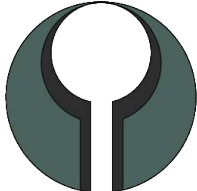


# Installation Instructions

Forest Accents

Solid Hardwood Flooring



*Forest Accents*<sup>®</sup>

## Attention

**Before starting installation, read all instructions in entirety. Installation instructions and maintenance procedures must be followed in entirety for warranties to be considered valid.** Forest Accents desires for you to have the best performing floor possible. For proper performance, it is your responsibility to handle and install this product in strict adherence to these installation instructions. Beautiful hardwood floors are a product of nature. This flooring is manufactured in accordance with accepted industry standards, which permit a defect tolerance not to exceed 5%. These defects may be manufacturing or natural. Hardwood flooring is a product with natural variations in color, tone, and grain. We cannot warrant against color variations within a floor or variations between samples and the installed floor. **INSTALLATION OF FOREST ACCENTS CONSTITUTES ACCEPTANCE OF THE FLOOR'S GRADE, COLOR, MILLING, SHEEN, AND FINISH.**

Important Note: If you are installing Nantucket Graphite or Piedmont Linen, it is most important that you properly mix the boards as the floor is being racked out. These floors can vary quite a bit in color range from light to dark and you will create a more pleasing visual look when they are properly mixed. Also, we do not recommend mixing 2 1/4" and 3 1/4" boards of the Nantucket Graphite and Piedmont Linen in the same area as there can be noticeable shade differences between the two face widths.

## Pre-Inspection, Handling, and Acclimation

- We **require** the homeowner and installer to inspect the flooring in well-lighted conditions prior to installation to ensure the flooring is satisfactory. If there is a concern with the flooring, the decision not to proceed with the installation must be made within the first 10% of the total square footage or 100 square feet of flooring boxes opened, whichever is less. Boxes of flooring that are opened in excess of the 10% of total square footage or 100 square feet, (whichever is less) are not eligible for return including boxes left over from a completed job. Flooring that has been installed will be deemed to have been inspected and accepted by the owner and installer. Forest Accents will not be responsible for flooring that has been installed with visible defects.
- Pre-inspect the job site prior to delivery of the Forest Accents. It is the responsibility of the owner and installer to ensure that the building is suitable for the installation of solid hardwood flooring.
- A wood flooring professional should have a general understanding of the geographic climate zone for the building that is receiving the wood floor and can thus make a decision as to whether the interior conditions of the structure will allow for wood flooring to be installed and the best means of installation.
- Evaluate the exterior of the building to ensure that the jobsite is ready to receive wood flooring. Grade level of the structure as well as site drainage should be documented. Also, the installer should identify any areas within the structure that wood flooring is being installed that are adjacent to unconditioned (no heat/no A/C) spaces. Any concerns should be addressed with the homeowner and/or builder prior to beginning installation. Forest Accents solid wood flooring can only be installed on or above grade. Forest Accents is not responsible for flooring failure due to poor or unsatisfactory jobsite conditions.
- Be mindful that foundation issues become flooring issues. Cracks in foundations can be a sign of moisture intrusion or structural damage that needs to be repaired by a qualified contractor prior to the installation of wood flooring.
- The conditions in the space in which the wood flooring is being installed will directly impact the performance of the wood flooring. Wood flooring should **never** be stored, nor packages opened, on a jobsite where there is no climate control (no heat/no A/C).
- Wood flooring should be one of the last jobs completed in any new construction or remodel project.
- Flooring should not be delivered until the structure has been fully closed in with windows, doors, siding, soffits, roof coverings, insulation, and ventilation in place. The structure must be fully enclosed and protected from outside weather conditions. All wet work including cement, masonry, plastering, drywall,

painting, and all other “wet” work must be completed and dry. This includes any wall coverings, including painting except for the final coat of paint on base molding. Concrete work must be at least 60 days old.

- Never unload or transport flooring in rain, snow, or excessive moisture conditions.
- The structure must have permanent mechanical (heating, cooling, dehumidification, and humidification) systems in place and operational. These systems must be operating a minimum of 14 days prior to the delivery of the wood flooring. In the dry (heating) season, a humidifier is recommended to prevent excessive shrinkage in wood floors due to low humidity levels. Use of wood stoves and electric heat can create very dry conditions. In the non-heating (humid/wet) season, proper humidity levels can be maintained by use of air conditioning systems and dehumidifiers. Avoid excessive exposure to water from foot traffic during periods of inclement weather.
- The installer should test and document the temperature and relative humidity in each room that the wood flooring will be installed.
- Climate control at the job site must be maintained with the temperature between 60-75 degrees Fahrenheit and relative humidity within 30-50% **before, during, and after installation**. These conditions should be maintained at least 14 days prior to installation. Following installation, these conditions should be maintained **at all times** to ensure proper performance of the floor.
- The space below the flooring system should be free of any standing water or high humidity levels or any evidence of such.
- Prior to the delivery of the flooring, the installer should take readings of the jobsite temperature and humidity levels as well as a reading of the moisture content of the subfloor to ensure compliance to requirements for wood flooring. These readings should be documented.
- Upon delivery of the wood flooring, the installer should check the temperature, humidity levels, and moisture content of the subfloor. The readings should be documented.
- Upon delivery, multiple boards of flooring from several different bundles or boxes should be checked for their moisture content (MC) using a moisture meter. Check with the moisture meter manufacturer for the correct setting for the wood species being tested. These readings need to be documented. MC readings of the wood flooring need to be taken on a minimum of 40 boards for up to the first 1,000 square feet, and an additional 4 readings per 100 square feet thereafter. Document the results in writing and with pictures. Do the math to get an average reading. More readings will result in a more accurate average reading.

If a pin-type moisture meter is used, take the readings from the back of the boards so as not to damage the face of the flooring. Any boards that register with an unusually high or low moisture content should not be installed.

