



Thank you for choosing Morning Star ®Bamboo flooring.
Morning Star ®Bamboo can be Nailed, Glued or Floated using the Elastilon Installation System

Install according to the general installation guidelines as set forth by the (NWFA) The NATIONAL WOOD FLOORING ASSOCIATION WWW.NWFA.ORG. However, because of various vendor and product requirements the Morning Star ® instructions takes precedence. Morning Star ® denies any responsibility for problems beyond its control such as but not limited to; job-site and subfloor conditions, improper storage, environmental or moisture related issues, installation and improper tool usage, surface dimpling, shading. See warranty for full details. Please read and understand these instructions. Questions call 800-366-4204. Comply with your local or International Residential Codes (IRC)

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APPLICATIONS **Nail/Glue/Float**

Solid prefinished bamboo products are normally installed using 18 gauge cleat flooring nailers. Bamboo styles like horizontal and vertical can be easily nailed whereas strand bamboo is much harder and tends to be rather challenging to nail. These natural characteristics are not considered defects. To **prevent board damage**, installers will determine the best fastening method appropriate; cleat nailing vs. gluing. Not surprising, hand nailing or direct gluing may be needed for strand bamboo (see **nailing** recommendations). Ensure the use of correct sized fasteners and or adaptors. In addition, using approved flooring adhesives bamboo flooring can also be glued to plywood or to a concrete substrate with or without an underlayment (see **glue** recommendations). We do not recommend bamboo for radiant or in-floor heat applications. For greater thermal insulation and sound isolation qualities, our flooring can also be installed (nailed or glued) over an underlayment to meet the needs of customers, building specifiers and condominium associations. (see approved **underlayments**) Our flooring can also be installed as a **floating floor** over concrete when used in conjunction with the Elastilon Installation System along with 6-8mil sheet plastic. Do not use bamboo for below-grade applications

OWNER/INSTALLER RESPONSIBILITIES

Bamboo flooring is characterized by distinctive variations in grain, pattern, and color. These **natural variations** are neither flaws or defects, but rather the natural beauty and uniqueness of bamboo, and should be expected. Only stained products will have the most uniformity in color or shade. Before beginning the installation determine if the job site and subfloor conditions are acceptable. The in-home environment, weather fluctuations and product storage can adversely affect all organic materials including bamboo flooring (see **acclimation**). The customer/installer is responsible for final inspection of quality, and for moisture testing the subfloor and flooring. During installation, use reasonable selectivity and good judgment. **From a standing position** any individual board deemed unacceptable in appearance should not be used. Defects should be cut off placing the remainder in closets or near walls. If milling or quality issues are suspected stop the installation and call the manufacturer. Most manufacturers and distributors agree that a reasonable amount of installed flooring is enough to stop and determine acceptable product quality, as an example; up to 30% for projects less than 500 sq ft or up to five boxes of flooring for projects 1000 sq ft or more. Therefore once the flooring is completely installed it is assumed that the material is free of visual manufacturing problems and that the installation is correct. In this industry **use constitutes acceptance**, once the flooring is completely installed it is deemed appropriate for use by all parties concerned. The manufacturer shall not be responsible for costs associated with repairing or replacing flooring installed with visible defects. Our floors are manufactured in accordance with accepted industry standards that allow a defect tolerance not to exceed 5% of a manufacturing or natural type. Before installation, if more than **5%** of the purchased material is unusable contact your local store or call CUSTOMER CARE immediately. Depending on layout, board selection and cutting about 5% to 8% extra material should be added to the actual order to complete the project. Diagonal layouts or custom installations usually require an additional 15%. The use of putty, stains, filler sticks or markers to touch-up prefinished flooring during installation is considered normal practice.

JOB SITE INSPECTION

Exterior conditions can influence home interior subfloor moisture.

1. Check water drainage from gutters, sprinklers, and drainage to adjoining properties. Changes to your home site, or incorrect building procedures, and lack of moisture protection can allow excessive water or moisture to penetrate basement walls, flow beneath concrete slabs, basement floors, and into crawl spaces.
2. All wet trades should be complete before installation of bamboo flooring (wet trade include ceramic tile installation, painting, and mudding dry wall.
3. Bamboo flooring should not be installed over any floor with a sump pump, or in a room with a floor drain.
4. Check specific local building codes for assistance when correcting excessive moisture.
5. Yard grading; inspect the outside surroundings for improper drainage or obvious sources of moisture. The soil should slope away from the foundation (at least 1/2 inch per foot for at least 10 feet). Walkways and driveways should direct water away from the foundation. Adjoining properties should drain water away from the building site.
6. New concrete should be cured at least 60 to 90 days before installation.

HANDLE WITH CARE

Store product flat, in a dry level place. Provide air flow under and around cartons. Do not store in buildings without climate controls, garages, sheds, directly on bare concrete or next to outside walls. Cartons should be placed close to the center of the installation area as possible. Keep out of direct sunlight and away from heat/air vents. To prevent board warping, twisting or bowing do not cut the plastic support packaged bindings or remove product from the packaging until ready to install.

VENTILATED CRAWL SPACES Per; (IRC) International Residential Code, Section R408.1

Completely Cover 100% of the soil or concrete surface to guard against ground moisture. Overlap plastic seams 6" and duct tape seams completely. Inspect the under-floor crawl space. It must have vents for proper **cross-ventilation** (pic1). Venting allows damp areas to dry-out and to minimize moisture build-up under homes. Do provide year-round air circulation with multiple vents, a minimum of 1 square foot for each 150 square feet of under-floor space area. One ventilating opening shall be within 3 feet of each corner. Ventilation fans can be used in the crawl space area to circulate the air, promote drying and reduce dead air spaces. **Ground cover**; under the home in the crawlspace, use black 6-mil polyethylene sheet plastic as a **moisture vapor barrier**. (Exception R408.2; *"Where warranted by climatic conditions, ventilation openings to the outdoors are not required If, ventilation/conditioned openings to the interior are provided."*)



(pic1)

