Install wedges into the gap and tighten. If any glue gets on the surface of the flooring, wipe off immediately with a clean damp cloth. Cut or use a shorter board for the first board of the second row. Start the second row by applying 1/8" bead along the inside bottom of the end and side groove of the new board.

Install the first board of row two. Apply a bead of glue to the inside bottom of the end and side groove of the next board and install. When installing boards together, use a tapping block against the tongue, not the groove. Tap the boards into place by tapping with a hammer on the tapping block. DO

Forest Hill

INSTALLATION & MAINTENANCE

NOT tap on the edge directly with the hammer. Complete the second through fourth rows using this technique.

Insert wedges on the ends, as necessary, to restrain the movement of the floor. In the remaining rows, stagger joints 4" to 6" apart. Install the rest of the floor. Be sure all joints are tight. Use spacers on the long and butt walls. Use a tapping bar to tighten the joints from the ends.

NAIL DOWN INSTALLATION

Please refer to the National Wood Flooring Association (NWFA) for nail down installation instructions.

COMPLETING THE INSTALLATION (FOR ALL METHODS)

- Remove all tape and clean the floor with the recommended hardwood flooring cleaner
- Trim all underlayment (floating only) and install or re-install any transition pieces, reducer strips, Tmoldings, thresholds, bases and/or quarter round moldings that may be needed. These products are available pre-finished to blend with your flooring. Nail moldings into the wall, not the floor
- Inspect the floor, filling all minor gaps with the appropriate blended filler
- If the floor is to be covered, use a breathable material such as cardboard. Do not cover with plastic
- Leave warranty and floor care information with the owner. Advise them of the product name and code number of the flooring they've purchased
- To prevent surface damage, avoid rolling heavy furniture and appliances on the floor. Use plywood, hardboard or appliance lifts if necessary. Use protective castors/castor cups or felt pads on the legs of furniture to prevent damage to the flooring.

REQUIRED FASTENERS LISTED BY NWFA

WOOD FLOORING TYPE	FASTENER TO BE USED	FASTENER SPACING
Engineered wood flooring	Narrow crowned (under 3/8") 1" to 1 1/2", staples or 1" – 1 1/2" hardwood flooring cleats designed for engineered flooring.	Space fasteners at 3" – 4" intervals for staples, 4" – 6" for cleats, and within 1" 2" of end joints, or as recommended by the flooring manufacturer.

NOTE: It is normal to have occasional sounds walking over any floating floor since it is not nailed or glued. This does not diminish the warranty of the product and should be anticipated. Sounds may vary or go away during heating and cooling seasons throughout the year that relate to the home's relative humidity fluctuations.

CARE AND MAINTENANCE

Today's wood floors don't require the wax and buff treatment they used to. New technology in stains and finishes call for regular cleaning that takes little more than sweeping or vacuuming, with occasional use of a professional wood floor cleaning product. Over time, wood floors maintain their value and with little effort; preserve their timeless beauty and natural elegance for years to come.

COLOR VARIANCE:

Beautiful hardwood floors are a product of nature and will darken or lighten over a period of time due to exposure to sunlight. Some species darken deeper than others. This is a natural characteristic of wood and in most cases it will enhance the richness of the floor. Proper UV protection for large windows and doors is highly recommended for protection against over exposure to sunlight.

MAINTENANCE TIPS:

- Hardwood floors can last a lifetime and are easy to take care of. They will retain their distinctive beauty for years to come with simple and regular floor care maintenance.
- Sweep, dust mop, or vacuum weekly. If vacuuming, make sure vacuum head is a brush or felt, not a beater bar.
- Clean any spills promptly with a soft cloth.
- For more stubborn stains, apply a dime-sized drop of gentle cleaner to the area and rub with cloth. If more muscle is required, use a small amount of mineral spirits.
- Recommended cleaning products: Dry Swiffer or similar, Bona X Swedish Formula Hardwood Cleaner, or Basic Coating Squeaky Hardwood Floor Cleaner.
- Avoid oil soaps, liquid or paste wax, detergents, bleach, vinegar, abrasive soaps, and household cleaners containing lemon oil, tung oil, silicon, or ammonia. These may cause irreparable damage and void warranty.
- Never use a wet mop or douse floor with water or liquid cleaners. These can seep between the cracks and cause moisture damage. Wet mopping also voids warranty.
- Do not use hardwood floor cleaning machines.
- To avoid uneven UV aging and oxidation, rearrange rugs and furniture periodically.
- Minimize abrasive sand and dirt by placing mats on both sides of exterior doors. Area rugs in high-traffic areas are also a good idea. Note: Do not use rugs with rubber or vinyl backings – they trap moisture.
- Place protective pads beneath furniture legs and feet. Keep furniture casters clean.
- Keep pets' nails trimmed.
- Remove shoes with cleats, spikes, or exceptionally pointy heels.
- Take great care when moving furniture and heavy objects. Lay down a protective sheet of plywood.