- To ensure optimal acclimation, Forest Accents recommends cross stacking planks in the building in which the flooring will be installed. Stack on a pallet at least 4” off the ground. This will allow for proper air flow.
- Upon delivery, calibrate the moisture meter to take subfloor readings. Again, consult the manufacturer of the moisture meter to determine the correct setting. Once your moisture meter is calibrated, take MC readings in a minimum of 20 test locations for up to the first 1,000 square feet, and an additional 4 readings per 100 square feet thereafter. Document the results in writing and with pictures. You should test the subfloor MC in areas that represent the entire scope of the project and should include a minimum of 3 tests per room receiving the wood flooring. Again, do the math and get an average of the readings. More readings will result in a more accurate average. The average of the wood subfloor readings must be no more than 4% greater than the MC of solid strip flooring, and no more than 2% greater than the MC of solid plank flooring. Strip flooring is defined as flooring that is less than 3” wide. Solid plank flooring is defined as flooring that has a face width equal to or greater than 3” in width. Any unusually high or low subfloor moisture reading should be dealt with prior to the installation of any wood flooring.
- Once the wood flooring is delivered and the MC is compliant with the expected normal living conditions and the required temperature and relative humidity levels have been maintained for a minimum of 14 days, the flooring may be installed.
- Forest Accents solid wood flooring **cannot** be installed over a radiant heat system.

## Basements and Crawlspace

- Basements and crawlspaces must be dry, weather tight, and well-ventilated prior to installation of wood flooring.
- The environmental conditions of basements will change from season to season which may affect the wood flooring that is installed above. Be careful to make sure to evaluate the environment of the basements prior to installation and at several times during the year to ensure the basement is dry and maintained at the proper humidity and temperature levels.
- Relative humidity of basement should not vary more than 10% higher than the relative humidity of the upper floors.
- Changing a basement space from unfinished, meaning no climate control, to a finished space, meaning insulated walls and a climate-controlled space, could affect an already installed wood floor.
- In a crawlspace, the distance from the earth to the underside of the floor joist must be 18" and a minimum of 12" from the earth to the underside of the beams.
- The piers should be set on the footings evenly.
- The International Residential Code (IRC), section R408, gives standard requirements for ventilation in crawlspaces. As per the IRC, the underfloor space between the bottom of the floor joists and the earth under any building (except space occupied by a basement) shall have ventilation openings through foundation walls or exterior walls. The minimum net area of ventilation openings shall not be less than 1 square foot for each 150 square feet of under floor space area unless the ground surface is covered by a Class 1 vapor retarder material. When a Class I vapor retarded material is used, the minimum net area of ventilation openings, shall not be less than 1 square foot for each 1500 square feet of under floor space area. One such ventilation opening shall be within 3 feet of each corner of the building.
- Crawlspaces are considered enclosed and conditioned spaces when they meet all the requirements of IRC R408.3, and the entire space is conditioned and maintained at the same temperature and humidity levels as the above interior living space. IRC R408.3, does not require ventilation openings in crawlspaces where the following conditions are met:
  1. A ground cover of 6-8 mil black polyethylene film to serve as a vapor retarded is present. The vapor retarder should overlap by 6" and be taped to create a seal. The edges of the vapor retarder should extend not less than 6" up the stem wall and should be attached and sealed to the stem wall or the insulation; and
  2. One of the following is provided for the crawlspace:
    - a. Continuously operated mechanical exhaust ventilation at a rate equal to 1 cubic foot per minute for each 50 square feet of crawlspace floor area, including an air pathway to the common area, and perimeter walls insulated per IRC Section N1102.2.22, or
    - b. Conditioned air supply that will deliver at a rate of 1 cubic foot per minute for each 50 square feet of crawlspace floor area, including an air pathway to the common area, and perimeter walls insulated per IRC Section N1102.2.22, or
    - c. Plenum, which is a chamber that forms part of an air-circulation system other than the occupied space being conditioned, in existing structures in compliance with IRC Section M1601.5, if the crawlspace is used as a plenum, or
    - d. Dehumidification system that delivers 70 pints of moisture removal per day for every 1,000 square feet.
- Vapor retarder installed on the underside of the joists. For hot and humid climates, see the IRC Section 408.8. In IRC Section 408.8, there is a standard requirement for installation of a continuous Class I or Class II vapor retarded to be installed on the exposed face of insulation installed between the floor joists and exposed to the grade in the under floor space. There are some exemptions. See IRC code for more specific detail.
- Building codes in specific climate regions dictate crawlspace construction methods and best practices related to installation of insulation and moisture control systems. Be sure your crawlspace complies with current building codes prior to the installation of Forest Accents.

- **Never install Forest Accents solid wood flooring over a known moisture issue.**
- **Forest Accents solid wood flooring can only be installed on or above grade.**

## Wood Subfloors and Wood Structural Panel Subfloors

- Plywood subfloors should meet or exceed the most up-to-date U.S. Voluntary product standard of PS 1 performance for Construction and Industrial Plywood. It should also meet the requirements of the International Residential Code (IRC) and the International Building Code (IBC) at the time it was manufactured. The subfloor system must meet or exceed all applicable standards of the construction and materials industry. The final wood floor installation is only as good as the subfloor it is installed over.
- Oriented strand board (OSB) subfloor panels should meet the U.S. Voluntary PS 2 performance standard as well as the IRC and IBC codes. The OSB board must be installed sealed side down.
- When possible check the back of the subfloor panel for identifying information about the panel. The underside of the installed panel should contain a stamp from an accredited testing agency indicating that it complies with the PS1 or PS2 standard at the time it was manufactured.
- It is the responsibility of the flooring installer to make sure the subfloor is in acceptable condition before beginning the installation of the hardwood flooring. If there is undesirable noise, movement, loose fasteners, delamination, water damage, or other types of damage within the subfloor system, or the subfloor does not meet building code standards, then the wood flooring should not be installed until all the issues are addressed appropriately.
- The subfloor must be clean, flat, structurally sound, and dry.
- The subfloor must be free of wax, paint, oil, and/or debris.
- Subfloor flatness can be assessed by using a laser-level, a string line, or a straight edge and taking measurements across the plane of the line to determine flatness.
- Where one room meets another, the flatness of the subfloor should be within standard building code tolerances. Where adjoining rooms are not within tolerance, or are on a separate plane, or adjoining a ramp, a custom transition will be required.
- The subfloor should be flat to within minimum tolerance of 1/8" in 6', or 3/16" in 10'. Sand the high areas or joints. Low spots can be flattened using shims or layers of builder's felt between the wood and the subfloor during installation.
- Ensure the subfloor is structurally sound by nailing or screwing down any loose areas that squeak. Replace any water damaged, swollen, or delaminated subflooring or underlayment, as they are not properly suited to hold fasteners. Subfloors with excessive vertical movement should be avoided unless they have been properly stiffened prior to the installation of the wood flooring. Optimum performance of the wood flooring occurs when there is no horizontal or vertical movement of the subfloor.
- Check moisture content of subfloor. Take MC readings in a minimum of 20 test locations for up to the first 1,000 square feet, and an additional 4 readings per 100 square feet thereafter. You should test the subfloor MC in areas that represent the entire scope of the project and should include a minimum of 3 tests per room receiving the wood flooring. Again, do the math and get an average of the readings. More readings will result in a more accurate average. The average of the wood subfloor readings must be no more than 4% greater than the MC of solid strip flooring, and no more than 2% greater than the MC of solid plank flooring. Strip flooring is defined as flooring that is less than 3" wide. Solid plank flooring is defined as flooring that has a face width equal to or greater than 3" in width. Any unusually high or low subfloor moisture reading should be dealt with prior to the installation of any wood flooring.
- In hot and humid climates, and during the humid season, the subflooring should not exceed 12% moisture content (MC).
- Preferred subfloor surfaces are 3/4" CDX grade plywood and 3/4" OSB PS2 rated underlayment. These preferred subfloor recommendations allow for 19.2" O/C joist spacing if the joist manufacturer's recommended span is not exceeded. Joist spacing that exceeds 19.2" O/C may not offer optimum results.