ACCLIMATION/CONDITIONING OF THE FLOORING

After harvesting, bamboo flooring is kiln-dried for optimum service. During transit, delivery and storage, bamboo flooring must be protected from moisture. Bamboo is hygroscopic, meaning its size and shape changes with the absorption or release of moisture. The amount of change varies with wood species, cut, type of flooring and work-site conditions. Therefore, bamboo movement (shrinkage or expansion) is to be properly controlled and achieved at the work-site. First, **acclimate** the new flooring in the areas to be installed to the expected environment that the floor will service while in the boxes. If products are packaged in plastic, remove the plastic wrapping from the outside of the boxes and open the ends of the boxes. If plastic is wrapped around the flooring inside of the boxes, open the box ends only, cut away plastic to speed up the acclimation process increasing air-flow. Strand bamboo can take extended time to acclimate to a new environment; however, length of acclimation time is not the determining factor. **The goal** is to reach an indoor equilibrium or balance between the core of the new flooring with its surroundings before assembly, fastening or installation. Extended conditioning is not unusual for strand bamboo species as it will slowly gain and lose moisture due to its density and finish coatings. For best performance, condition and maintain the flooring to consistent indoor temperatures of **60°-80° F** and indoor humidity levels of **30% - 50%**, before, during and after installation. Depending on your local conditions the use of a **dehumidifier** or a **humidifier** may be necessary to maintain the desired results. **Very dry or humid regions** of the country usually require extended conditioning to balance the bamboo to the environment it will service. Proper jobsite conditions, acclimation, moisture testing of the subfloor and new flooring all work together for the success of the installation, and is the responsibility of those overseeing the project. Not following the above recommendations can negatively impact board performance and can result in excessive movement, squeaks, board gapping, board-edge cupping, finish splits and other related issues. This is especially true regarding flooring placed in seasonal or **vacation homes** without proper ventilation and climate conditions.

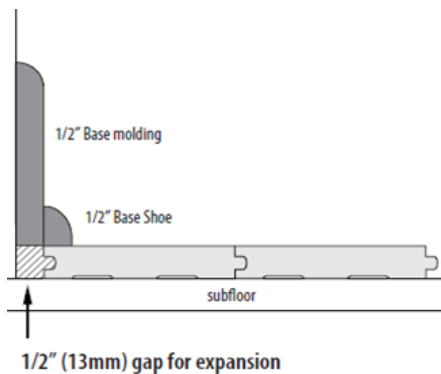
The map of the United States below shows the average moisture content of interior wood products for each state/region. The first number indicates the average moisture content of wood in January (winter – lower humidity months), and the second number indicates the average moisture content in July (summer – higher humidity months). To calculate what the optimal wood moisture content is (baseline) add the high season and low season together, then divide by two. Example: If your region has an expected low of 6% to a high of 9%, the baseline moisture content of the wood would be 7.5%. If bamboo flooring is delivered and recorded to its baseline moisture content for the geographical location and proper relative humidity conditions are maintained, installation can begin. If the moisture content of the product received is well outside of the average moisture content of that region, extended acclimation time would be needed. **NOTE:** This map is a helpful guide for installation. Actual moisture content conditions in any location may differ significantly from these numbers. Ideal interior environmental conditions vary from region to region and jobsite to jobsite, therefore the most reliable moisture-content numbers should be obtained using a moisture meter to determine the moisture content of the product in relation to the subfloor. Some regions of the country are moderate in both temperatures and humidity, homes in these regions may not have typical HVAC heating, ventilation and air-conditioning systems to better regulate the indoor environment, therefore it is the flooring professional or users responsibility to determine and warranty if the indoor environment is suitable or not for wood floor installations.

SUMMER/WINTER MOISTURE CONTENT MAP Optimum Flooring Moisture Content (%) by U.S. Region



GENERAL INFORMATION - all installations

- Install flooring in good lighting.
- Save a box of flooring for use in future repairs.
- Recommend not to install flooring under permanent or fixed cabinetry.
- Keep flooring seams stagger from row to row minimum 6" during installation.
- Use breathable materials like paper when covering a newly installed floor.
- Inspect flooring during installation, maintain appropriate perimeter expansion.
- The customer is advised to be home during the installation for consultation/direction.
- Customer and installer should discuss installation and layout to maximize satisfaction.
- Floor should be installed from several cartons at the same time to ensure good color, shade and appearance.
- For future questions regarding your product it is helpful to save the item number found on the packaging box ends.
- To prevent board warping, twisting or bowing do not cut the plastic support packaged bindings or remove product from the packaging until ready to install.
- Most installation failures result from jobsite moisture; do not deliver flooring to the jobsite until problems are corrected.
- Do not install over radiant heat systems. Do not install below grade.
- An Expansion gap or space must be left around the perimeter and vertical obstructions placed usually under base moldings, quarter round, or sheetrock. This space is normally the same as the thickness of the new flooring. For example; 1/2" flooring requires 1/2" expansion. See (PIC)



HELPFUL TOOLS

- Pencil
- Chalk line
- 6' level
- Miter saw
- Table saw
- 60 tooth carbide tip saw blades
- Broom
- Jamb saw
- Eye protection
- Niosh Dust Mask
- Ear protection
- Gloves
- Floor Nailer
- Floor fasteners
- Cloth rags
- Hygrometer (test home temperature and humidity)
- Blue painters tape (2080)
- PVA wood glue
- Compressor with regulator
- Drill
- Drill bit set
- Hammer
- Nail set
- Moisture meter (wood)
- Approved floor cleaner
- Calcium chloride moisture test (concrete)
- Approved adhesive remover

NAILDOWN OVERVIEW



MOISTURE TESTING subfloor and new floor

[CAUTION] Most bamboo flooring failures result from jobsite moisture. Do not unpack or deliver flooring to the jobsite until moisture problems are corrected. The **goal** of moisture testing is three-fold. (1) to determine when the installation can begin, (2) to verify the placement of dry flooring on dry subfloors and (3) to verify a moisture balance between the new floor boards and that of the existing subfloor. Note that for 3" or wider floor boards there should be no more than **2%** difference in moisture content between properly acclimated bamboo flooring and wood subflooring materials. Verify by using a moisture meter (**pic1**) such as; ([Tramex](#), [Ligno-Mat](#), or [Delmhorst](#)) to name a few that will have strand bamboo settings.



(pic1)

General purpose meters may be appropriate for rough carpentry, sheetrock or lumber but are not recommended for wood flooring. Species specific, adjustable moisture meters are most accurate for bamboo and wood flooring. Contact the meter manufacturer for alternate or substitute settings. Begin by **testing the subfloor**. Set the meter to the type of subfloor (obtain an average by testing 20 locations per 1000sqft) test around exterior doorways, near foundation walls and in the center of the room. On average, the subfloor moisture range must not exceed **12%**. Next, **test the new flooring**. Set the meter to the proper setting for t bamboo (Obtain an average reading by testing about 5% of the new flooring). Our flooring can have acceptable moisture range between 6% minimum and 12% maximum with no more than 5% variance up to 14%. If high moisture readings are found in either the new floor or subfloor identify the moisture source and correct, extend acclimation time, increase ventilation. Postpone the installation until the proper conditions have been met. Should future questions arise, it is recommended in the process of installation to document moisture test results with notes, for example; record the customer's name, the order number, and take digital pictures that show the meter that was used, including the time and date.