- Minimum recommended subfloor surfaces: 5/8" CDX plywood, existing solid wood flooring, screeds, and T&G wood subflooring. These minimum recommendations allow for 16" O/C joist spacing.
- Installation of the hardwood flooring should be perpendicular to the floor joists when possible. Installations should not be made parallel to the floor joists or on joist spacing that exceeds 19.2" O/C unless the subfloor has been properly stiffened. Stiffening may require that the addition of a second layer of subflooring material to bring the overall thickness to 1-1/8". When installing over existing wood floors parallel with the flooring, it may be necessary to install an additional 1/4" layer of plywood to stabilize the flooring or install the wood floor at right angles. If additional layer of plywood is installed, the base layer seams should not align with the top layer seams.

## Wood Subfloor Systems over Concrete

- The concrete must be of high compressive strength and must meet all moisture requirements.
  - All moisture tests should be performed as dictated by the ASTM standard.
  - Test for moisture content in several areas and document readings. Be sure to test near exterior walls and walls containing plumbing.
  - The concrete slab should be flat to within 1/8" in 6' or 3/16" in 10' prior to the installation of the wood subfloor.
  - The wood subfloor panels used in the below installation methods should be suitable for use as subflooring material as described in the section on *Wood Subfloors and Wood Structural Panel Subfloors*.
1. Floated Subfloor
    - a. A Class I impermeable vapor retarder is required to be installed over the concrete slab when calcium chloride readings are greater than 3 pounds, relative humidity readings are greater than 80%, or calcium carbide readings are greater than 2.5%. In on or below grade applications, a Class I impermeable vapor retarder is always required.
  2. Double Layer Subfloor
    - a. Installing a new wood floor parallel to an existing solid nail-down floor will require a double layer subfloor system.
    - b. For a double layer subfloor, the wood panels should be plywood or OSB, manufactured to PS1 or PS2 standard. A minimum of 11/32" (9.5mm) subfloor panels in 4'x8' sheets should be used. Both layers should be acclimated to the conditions in which they are going to be installed.
    - c. The first subfloor panel layer should be laid with edges parallel to the wall without fastening. The second layer should be laid on a diagonal or offset by a minimum of 4" in each direction to the base. The base layer seams should not align with the top layer seams.
    - d. Both layers should be laid with 1/16" to 1/8" gaps between the adjoining panels on all four sides with a 3/4" minimum expansion space at all vertical obstructions.
    - e. Fasten the second layer at a minimum of 12" O/C along all edges and 12" O/C throughout the field. Use only screw- or ring-shanked nails. An elastomeric adhesive application can be used to assist in joining the panels together.
  3. Single Layer Subfloor
    - a. For a single layer subfloor, use subfloor panels that are a minimum 23/32" (19mm) cut into 16" or 8" or smaller panels. Kerf the subfloor panels on the back 3/8" deep every 12" across the width of the panels.
    - b. The panels 16" side should be placed perpendicular to, or diagonally to the direction of the wood flooring installation. Panels should be staggered every 2' and spaced 1/8" on all four sides of adjoining panels with a 3/4" minimum expansion space at all vertical obstructions.
  4. Glue Down Subfloor
    - a. For a glue down subfloor, a Class I impermeable vapor retarder is required to be installed over the concrete slab when calcium chloride readings are greater than 3 pounds, relative humidity readings are greater than 80%, or calcium carbide readings are greater than

2.5%. In on or below grade applications, a Class I impermeable vapor retarder is always required. Use minimum 23/32" (18.3mm) subfloor panels, cut into 2'x8' or 4'x4' pieces

- b. Kerf the subfloor panels 3/8" deep on the back of the panel on a 12"x 12" grid. For 2'x8' panels, the 8' side should be perpendicular to, or diagonal to the direction of the flooring installation. Panels should be staggered every 2" in the adhesive and spaced 1/8" on all four sides of the adjoining panels with 3/4" minimum expansion space at all vertical obstructions.

5. Mechanically Anchored Subfloor

- a. A Class I impermeable vapor retarder is required below the wood subfloor.
- b. Use minimum 23/32" (18.3mm) subfloor panels in full 4'x 8' sheets or cut 2'x8' or 4'x4' pieces.
- c. The long side of the panel should be perpendicular to, or diagonal to, the direction of the flooring installation
- d. Panels should be installed in a staggered joint pattern with 1/8" spacing between sheets and 3/4" minimum expansion space at walls and all vertical obstructions.
- e. The panels should be mechanically anchored using pneumatic driven nails, screws, or other fasteners suitable for concrete applications. Consult with fastener manufacturer for specifications.

Note: Great consideration should be given to the overall thickness when nailing down a wood floor. The length of the flooring fastener should not penetrate through the subfloor system and the vapor retarder membrane below.

## Moisture Testing of Concrete Subfloors

- Forest Accents solid wood flooring can be installed over concrete (on or above grade) once the appropriate nailing surface has been installed. See section on *Wood Subfloors and Wood Structural Panel Subfloors*.
- Wood flooring is not congruent with wet conditions. Forest Accents will not warrant our solid flooring against moisture related issues or damages to the flooring arising from moisture related issues. Therefore, it is very important that you test for moisture prior to the installation of Forest Accents solid hardwood flooring.
- Concrete moisture tests indicate the condition of the concrete slab at the time the test is taken under the specific ambient conditions at the time of the test. These moisture tests are not a predictor of future moisture content of the slab and cannot specify a permanent condition of the slab. This is increasingly true if an effective moisture vapor barrier is not present or has been compromised. All concrete slabs will experience moisture changes over time.
- Concrete subfloors must be moisture tested and appropriate moisture control systems should be in place prior to the installation of any wood floor. A moisture barrier of a 6-8 mil poly film should be installed between the ground and the concrete.
- All testing of concrete slabs should be performed as dictated by the American Standard Test Method (ASTM) concrete standards. Common ASTM tests are:
  1. ASTM 1869 Calcium Chloride
    - a. The Calcium Chloride test measures the moisture vapor emission rate (MVER) of a concrete subfloor using anhydrous calcium chloride. The results of this test do give quantifiable results.
    - b. Results are shown as pounds of water over a period of 24 hours, per 1,000 square feet.
    - c. Ambient conditions must be 65°-85° Fahrenheit and 40% - 60% relative humidity for a minimum of 48 hours prior to the test.
    - d. Each area tested must be at least 20" x 20", clean, and free of any debris.
    - e. If the MVER reading is greater than 3 pounds per 1,000 square feet per 24 hours, it is highly recommended to wait for further drying of the slab. If unacceptable moisture levels are discovered, the use of moisture vapor barrier is required.
    - f. Be careful to follow the instructions in the test kit to make sure you get accurate results.
  2. ASTM 2170 Relative Humidity

- a. Relative humidity moisture testing is the standard test for determining relative humidity in concrete slabs using in-situ probes. The results of this test do give quantifiable results.
- b. This method of testing predicts what the equalized relative humidity will be through the entire thickness of the slab once the flooring material is installed.
- c. Normal living conditions should be maintained for 48 hours prior to testing.
- d. Probes that have not been used for 30 days should be recalibrated prior to using.
- e. Tests should be placed within 3 feet of each exterior wall.
- f. Concrete slabs with a RH reading of more than 80% are highly recommended to wait for further drying of the slab. If unacceptable moisture levels are discovered, the use of moisture vapor barrier is required.
- g. Be sure to follow all the test manufacturer's guidelines in performing the test to ensure accurate results.

## Screeds/Sleepers

- Only Forest Accents 3/4" solid wood flooring material can be installed over screeds/sleepers.
- Screed/sleeper material must be kiln dried. If using pressure-treated material, only use material that has been kiln dried after treatment.
- Screed/sleeper material must be flat. You can check for flatness with an 8'-10' straight edge. All screeds should come into full contact with the straight edge.
- If material is not flat, sand the high spots to achieve flatness tolerance where all screeds come into full contact with the straight edge. Shim the low areas of the screeds or replace the low screeds. If shimming the low areas, be sure the material used is acceptable and allows for fastener penetration and hold.
- Screed/sleeper material should be acclimated to the expected interior use conditions with regards to temperature and relative humidity of the areas where the wood flooring is being installed.
- The substrate on which the screeds/sleepers are being installed over should be moisture tested.
- A proper vapor retarder must be installed over the substrate and below the screeds/sleepers.
- The channels between the screeds/sleepers should be filled with concrete, a lightweight concrete mix, or a gypsum-based topping compound. This will introduce moisture to the screeds/sleepers. Dry times of subfloor toppings vary and may add significant time to the process. A minimum of 20 areas per 1,000 square feet of subflooring should be moisture tested using a moisture meter set to the appropriate species. Test areas that will represent the entire project and be sure to include a minimum of 3 tests per room. Take readings at multiple depths to ensure readings are inclusive. The MC of any screed/sleeper material should be no more than 2% MC difference from plank flooring (flooring greater than or equal to 3" in width) and no more than 4% difference in strip flooring (less than 3" in width). Be sure to document all moisture readings. Elevated readings should be addressed prior to the installation of any wood flooring.
- Screeds/sleepers must be placed 8" O/C for nail-down installation method to be used as long as fastener scheduling requirements are strictly adhered to. If the situation arises where screeds/sleepers are laid on end and the screeds/sleepers are spaced greater the 8" O/C and space between screeds/sleepers is being filled with a concrete mix, concrete, or a gypsum-based material, the nail-assisted glue down method is required.
- The screeds/sleepers laid on end should be laid out no more than 8" O/C to allow for 3/4" installation fastening schedule. When embedded screeds/sleepers are placed wider than 8", the wood floor installation must be installed in nail-assisted glue down, or with a wood panel subfloor system installed over the screeds/sleepers.
- Screeds/sleepers should be adhered to the subfloor perpendicular to the direction of the flooring and parallel to one another.
- For screeds/sleepers laid flat, bond the material to the concrete subfloor using an elastic wood floor adhesive or hot tar that is specifically designed for wood flooring applications.



- For screeds/sleeper laid flat, bond the screeds/sleepers to the concrete subfloor using an elastic wood floor adhesive or hot tar that is specifically designed for wood flooring applications. For 3/4" thick flooring up to 3-1/4" wide, screeds/sleepers should be placed 3-1/2" apart to allow for approximately 50% of the subfloor to be covered. For 3/4" thick flooring between 3 -1/4" and 5" wide, screeds/sleepers should be placed 1" apart to allow for 90% of subfloor to be covered. Flooring that is wider than 5" should **not** be installed over screeds/sleepers laid flat.
- Only use flooring boards where the length of the board spans two or more screeds/sleepers.