SUBFLOOR PREPARATION

Wood subfloors

Do not install flooring directly over floor joist without proper subflooring.

All structural panels/underlayment must be installed sealed-side down, and provide minimum 3/4" perimeter spacing. Square-edged or non tongue and grooved panels used as a subfloor will require a minimum 1/8" (3 mm) expansion space placed between all plywood seams. Panels must meet minimum CDX grade Exposure 1 and US Voluntary Product Standard PS1-95, PS2-04 or Canadian performance standard CAN/CSA 0325-0-92 for construction sheathing. Check panel for codes.

- Solid-boards used for subflooring should be 3/4" x 5 1/2" (1" x 6" nominal), Group 1 dense softwoods, No. 2 Common, kiln-dried to less than 12% percent moisture content.
- Particleboard, Luan or Masonite: is not recommended, remove or cover with 3/8" plywood.
- Minimum of 3/8" CDX panel thickness is recommended when used as an underlayment over an existing subfloor.
- Avoid pressure treated plywood for interior use. These can have elevated moisture or latent with rot resistant chemicals.
- When installing over an existing nail down solid wood floor install the new floor perpendicular or at a 45 degree angle to the existing solid nail down flooring or when running the new floor in the same direction as the existing floor, place a minimum 3/8" plywood between the new flooring and the existing floor.

Note that joist spacing determines minimum subfloor thickness.

- Joist spacing **16" on center (OC)**
Plywood: Minimum of (5/8") **Oriented Strand Board (OSB):** Minimum (3/4", 23/32") **Advantech** Minimum (3/4", 23/32")
- Joist spacing **16" up to 19.2" (OC)**
Plywood: Minimum of (3/4", 23/32") **Oriented Strand Board (OSB):** Minimum of (3/4", 23/32")
- Joist spacing over **19.2" up to maximum 24" (OC)**
Plywood: Minimum of (7/8") **Oriented Strand Board (OSB):** Minimum of (1")

Flatness



All subfloor should be flat to within 3/16" in 10 feet or 1/8" in 6 feet radius. Wood subfloors must be securely nailed or screwed to joists to minimize movement or squeaks. Install over 16" minimum center-to-center joist sub-structure. Thoroughly inspect and replace existing floor or subfloor that shows evidence of water damage or structural weakness. Repair any sagging or loose sections of a wood subflooring. Squeaky or loose boards should be re-secured. An uneven or cupped subfloor can be an indication of excess moisture or rot, identify and correct. High spots/joist may be sanded down. Low spots should be cut out and repaired or may be filled with old pieces of firm vinyl or build up with 30 lb. black roofing paper. Do not fill-in low areas under nail down flooring with cement patching materials that can break down over time.

New construction; It is the builder's or general contractor's responsibility to provide the wood-flooring contractor with a subfloor that is within the tolerances listed above. Postpone the installation until corrections have been completed

NAILERS/STAPLERS

Nailing tips

Tongue fracture and surface dimpling during the installation of strands and other harder bamboo styles is not a manufacturer's defect. It is common and can be minimized by installing the flooring in proper lighting, using the correct nail thickness or gage, using the recommended shoe adaptor, or changing the angle of nail entry. If however, surface dimpling still occurs when using the recommended nailers bamboo can be installed by pre-drilling and hand nailing using a 3/32 drill bit and 6d finish nails (**pic 1**) or can be directly glued to the subfloor using our recommended adhesives.

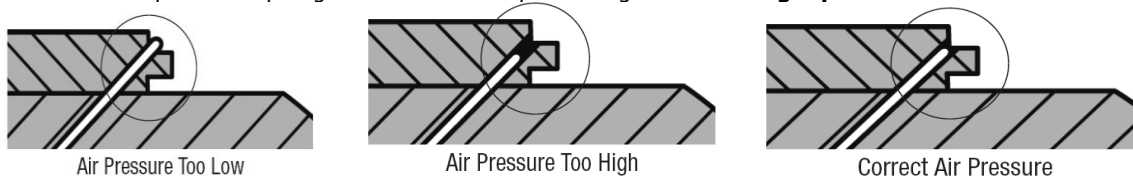
- 1 To further reduce the occurrence of surface dimpling and tongue fracture the use of thinner 18 gage cleat nails is recommended especially for strand bamboo, but is no guarantee to prevent all surface dimples. In addition, many installers will sometimes adjust the nailer angle temporarily by applying layers of duct tape or adding a single piece of cardboard taped to the bottom nailer foot plate. The use of an over-size base or foot plate to distribute the nailing force is encouraged.
- 2 Staples may increase the risk for tongue fracture and surface dimples. We do not recommend the use of staples on strand bamboo flooring. Staples and cleats hold differently when mixed can result in irregular fastening and or may allow excessive movement. When face or top nailing pre-drilling is recommended. Pick areas of the grain or pattern that would best hide touch-up fillers.
- 3 Do not use significantly bowed, crooked or twisted boards. Use a wood spline or slip tongue whenever a change in board direction is needed. Splines should be glued with PVA wood glue and nailed into place. Forcing or pounding floor boards together with a rubber mallet during assembly can bruise or damage board edges.



(pic 1).

Air compressor tips

Adjust the regulator to ensure proper air pressure and setting of fasteners. Set air compressor to 70-80 PSI or at the lowest air pressure needed to set the fastener flush into the wood, adjust as needed, too much pressure can create board-edge damage. Do not exceed the nailer or air hose limitations. Air hose over 25' can cause poor response, loss of proper PSI, jamming and miss-fire. To prevent air leaks apply white Teflon tape to all threaded connections. Make sure that the fastening machine is recommended for the floor, is in good working condition, is fully adjustable, is at the appropriate angle, and that it seats fasteners properly against the tongue of the board to prevent top edge and surface dimple damage. **See nailing Tips**



FASTENER AND NAILER SELECTION

When using any nailer ensure that you are using the correct size shoe-plate matching the thickness of the bamboo. In addition, fine tuning proper nail height adjustment can be easily accomplished by using a piece of 1/16" or 1/8" cardboard or similar material taped to the bottom of the shoe-plate, used as a shim.