## Installation over Existing Wood Floors

- The existing wood floor should be flat to within 1/8" in 6' and 3/16" in 10'. Sand any high spots in the existing floor. Check existing flooring to make sure it is properly adhered to the current subfloor.
- The existing wood floor and the new wood floor should be within 2% MC for plank flooring (flooring greater than or equal to 3" in width) and within 4% difference in strip flooring (less than 3" in width). Check the moisture content with a wood moisture meter set on the appropriate species setting.
- A new nail-down 3/4" solid Forest Accents wood floor should always be installed perpendicular to or on a diagonal to the existing floor. Installing a new wood floor parallel to an existing solid nail-down floor will require a double layer subfloor system using an overlay of a minimum of 11/32" (9.5mm) subfloor panels over the existing wood floor.
- If the existing wood floor was installed directly to the joists/trusses, install new wood flooring perpendicular or on a diagonal to the direction of the existing floor, or install an overlay of a minimum of 11/32" (9.5mm) subfloor panels over the existing wood floor.
- Do **not** install a new wood floor over an existing floating wood floor.

## Controlling Moisture

- When installing wood flooring over a space that is conditioned, meaning the space below the flooring is climate controlled and maintained at the same temperature and humidity levels as the interior living space, a vapor retarder is not necessary over the wood subfloor.
- A vapor retarder should not be installed over the wood subfloor and under the wood floor where a Class I or Class II vapor retarder has been installed on the underside of the floor joists unless deemed necessary.
- A Class II vapor retarder can be installed over the wood subfloor over unconditioned spaces if deemed necessary.
- Do **not** install Forest Accents over a known moisture issue.
- Check moisture content of subfloor. Take MC readings in a minimum of 20 test locations for up to the first 1,000 square feet, and an additional 4 readings per 100 square feet thereafter. You should test the subfloor MC in areas that represent the entire scope of the project and should include a minimum of 3 tests per room receiving the wood flooring. Again, do the math and get an average of the readings. More readings will result in a more accurate average. The average of the wood subfloor readings must be no more than 4% greater than the MC of solid strip flooring, and no more than 2% greater than the MC of solid plank flooring. Strip flooring is defined as flooring that is less than 3" wide. Solid plank flooring is defined as flooring that has a face width equal to or greater than 3" in width. Any unusually high or low subfloor moisture reading should be dealt with prior to the installation of any wood flooring.
- In hot and humid climates, and during the humid season, the subflooring should not exceed 12% moisture content (MC).
- Concrete slabs should have a Class I vapor barrier installed directly beneath them. Moisture testing of the concrete slab should be done using ASTM standards prior to the installation of any wood flooring.
- A Class I impermeable vapor retarder is required to be installed over the concrete slab when calcium chloride readings are greater than 3 pounds, relative humidity readings are greater than 80%, or calcium carbide readings are greater than 2.5%. In on or below grade applications, a Class I

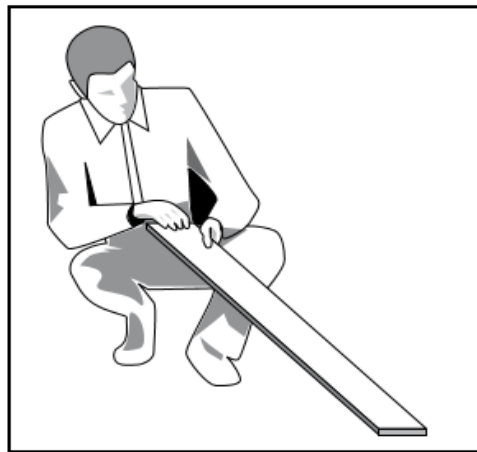
impermeable vapor retarder is always required.

## Fasteners and Fastener Schedule

- Forest Accents solid hardwood flooring can be installed using cleats or staples that are specifically designed for the installation of hardwood flooring.
- Wood flooring cleats are available in 16, 18, and 20 gauge; ranging in length from 1"-2".
- Wood flooring staples are available in 15.5 gauge, and 16 to 20 gauge; and in lengths ranging from 1 ¼" – 2".
- It is important to use a flooring nail or staple gun specifically designed for the type of wood flooring being installed. The flooring gun should drive the fastener through the top of the tongue, into the nail pocket, along the length of the board, with the crown or the head of the fastener seated flush.
- Forest Accents solid T&G Flooring that is ¾" thick and less than 3" in width requires a 15.5gauge staple or 16g to 18gauge cleat, not less than 1-1/2" in length spaced at 8"-10" intervals along the length of each board and 4"-6" from the ends of each board with a minimum of 2 fasteners per board.
- Forest Accents solid T&G Flooring that is ¾" thick and equal to or greater than 3" in width requires a 15.5gauge staple or 16g to 18gauge cleat, not less than 1-1/2" in length spaced at 6"-8" intervals along the length of each board and 4"-6" from the ends of each board with a minimum of 2 fasteners per board.
- Forest Accents solid T&G flooring that is wider than 5" requires the addition of the glue-assist nail down method. See specific about glue assist method under Step 2 of *Nail Down Installation*.
- Improper use of nails and staples can cause much damage to a floor. Staples and cleats not properly fastened to the floor can cause a floor to squeak, pop, or crackle.

## General Installation Guidelines

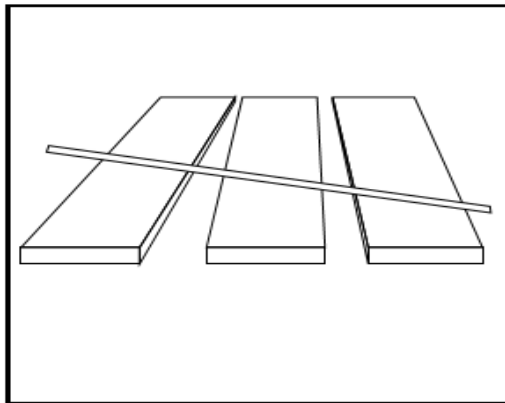
1. **Inspection of boards...** Visually inspect all boards for any defects prior to installation. Verify that the homeowner has seen the product and approves of the installation. Installation of Forest Accents constitutes acceptance of the floor's grade, color, milling, sheen, and finish.



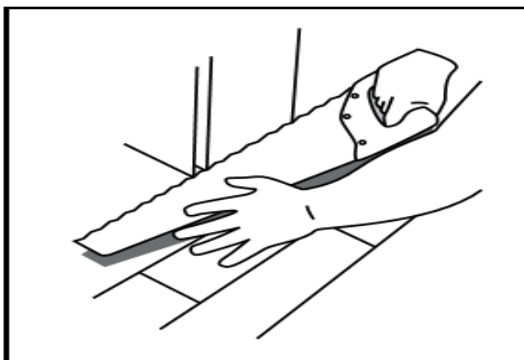
2. **Install flooring last...** Hardwood floors should be the last trade in the house and installed just before the baseboards. All wet work including cement, masonry, plastering, drywall, painting, and all other "wet" work must be completed and dry. This includes any wall coverings, and painting except for the final coat of paint on base molding. Concrete work must be at least 60 days old. Covering a floor while other trades are in the house can lead to moisture issues, scratches, dents, and other damage. Coverings that are

held in place by tape for more than 24 hours can result in damage to the floor's finish. Never tape directly to the floor.

3. **Cabinets and built in appliances...** Cabinets and built in appliances should be installed prior to the installation of Forest Accents.
4. **Molding Selection...** Before you start to install the floor, open multiple boxes of the flooring and examine the boards to see how they blend with the moldings. Set aside those boards that blend best with the moldings so you can use them when needed.



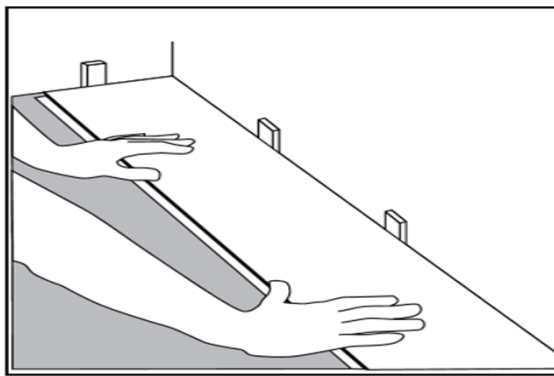
5. **Undercut door casings and moldings...** Undercut door casings and remove any existing base molding, shoe molding, or doorway thresholds. All door casings should be notched out or undercut to avoid difficult scribe cuts. Use scrap piece of flooring to establish height of cut. Remember to account for height of underlayment.



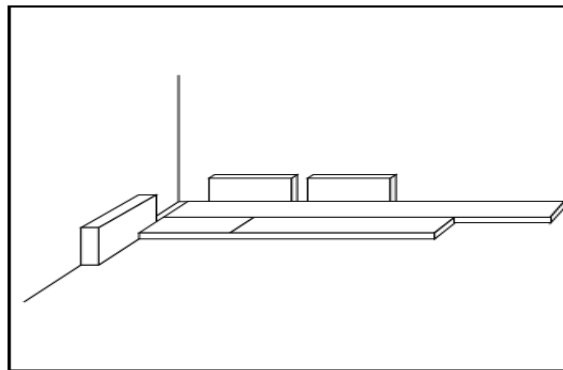
6. **Choose an Underlayment ...** Aquabar "B", HWD 15, 15lb., or 30lb. roofing felt are acceptable underlayments. The underlayment should be installed on top of the subfloor before beginning installation of the wood flooring. Lap the joints 6" and staple in place.



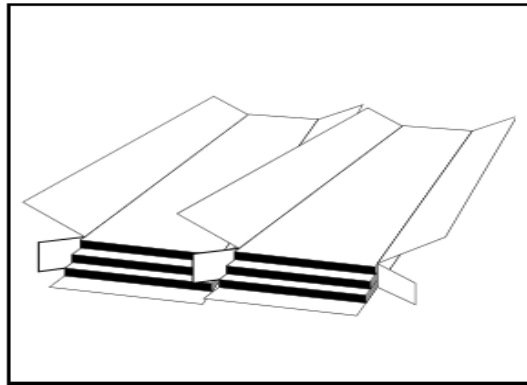
7. **Choose a starting point...** Take into consideration the most important aesthetic or architectural elements in the room. The starting wall is usually the longest continuous exterior wall in the room. Check to make sure that the wall is straight and square. The flooring should be installed perpendicular to the flooring joists unless the subfloor has been stiffened.



8. **Expansion Space...** Maintain proper expansion space at all side and end walls, and at all vertical obstructions. The expansion space is generally equal to the thickness of the flooring. Maintain 3/4" expansion space for Forest Accents 3/4" solid hardwood flooring. The use of spacers may be helpful in maintaining a straight working line.



9. **Laying out the floor...** Be sure to work from multiple boxes simultaneously as you install the flooring to ensure variation and good blending of the boards throughout the entire installation. *Forest Accents warranty does **not** cover materials with visible defects once they are installed. Installation is acceptance of product aesthetic quality.*



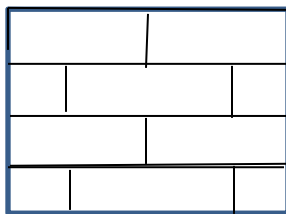
## Nail Down Installation

After careful completion of the pre-inspection procedures, acclimation, and appropriate subfloor preparation, installation of your Forest Accents can begin. Remember that **INSTALLATION OF FOREST ACCENTS CONSTITUTES ACCEPTANCE OF THE FLOOR'S GRADE, COLOR, MILLING, SHEEN, AND FINISH.**

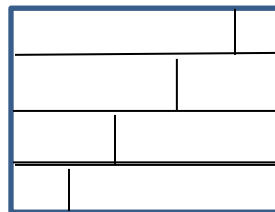
Random noises are inherent within a floor that is nailed or stapled down and will change as changes in the environment occur. These noises are **not** a defect and are not covered under the Forest Accents warranties. Subfloor soundness, subfloor cleanliness, proper nailing schedule, and proper calibration of flooring nailer/stapler will all contribute to reducing noises within a nailed or stapled wood floor.