Vertical and Horizontal Bamboo

FLOOR THICKNESS	RECOMMENDED NAILER	FASTENER TYPE	FASTENER LENGTH
5/8"	Norge 2n1 nailer	15.5 gauge staples or 16 gauge cleats	1-1/2" to 2"
	Norge 18 gauge floor nailer	18 gauge cleat	1-1/2" to 1-3/4"
1/2", *7/16", 9/16"	Norge 2n1 nailer	15.gauge staples or 16 gauge cleats	1 -1/2" to 2"
	Norge 18 gauge floor nailer	18 gauge cleats	1-1/2" to 1-3/4"
3/8"	Norge 18 gauge floor nailer	18 gauge cleats	1-1/4" to 1-1/2"
5/16"	Norge 4 n 1 floor stapler	18 gauge staples 1/4" crown	1-1/4"
	Pownail M200 floor nailer	20 gauge cleats	

Strand, Vertical, and Horizontal Bamboo

FLOOR THICKNESS	RECOMMENDED NAILER	FASTENER TYPE	FASTENER LENGTH
5/8"	Norge 18 gauge floor nailer	18 gauge cleats	1-1/2" to 1-3/4"
1/2", * 7/16", 9/16"	Norge 18 gauge floor nailer	18 gauge cleats	1-1/2" to 1-3/4"
3/8"	Norge 18 gauge floor nailer	18 gauge cleats	1-1/4" to 1-1/2"



18ga cleat nails recommended for strand bamboo

FASTENER SPACING

Space fasteners every 8" to 10" intervals and within 3" of board ends with at least two fasteners in every board.

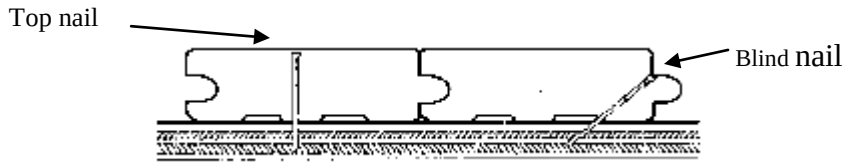
NAILDOWN INSTRUCTIONS and PREP WORK

[CAUTION]: Nail flooring in good lighting. After nailing 100 sq ft, stop and inspect the installed floor for any defects or damages. Make adjustments as needed. If satisfied, continue with the installation. When top nailing pre-finished flooring (the first and last rows, stair treads, and risers) it is recommended to pre-drill and hand nail using a 3/32" drill bit and 6d finish nails. Although pneumatic finish nailers are faster, improper use can easily damage the board or finishes. When installing over crawl spaces or rooms over basements use minimum 15 lb. black roofing felt or white Silicon Vapor Shield® paper to provide protection against moisture vapors. (**See list of approved underlayments**). Install underlayment parallel to the new flooring. When installing over wood subfloors, install the new flooring perpendicular to the floor joist. Installing parallel to the floor joist is only an option over 1" thick plywood subfloors, or 3/4" plywood subfloors that have been reinforced to prevent sagging.

Use a manual or electric jamb saw to undercut all door jambs/casing to allow enough clearance for the wood flooring to easily slide underneath. A business card thick gap between the top of the bamboo flooring and bottom of the door jamb is acceptable. Sand down high spots in the subfloor, and the subfloor seams. Correct low spots (**See subfloor prep**). Sweep or vacuum the subfloor clean of dust and debris. Install moisture retardant underlayment. Most underlayments can be stapled down to prevent movement/sliding. (**See underlayments**)

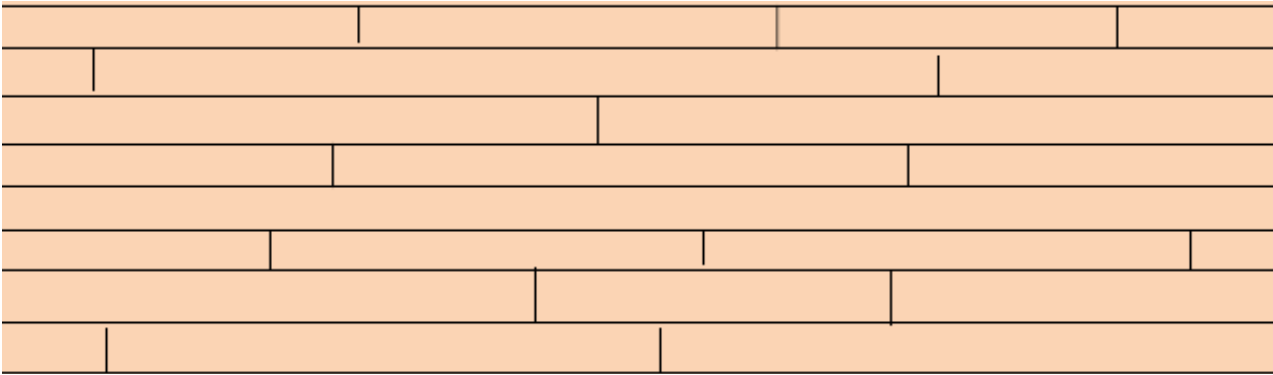
STEP 1: THE FIRST THREE ROWS

- Determine the starting wall, usually the longest or outside foundation wall. At the two opposite ends of this wall, measure out the width of the board, plus the expansion space, and place a mark on the subfloor or underlayment. (do not include the tongue of the board when measuring). An Expansion gap or space must be left around the perimeter and at all vertical obstructions. This space is normally the same as the thickness of the new flooring, for example; 1/2" flooring requires 1/2" expansion.
- Snap a chalk line connecting the two marks. Align the tongue side of the first row of boards on the chalk line with the groove side towards the starting wall, maintain the expansion space.
- Install the flooring with the tongue side facing away from the starting wall(Use long straight planks for the first two rows). Always nail on the tongue side of the flooring.
- Pre-drill and top nail the first row of boards using a 3/32" drill bit and 6d finishing nails about an 1" from the back edge. Countersink the finish nail using a nail punch and fill with close matching wood filler. Blind nail the 2nd and 3rd rows using 6d finish nails above the board tongue until nailing machines can be used. (set finish nails with nail punch).