- **Step 1 – Installation of underlayment** ...The underlayment should be installed on top of the subfloor before beginning installation of the wood flooring. Lap the joints 6” and staple in place. If using the glue-assisted nail down method, no underlayment should be used. See Step 2.
- **Step 2 – Glue-Assisted Nail Down...** Forest Accents **requires** using the glue-assisted nail down method for wood flooring that is greater than 5” in width.
  1. A traditional sheet good vapor barrier cannot be used when using the glue-assisted nail down method. Forest Accents highly recommends the use of a liquid-applied vapor barrier that is compatible with the flooring adhesive to allow for a glue-assist installation directly to the subfloor. The living space where the wood floor is being installed must be conditioned and maintained as the interior living space. **Never** install a wood floor over a known moisture issue.
  2. When mechanical fasteners are the primary fasteners used on a nail-down installation, the nailing schedule remains the same as normal. The addition of the adhesive via the glue-assist method is not intended to be a replacement for the mechanical fasteners but instead is to be viewed as a supplement to the mechanical fastener.
  3. If adhesive is applied using a full spread application, then the mechanical fastener schedule is not to be deemed as the primary fastening method.
  4. Only use a wood flooring adhesive that is elastomeric that will allow for normal movement within the floor system. The adhesive must be compatible with the subflooring and the liquid vapor barrier.

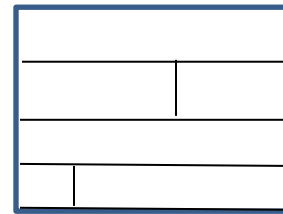
5. The wood subfloor must be thoroughly cleaned by vacuuming. The subfloor must be entirely free of any debris. A clean subfloor ensures proper adhesion. Test the application of the adhesive to determine the most effective application. The application of the adhesive should supplement the fastening system. The adhesive may be applied to the subfloor or to the back of the board. Use a notch trowel to apply the adhesive directly to the subfloor. For application to the back of the flooring board, use a glue gun and apply a minimum 1/4" bead of adhesive. Make sure you cover the entire width and length of the board up to a minimum of 1" from each edge and each end of each board.
  6. When using a trigger activated floor nail gun with the glue-assist method, the installer must either stand on the floor or apply a downward pressure to the surface of each board as it is being nailed. This will ensure that there is no unwanted movement or hollow noise.
- **Step 3 – Laying out the floor....** Dry lay materials to cover approximately 2/3 of the entire room. Be sure to work from multiple boxes to ensure variation and good blending of wood flooring. Avoid laying out in "H" patterns or any discernible pattern. See figure below.



Incorrect



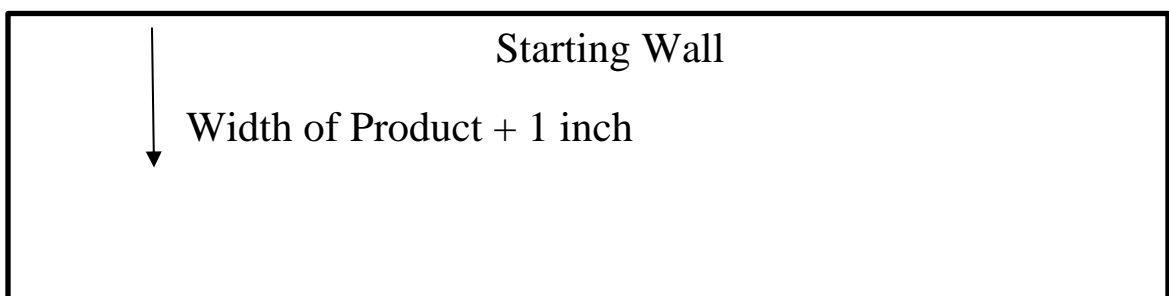
Incorrect



Correct

Cutting starter boards from full length boards will help you to randomize joints in products where the lengths are equal or limited. Begin dry laying 6" from the edge of the previously installed row. Be sure to stagger the end joints of adjacent boards, A general rule is to stagger the end joints row-to-row at a minimum of twice the width of the flooring. For example, there should be a 6" stagger for 3" wide flooring.

- **Step 4 – Set your flooring nail gun or stapler...** Make sure that your air compressor for the flooring gun or stapler is set at the recommended PSI setting for the wood species being installed. If the air pressure is too high for the species, the nails or staples could be driven below the nail pocket which will result in splitting of the tongues and a less than desirable fastening.
- **Step 5 – Establish your starting point – Wall to Wall Installation...** The starting wall is usually the longest continuous exterior wall in the room. Check to make sure that the wall is straight and square. The flooring should be installed perpendicular to the flooring joists unless the subfloor has been stiffened. Measure the width of the product being installed. For random or alternate width products, use the widest plank measurement for the first row. Add 1" to allow for the 3/4" expansion and the width of the tongue. Using this measurement in at least 2 places, measure out equal distance from the starting wall and 12" to 18" from the corners (see Figure below)



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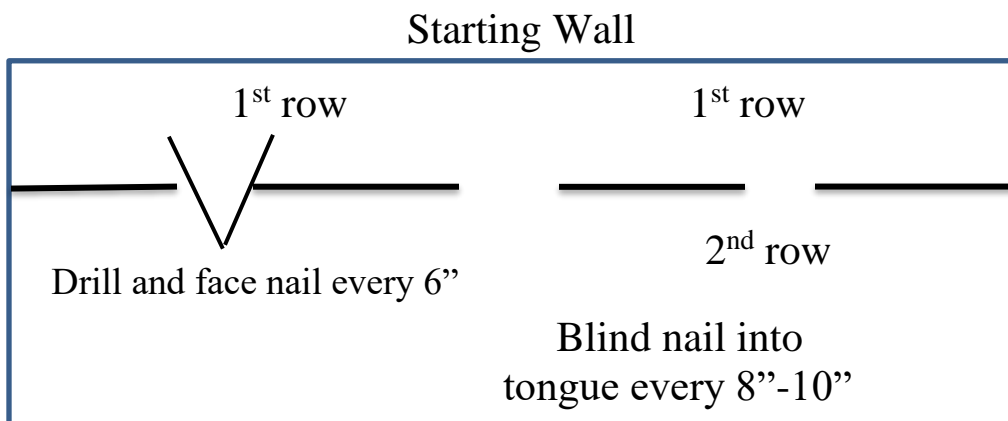
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## Chalk Line

- **Step 6 – Installing First Rows – Wall to Wall Installation...** Use the longest and straightest boards available for the first 2 rows. Align tongue of first row on chalk line. The groove should be facing the starting wall. Pre-drill the nail holes 1/2" from back (groove) edge, 1-2" from each end, and at 6" intervals at a 45° angle down through the nailing pocket on top of the tongue. Face nail the groove side where pre-drilled. When complete, blind nail at a 45° angle through the tongue of the first row. Fasten using 6d or 8d nails. Countersink nails to ensure flush engagement of groove. Avoid bruising the wood by using a nail set to drive the nails at least 1/4" into the tongue. Continue blind nailing using this method with following rows until a nail gun or stapler can be used. Beginning rows may be blind-nail where clearance allows using a pneumatic finish nail gun with a 15 gauge, 1 1/2" minimum nails. Flooring mallets, tapping blocks, and pull bars may be used to help tighten the flooring during installation. Be sure the mallets, blocks, and bars are clean and free from residue when using. Be sure to keep the runs of the flooring straight. The deviation from a straight line should not be more than 3/16" in 10'. End joints of adjacent rows should be staggered a minimum of 6" to ensure a more favorable overall appearance. See figure below.