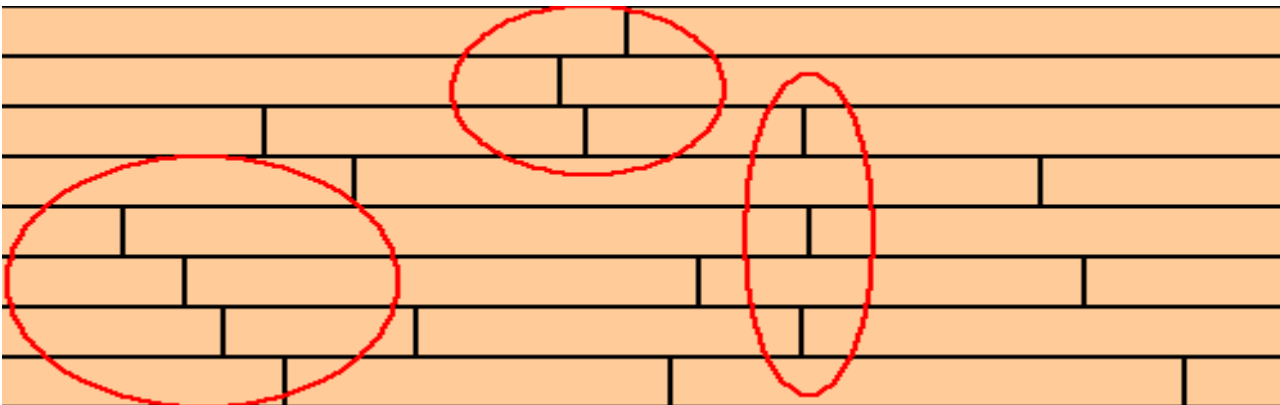


STEP 2: FLOORING LAYOUT (Racking)

After installation of the first three rows, loose lay about 100sqft of flooring about 4" or 5" away from the last secured row. Pull from several boxes to mix board color and sizes to create a random look. Visually inspect flooring for defects while racking. Stagger boards randomly as possible, avoid creating patterns. See picture for proper layout guidance.



(pic1) Staggering board randomly adds strength to the total floor



(pic2) Avoid "stair step" and "H" patterns, or lining-up or spacing board-ends closer than 6"

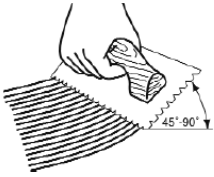
STEP 3: INSTALLATION CONTINUED

- After racking out 100sqft of flooring begin nailing the floor using a hardwood flooring nailer (See nailer recommendations). Visually inspect board for defects while nailing. Use proper fastener spacing (See fastener spacing). Continue nailing until you get to the last one or two rows. The last one or two rows will have to be top nailed. Again pre-drill using a 3/32" drill bit and 6d finishing nails.
- The last row may have to be ripped down in width to fit. If the last row is less than 1" in width use a PVA carpenters wood glue to join the last piece to the previous row.

STEP 4: FINISHING UP

- Fill in nail holes and minor gaps with close matching wood filler.
- Install any base board molding and shoe molding
- Install transition moldings using a urethane adhesive, or pre-drill and hand nail with 6d finish nails (3/32" drill bit)
- Clean floor with Bellawood floor hardwood floor cleaner.
- Use felt pads under furniture legs
- Protect for before moving appliances and heavy furniture. (damages from furniture and appliances are not covered)

GLUE DOWN OVERVIEW



[CAUTION] Most installation failures result from jobsite moisture.

Do not unpack or deliver flooring to the jobsite until moisture problems are corrected.

Note that flooring adhesives may have special requirements and limitations of use. **Follow closely the adhesive labeling instructions and adhesive Technical Data Sheet** pertaining to moisture testing procedures, moisture barriers, and trowel size recommendations. Depending on the selection and application of a particular adhesive, you may be required to use moisture barriers. Adhesive Technical Data Sheets can be found on the adhesive manufacturer's website. When in doubt about an adhesive application or requirement call the adhesive manufacturer. **Not following the adhesive manufacturer's recommendations can lead to installation failure and void your warranty.**

[TIPS]:

- Place saw equipment outside in an area where they can be reached without having to walk across the flooring
- Install the flooring parallel to the longest wall or foundation wall in the room. Keep the flooring straight using a chalk line
- Select flooring from several cartons to mix color, grain and shade.
- Discard twisted or warped boards.
- For the best results, do not mix adhesive products or glue over sealers
- Follow the glue manufacturer's labeling instructions regarding adhesive set time, correct trowel size, removal of surface sealers or contaminants and use of moisture barriers
- Glue manufacture may require rolling the floor throughout installation to ensure glue transfer, refer to adhesive labeling instructions
- Use the trowel size recommended by the adhesive company to get required spread rate and ridging height. Typically, trowel size is determined by board type, size and surface texture. Check adhesive bucket for trowel size recommendations.
- During constant use trowel teeth will wear down, for best glue coverage use a new trowel with each new container of adhesive.
- Blue painter tape #2080 can be used to keep rows or sections of floor boards together until the adhesive has cured.
- (Incorrect or aggressive tape can harm the finish, do not leave on overnight) Tape 4 or 5 board rows together during installation.
- Many installers choose to use straps or clamps in an effort to force board rows tighter together during installation. Be advised that over-strapping can adversely affect the floor and may result in glue-bond failure, seam peaking, twisted boards or out-of-square floor board alignment.

CONCRETE SUBFLOOR PREPARATION

Flat concrete

• A flat cement surface is very important when gluing down ridged solid bamboo. To minimize squeaks and gaps the final surface must be flat to within **1/8" in 6' radius** or within **3/16" in 10' radius**. Sand or grind down high spots. Fill valleys or low areas with cement based leveling compounds compatible with the flooring adhesives. Allow extra drying time for the leveling compounds. Concrete that is not properly leveled can cause improper adhesive transfer, hollow spots, and squeaks.



Moisture testing (Concrete Subfloors)

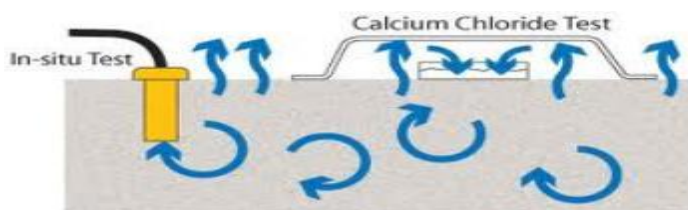
Because concrete generally takes 15 days to dry for every 1 inch (25 mm) of thickness, the concrete must be between **60 to 90 days old** prior to installation and moisture testing, free of surface sealers or contaminants.

The following are acceptable industry standards ASTM for moisture testing (pic 1)

***Calcium Chloride Test** (ASTM F 1869): The maximum vapor emissions cannot exceed 3lbs/1000SF in 24 hours
Three Calcium Chloride tests are needed for the first 1,000sqft. Add one additional test for each 1,000 square feet thereafter. For example; a job of 3,000 sqft would need 5 Calcium Chloride tests performed. Contact your flooring dealer for Calcium Chloride test kits. Results of 3lbs or less per 1000 sqft are considered dry. (refer to the type of adhesive selected)

***In-Situ Probe Method** (ASTM F 2170): The Relative Humidity levels should not exceed 75%-95%, (depending on the adhesive)
Concrete Moisture Meters such as Tramex Encounter or similar is not acceptable as an industry standard

**always refer to the adhesive labeling for moisture testing details, procedures, trowel sizes and any limitations of use*



(pic 1)

Check Concrete for Sealers

- All paint, adhesives, dust, debris, and sealers must be removed from the concrete prior to gluing down solid bamboo flooring. To check for a sealer on the concrete spill a small cup size amount of water onto the concrete surface. If the water beads up, and does not soak into the concrete, a sealer is present. The sealer will have to be removed before continuing with the glue down installation of bamboo flooring. Check with adhesive manufacture for recommendations on sealer removal.

RECOMMENDED ADHESIVES and LIMITATIONS

- **MORNING STAR**
Limits: Up to 15lbs per Calcium Chloride test or 95% (RH) relative humidity per In-Situ Probe Method.
- **Exmore EX3 Pro** ----- Domestic and Exotic wood adhesive.
- **Exmore EX3 Pro Plus** ----- 2 n- 1 adhesive, sound control, and moisture vapor protection.
Limits: Up to 15lbs per Calcium Chloride test or 95% (RH) relative humidity per In-Situ Probe Method.
- **Exmore EX3 MAX** ----- 2-n-1 adhesive, sound control and moisture vapor protection.
Limits: the concrete must be prepared properly and dry to the touch to properly bond.



www.mapei.com

- **Mapei ECO 980** ----- an adhesive only.
- **Mapei ECO 995** ----- 2-in-1 urethane adhesive and Moisture Vapor Protection.
Limits: Up to 15lbs per Calcium Chloride test or 95% (RH) relative humidity per In-Situ Probe Method.

Technical Services 1-800- 992-6273, 1-800-876-2734 (USA) 1-800-361- 9309 (Canada)



www.bostik-us.com

- **Bostiks UltraGrip** ----- 2-in-1 urethane adhesive, sound control, and Moisture Vapor Protection
Limits: the concrete must be prepared properly and dry to the touch to properly bond.
- **Bostiks Seal-n-Grip** ---2-in-1 urethane adhesive, sound control, and Moisture Vapor Protection
Limits: Up to 15lbs per Calcium Chloride test or 85% (RH) relative humidity per In-Situ Probe Method.
- **Bostiks DuraGrip** ----- adhesive only.
- **Bostiks BBA** ----- adhesive only.
- **Bostiks MVP** ----- Moisture Vapor Protection/Sound control.
Limits: the concrete must be prepared properly and dry to the touch to properly bond.

Technical Services 1-800-523-6530 1-800-726-7845 1-888-592-8558

**always refer to the adhesive labeling for moisture testing details, procedures, trowel sizes and any limitations of use*

STEP 1: GLUE DOWN INSTRUCTIONS

Install in good lighting. Inspect the flooring often. Make adjustments as needed. If satisfied, continue with the installation. 100sqft of installed flooring is enough to verify quality or 20sqft for areas under 100sqft.

- Determine the starting wall, usually the longest wall. At the two opposite ends of this wall, measure out the width of 5 planks, add the expansion space to that measurement, and place a mark on the subfloor. (do not include the tongue when measuring the width of the planks.)
- Next, use a chalk line to connect the two marks. Tack down furring wood strips along the straight chalk line. You can also use carpet tack strips. This will give you support to push your first row of flooring against. Use concrete nails when attaching the furring strips to concrete subfloors.
- Measure out from your first chalk line the width of 5 planks on each side, and pop another chalk line. This chalk line will run parallel to the first chalk line.
- Rack out 5 rows of flooring starting at the second chalk line. Be sure to pull from several flooring boxes at a time to mix color, while keeping proper seam stagger. (See loose lay/rack flooring **Pic 1** install randomly)
- Using an approved trowel and wood flooring adhesive, spread the glue between the furring wood strips and second chalk line.
- Start placing the racked out flooring into the adhesive. If you're facing the starting wall, install the flooring left to right. The groove side of the planks should be facing away from the starting wall. Push the first row up tight against the furring wood strips.
- Progressively lay-in the next rows by inserting the tongue into the groove of the previous row at a 30 degree angle, then drop board into adhesive. Avoid dragging or sliding boards together as this can trap or squeeze glue up in between the boards creating gaps. Continue working 5 rows together. The last board in each row will need to be cut to fit.
- The balance of a board cut may be used to start a new row, discard lengths under 6". Avoid clustering of end joints. Stagger the ends of the boards correctly. A tapping block can be used to gently tap the boards into proper position. During installation, end gaps between board ends can be minimized by temporarily locking a completed row in place by using spacers placed between the first and the last board of each row, remove when glue has dried.
- Apply #2080 blue painters tape to the plank surface perpendicular to the installed floor. This is used to hold the planks together.
- Continue adding new chalk lines using the previous techniques. Spread adhesive and continue installing 5 rows at a time until job is complete. Tape planks together as needed to keep them from separating.
- **Remove any wet adhesive that gets on the floor finish right away using mineral spirits or adhesive manufactures adhesive remover product.**

STEP 2: INSTALLING THE LAST ROWS

- Most often, the entire length of the last row will need to be trimmed so that it is narrow enough to fit the remaining space. It should be glued and wedged with wood shims into place. Leave all spacers/shims in the expansion space until the adhesive has cured, then remove. Keep the floor free from foot traffic, until adhesive has cured.
- Go back to the starting wall and pull up the furring wood strip or carpet tack strip. Spread adhesive onto the subfloor, and install the last boards needed to finish the job. Install these boards right to left. Use wood shims between the wall and floor to keep the last few boards tight together. Blue painters tape #2080 can also be used.
- Do not to spread adhesive too far ahead of your work area. If the adhesive skins over and fails to transfer, remove and spread new adhesive to achieve proper bonding to the subfloor.
- Occasionally lift a board and check for adhesive transfer. Adequate adhesive transfer is necessary to ensure sufficient holding strength. Solid bamboo flooring planks must have 95% adhesive transfer to the back of the flooring planks.
- When not in use, keep the adhesive container tightly closed to prevent drying and difficulty in spreading the adhesive. Proper ventilation within the room should be provided. Follow the recommendations on the adhesive container.