- **Step 5 and 6 for Center to Wall Installation...** When you begin the installation from a center point in the room this allows for the installation to proceed in opposite directions. Find the center of the room, square the floor, and snap a chalk line down the center of the room. Install a starter board along the chalk line. Fasten the starter board to the wood subfloor using an appropriate fastener. Install the first row of wood flooring against the starter board. The groove of the wood flooring should be against the starter board. Be very careful to not allow the starter board to move when you are nailing the flooring in place. Install several rows of flooring then remove the starter board. After installing in one direction, remove the starter board. Insert slip tongue into the open groove of the flooring that was against the starter board. Put wood adhesive down the entire length of the slip tongue being careful not to get adhesive on the face of the flooring. Use the groove side of a piece of scrap flooring to hold the slip tongue while nailing the board into place. Install the remaining rows in the opposite direction. Slip tongue should be used anytime the flooring direction changes and at all flush or header transitions. Be sure to keep the runs of the flooring straight. The deviation from a straight line should not be more than 3/16" in 10'.

- **Step 7 – Installing the Floor...**Once you have installed the first few starter rows, stop and check to make sure you are maintaining straight rows. Continue installing several rows at a time, fastening each board with at least 2 fasteners 8"-10" apart and 4"-6" from the ends (to avoid splitting or creating excessive overwood on the end joints). Tighten boards as necessary to reduce gaps before fastening. Be sure to stagger the end joints of adjacent boards to ensure a more overall favorable appearance. The last 1-2 rows will need to be face-nailed where clearance does not permit blind nailing with nail gun or stapler. Pre-drill and face-nail on the tongue side following the nailing pattern used for the first row. Rip the final row to fit and face-nail. If the final row is less than 1" wide, it should first be glued to the previous **uninstalled** row and the two jointed-units should be face-nailed as one complete unit.
- **Step 8 – Completing the Job...**Install all needed base boards, transitions, including shoe or quarter round moldings. Inspect the floor, filling all gaps as needed with the appropriate filler. Clean the floor by thoroughly vacuuming. Vacuum with a soft brush attachment. Be sure not to use a vacuum with the beater bar engaged. Next, clean the floor with the Bona Hardwood Floor cleaner or similar PH neutral cleaner. Be sure to leave the homeowner with maintenance instructions and warranty information.

## Care and Maintenance

To ensure the full benefit of warranties and to extend the beauty of your new hardwood floor, we recommend the following preventative maintenance steps for your hardwood floor. Regular and appropriate maintenance will also help to ensure proper performance of your floor.

### 1. Preventative Maintenance

- Always protect floors when moving heavy objects, such as furniture and appliances, to prevent scratches and possible scratches and dents to the flooring. The use of plywood and an appliance lift can be useful in such situations.
- Use appropriate floor protectors under all pieces of furniture, including tables, chairs, desks, etc.... Non-staining felt pads and non-pigmented floor protectors are recommended. Area rugs are recommended in high traffic areas and at sinks. Do not use mats backed with latex or rubber as discoloration may result. Rug pads are also recommended under all area rugs. Felt rug pads are recommended. Do not use latex or rubber rug pads. Use floor mats at all entrances to help keep dirt and moisture from being tracked in.
- Remove high heels or shoes that need repair prior to entering rooms with the hardwood flooring installed. Some high heels and shoes that need repair can cause damage to the surface layers of the wood flooring.
- Forest Accents does not recommend that you cover the flooring with a protective covering after installation. If you choose to do so, be sure to cover the floor completely. Many species of wood are light sensitive and uncovered areas can undergo color changes. Do **not** use plastic or any other material that is considered a vapor barrier for the covering.
- Do **not** tape anything, with any kind of tape, painter's blue tape, or otherwise to a finished floor.
- Be aware that area rugs placed on a wood floor do protect it from UV sun exposure which will result in color differences between the covered area of the flooring and other uncovered areas of the flooring.
- Climate and humidity control is very important to the overall performance of the flooring. Forest Accents performs best at a temperature of 60-75 degrees Fahrenheit and relative humidity between 30-50%.

### 2. Routine Maintenance



- Daily removal of dirt and dust is important to prevent particles from abrading the floor's surface. Vacuuming with a soft brush attachment or dust mopping is recommended. Be sure **not** to use a vacuum with the beater bar engaged.
- Periodic damp cleaning is recommended. Damp cleaning does not refer to soaking the floor with water. Damp cleaning refers to the use of Bona Hardwood Floor Cleaner, or similar PH neutral hardwood floor cleaner, to clean the floor. Be sure to vacuum or dust mop the floor before using any floor cleaner.
- **DO NOT USE** oil soaps, pastes, waxes, or cleaners containing lemon oils, tung oils, ammonia, vinegar, or silicones. Use of these types of cleaners will invalidate the warranty.
- Periodically inspect felt pads used on furniture and rug pads used on area rugs to ensure they are in good condition.
- Keep nails of pets well-trimmed and their paws free of dirt, gravel, grease, and other abrasive and/or staining material. Pet urine, feces, and vomit should be cleaned up immediately.
- Clean up spills immediately. Wipe up spills using a soft cloth and then use the Bona Hardwood Cleaner or similar PH neutral cleaner to remove any remaining residue.
- **DO NOT USE** string mops, wet mops, sponge mops, or steam cleaners to clean the Forest Accents.
- **DO NOT USE** treated commercial dust mops as they contain petroleum-based solvents that can leave a chemical residue.
- **DO NOT USE** cleaning products that claim to restore, refresh, polish, add shine, or rejuvenate without first consulting with Forest Accents dealer.