Post-installation

- Remove blue painters tape after 8 to 10 hours being on the flooring.
- After installation, allow glue to fully cure for 24 hrs before replacing furniture and heavy foot traffic.
- Protect flooring before moving any heavy furniture or appliances. (damages from furniture and appliances are not covered)
- Fill in minor gaps with close matching filler
- Check for adhesive on floor finish and remove with appropriate adhesive manufacture remover.
- For best matching of sheen or milling save a box of flooring for future repairs.
- Clean floor with approved cleaner (see floor retailer for proper cleaner)

DOUBLE STICK INSTALLATION – Flooring glued over an approved underlayment that is also glued to the subfloor

Approved underlayments - Bellawood Premium, Eco Silent Sound, Insulayment, Cork

Allow the underlayment to fully cure before gluing bamboo flooring to the underlayment

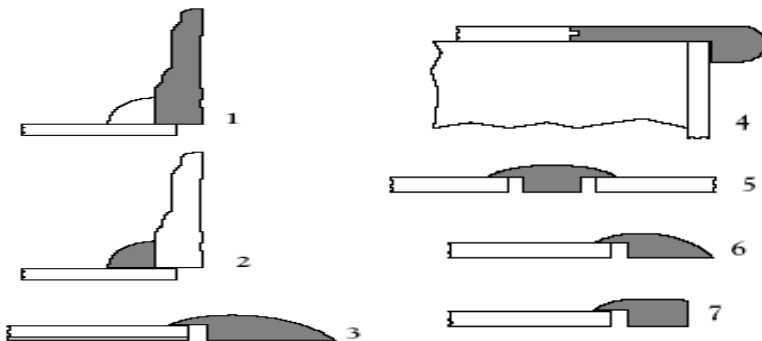
FLOATING INSTALLATION – Flooring not attached to the subfloor

The Elastilon Installation Systems allow the floating installation of solid bamboo flooring over wood and concrete substrates. To maintain your warranty follow closely the Elastilon installation guidelines found on the Lumber Liquidators website. Note recommendations for moisture barriers.

MOLDINGS & TRANSITIONS:

- Install transition moldings directly to the subflooring. Pre-drill and hand nail transitions moldings to wood subfloors using 6d finishing nails. Use a wood urethane tube adhesive to bond wood transitions to concrete subfloors.
- Acclimate wood moldings for best results
- Moldings should be predrilled to avoid splitting when hand nailing. Use a 3/32" drill bit and a 5d or 6d finish nail.
- The tool of choice for cutting hardwood moldings is a 10" or 12" motorized miter saw with pre-set adjustments for the basic miter cuts at 22.5°, 45°, and 90°.
- A 60 tooth or 80 tooth carbide tipped blade makes the best cuts. Be sure the saw blade rotation is positioned to cut into the finished face.
- Attach wall base or quarter round moldings to the wall.
- Mitered cuts hide better when joining moldings

- 1) **Base Board** – for hiding imperfections and adding a custom finish along any wall.
- 2) **Quarter-Round** - for covering the expansion left at walls and other fixed surfaces.
- 3 & 6) **Reducer Moldings** - used to transition to lower floors.
- 4) **Stair Nosing** - for finishing the exposed edges of stairs and landings.
- 5) **T-Expansion** - for joining two areas of flooring of similar heights.
- 7) **End Cap** - for finishing the space at sliding glass doors, at bath tubs or transitioning to carpet.



Bamboo REPAIRS

• Minor white scratches can be repaired with a wood stain marker. Nicks and dents can be filled with a wood blend sticks or color wood epoxy. Major damage may require individual board replacements up to 10% of the total floor and is best accomplished by professional flooring installers.

SEASONAL CHANGES What to expect (all installation methods)

Seasonal gapping should be expected in all bamboo flooring and does not constitute a product failure.

It is normal that bamboo floors will be affected by fluctuating levels of humidity within the building. Care should be taken to control humidity levels to within the **30-50%** range and temperatures of **60°-80° F**. To protect your investment and to assure that your floors provide lasting satisfaction, note recommendations below:

- **(Dry)** Heating Season - A humidifier may be needed to prevent excessive shrinkage in bamboo floors due to low humidity levels. Wood stoves, radiant floor heat and electric heat will create dryer conditions.
- **(Humid, Wet)** Non-Heating Season - Proper humidity levels can be maintained by use of an air conditioner or dehumidifier. Avoid excessive exposure to water during periods of inclement weather. Do not obstruct expansion joints around the perimeter of your floor.

RADIANT HEAT

- This product is not recommended for radiant heat applications.

ROUTINE MAINTENANCE

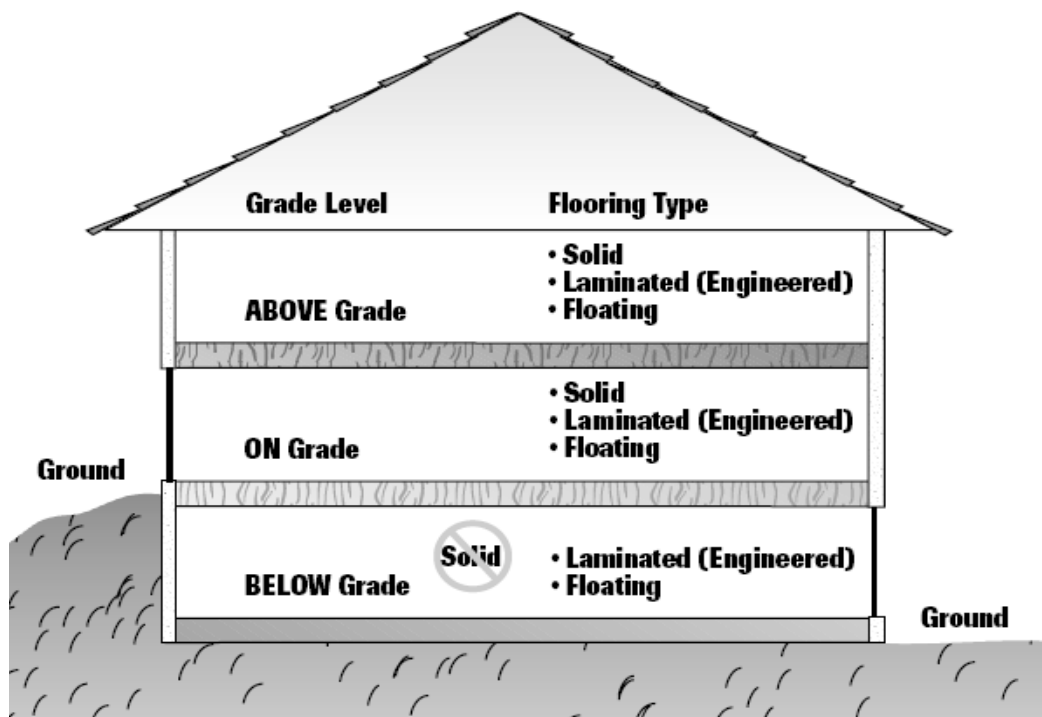
1. Use a damp cloth to blot up spills as soon as they happen. Never allow liquids to stand on your floor.
2. For tough spots, such as oil, paint, markers, lipstick, ink, or tar apply mineral spirits on a clean white cloth, then wipe the area with a damp cloth to remove any remaining residue.
3. **Sweep**, dust, or vacuum the floor regularly with a recommended hard floor attachment (not a beater bar) to prevent accumulation of dirt and grit that can scratch or dull the floor finish.
4. Do not use flood or **wet mop** the floor with soap, water, oil-soap detergent, or any other liquid household cleaning material. This could cause swelling, warping, delamination, joint-line separation and void the warranty.
5. Do not use steel wool, **abrasive cleaners** or strong ammoniated or chlorinated type cleaners.

6. Do not use buffing or polishing machines, these can generate heat or hot spots.
7. For spots such as candle wax or chewing gum, harden the spot with ice and then gently scrape with a plastic scraper, such as a credit card. Be careful not to scratch the flooring surface. Wipe clean with a damp cloth.
8. A more frequent dust-mopping or vacuuming schedule may be required in very sandy areas such as a beach home.
9. Clean flooring with the [Bellawood Floor Care Kit](#) or cleaning products safe for urethane finishes

Protection

1. Entry mats made of natural fibers are recommended and will help collect the dirt, sand, grit, and other substances such as oil, asphalt, or driveway sealer that might otherwise be tracked onto your floor.
2. Do not use plastic foam backed mats as they may contain solvents harming the flooring finish. To prevent slippage, use an under [rug underlayment](#) approved for urethane finishes.
3. Use floor protectors and wide-load bearing leg bases/ rollers to minimize indentations and scratches from heavy objects. As a rule, the heavier the object, the wider the floor protector.
4. Maintain a normal indoor relative humidity level between 30%-50% throughout the year to minimize the natural expansion and contraction of the wood.
5. Avoid excessive exposure to water during periods of inclement weather.
6. Do not walk on your floor with stiletto heels, shoes with sports cleats or exposed metal parts.
7. Do not allow sharp, pointed, or rough textured objects to be exposed to the hardwood flooring.
8. Keep **pet nails** trimmed to prevent scratching the floor.
9. **UV sunlight** will enhance –lighten or darken- the tone of different species of hardwood to varying degrees. Periodically rearranging your area rugs and furniture will allow the floor to antique or age evenly.
10. Use a dolly when moving heavy furniture or appliances; use a piece of quarter inch plywood or Masonite to protect the floor. Never try to slide or roll heavy objects across the floor.
11. A protective [felt](#), pads or castors should be used for furniture, [rubber wheels](#) or protective mats for office chairs.
12. We do not endorse the use of **hot steam** cleaning machines on hard wood products, use at your own risk.
13. Toys and tools can **scratch and dent** the finishes, are site related and not warrantable.
14. If using the glue-down installation method, do not allow foot traffic or heavy furniture on floor for 24 hours.

Bamboo is not recommended for below-grade or basement applications



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

From the NWFA Water and Wood publication

UNDERLAYMENTS FOR SOLID BAMBOO

Depending on the application, our flooring can be installed (nailed, glued or *floating) over an approved underlayment to meet the needs of customers, building specifiers and condominium associations desiring greater thermal insulation and sound isolation qualities. Note that when using an approved underlayment, pad or cushion there can always be slight movement, deflection or friction, squeaks or floor noise with any application. Floor noise is normal, to be expected and will vary from one installation type to the next or related to sub-floor type, flatness, deflection, and or related to the type of flooring material, species, the fasteners, relative humidity and the amount of topside pressure applied to the flooring. Therefore for these reasons floor noise is not considered a product or manufacturer defect.

UNDERLAYMENTS

(Nail down)

[White Silicon Vapor Shield®](#),

[15 lb felt paper](#) do not overlap seems under pre-finished flooring

[Black asphalt saturated Kraft paper](#) overlap seams 2" to 4"

[Bellawood Platinum](#), install (film side up) Flooring minimum ($\geq 3/8$ " thickness)

[Bellawood Premium](#), install (film side up) Flooring minimum ($\geq 3/8$ " thickness)

[Eco Silent Sound](#), install (film side down) Flooring minimum ($\geq 3/8$ " thickness)

[Dream Home Insulayment](#), install (smooth side up) Flooring minimum ($\geq 3/8$ " thickness)

[Dream Home Cork](#) (3mm), install (smooth side up) Flooring minimum ($\geq 3/8$ " thickness)

Do not use [plastic poly-sheeting](#) over wood subfloors, wood components need to breathe

(Glue down)

[Bellawood Platinum](#), install (film side up)

[Bellawood Premium](#), install (film side up)

[Eco Silent Sound](#) install (film side down)

[Dream Home Insulayment](#), install (smooth side up)

[Dream Home Cork](#) (3mm or 6mm) install (smooth side up)

*(Float)

Use the [Elastilon Underlayment System](#), (film side up). Flooring minimum ($\geq 3/8$ " thickness). Requires [plastic poly-sheeting](#) when placed over cement. Requires PVA [wood glue](#) be applied to the short ends. Not intended for below-grade installations.

SOLID WOOD APPLICATIONS

FLOOR PLACEMENTS	NAIL	GLUE	FLOAT
ABOVE GRADE	yes	yes	Use Elastilon
ON GRADE	yes	yes	yes
BELOW GRADE	no	no	no
SUBFLOOR TYPES			
CONCRETE	no	yes	yes
GYPCRETE	no	no	yes
OSB $3/4$ " min (floor joist 16" oc)	yes	yes	yes
PLYWOOD $5/8$ " min (floor joist 16" oc)	yes	yes	yes
PARTICLE BOARD	no	no	yes
ASPHALT TILE	no	no	yes
FIRM LINOLEUM	yes	no	yes
FIRM KITCHEN VYNYL	yes	no	yes
VCT VINYL TILES	no	no	yes
STEEL	no	yes	yes
CERAMIC/MARBLE	no	yes	yes
CUSHION VYNYL	no	no	no
RUBBER TILES	no	no	no

**** Before gluing, consult glue manufacture for proper prep needed on existing floors****



CAUTION: WOOD DUST Cut bamboo flooring outside

Sawing, sanding and machining wood products can produce 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.

Precautionary Measures: Cut flooring outside. Equip power tools with a dust collector. If high dust levels are encountered; use an appropriate NIOSH-designated dust mask. Avoid dust contact with eye and skin, **USE EYE AND EAR PROTECTION.**

First Aid Measures in case of irritation: flush/rinse eyes or skin with water for at least 15 minutes.

TO OBTAIN ASSISTANCE WITH PRODUCT INFORMATION, PLEASE CONTACT THE STORE OF ORIGINAL PURCHASE OR CONTACT **CUSTOMER CARE AT 800-366-4204**. VISIT THE "FLOORING 101" or www.lumberliquidators.com FOR INSTALLATION TIPS AND ADDITIONAL WARRANTY INFORMATION.