HARDWICK
Elegantly Curated Hardwood

Engineered Flooring Installation, Care & Maintenance Instructions for Standard Collections with Plywood Backing

Read all of these instructions carefully before beginning. In addition to these instructions, we recommend that the installer follow all guidelines set forth by the National Wood Flooring Association (www.nwfa.org). Where these instructions differ from NWFA guidelines, these instructions take precedence.

PRIOR TO INSTALLATION

It is the installer's responsibility to ensure that all of these General Requirements are met prior to installation, and that all specific installation instructions below for the installation method you have chosen (Glue Down, Nail Down, or Floating Floor plus, when applicable, Radiant Heat Systems) are followed carefully. When installed according to these instructions, this Engineered Hardwood Flooring is approved for use above, on and below grade. When installing below grade, use the Floating Floor installation method.

It is the installer's responsibility to inspect the flooring for proper color, grade, visible manufacturing defects, damage, or otherwise unsatisfactory appearance. **Upon receipt of the flooring, open 1-2 cartons to inspect and confirm with the job supervisor AND the homeowner/end-user that the material is satisfactory. If any problem is found, do not open any additional cartons**. Other than the first 1-2 that must be opened to check the material, open cartons are not returnable. Contact your supplier immediately if the material is not satisfactory. **Do not install damaged or visibly unsatisfactory material. Installing a plank constitutes acceptance of its appearance by the installer and homeowner/end-user.**

If installing over radiant heat, read the 'Radiant Heat Systems' section below before finalizing system design and product selection or beginning installation. Careful adherence to these guidelines is required for a successful and fully warranted installation. Certain wood species and plank sizes are not warranted for installation over any type of radiant heat. In wood flooring installations over radiant heat, moderate surface checking, cracking (especially at the ends of boards and around knots), shrinkage, gapping between planks, and slight cupping are all to be expected and do not constitute a product defect.

Note: in nail down installations of planks 5" and wider, adhesive is also required, using either the Full Spread or Glue Assist methods (see below under 'Nail + Glue Installation Instructions' for details).

Although engineered wood flooring is more dimensionally stable than solid wood flooring, it still expands and contracts in response to humidity changes. Seasonal gapping between planks, particularly with wide-plank flooring, is to be expected even with engineered products, and does not constitute a manufacturing defect.

ACCLIMATION

Do not begin opening cartons for acclimation until all parties, including the end-user, agree that the appearance of the flooring is acceptable. Opened cartons are not returnable. Before opening cartons, calculate the number of cartons that will be needed for each room/area where they will be installed and distribute them accordingly. South & West facing rooms will generally have different temperature and humidity ranges than North & East facing rooms.

Only after occupancy-ready site conditions have been established (see below under 'General Requirements'), carefully open both ends of each carton by cutting slits in the packaging, being careful not to tear the packaging. Do not open the cartons other than the ends, and do not cut the straps inside the carton until acclimation is complete. Removal of the flooring from the cartons/straps prior to installation could result in bowing/bending that could make the flooring difficult to install.

When the cartons are first opened, use a pin-type moisture meter and take 20-30 moisture content (MC) readings per thousand feet of flooring. Also, use a hygrometer to check the Relative Humidity (RH) in the space. Record all readings. Repeat this process (checking RH and the MC of the same planks checked previously) every few days until the moisture content has stopped changing and the wood has reached Equilibrium Moisture Content (EMC). Most jobsite conditions will require acclimation time of at least 5 days, but assessment of proper acclimation should be based on moisture content, not time.

GENERAL REQUIREMENTS – ALL INSTALLATION METHODS

Environmental Conditions

To help minimize moisture-related expansion and contraction, verify the following conditions prior to acclimation and installation:

- Permanent HVAC should be on and operational and maintained between 60-75°F with relative humidity of 35%-55% for a minimum of 7 days prior to delivery, during acclimation and installation, and throughout the life of the floor. Humidity levels below 35% or above 55% may cause movement in the flooring, gapping between pieces, cupping, cracking and other problems. Use of a humidification or dehumidification system may be required to maintain proper humidity levels, particularly over radiant heat and in desert or mountain regions.
- All exterior walls, windows, and doors must be in place and the building envelope closed during acclimation and installation.
- All wet work such as painting, drywall, masonry, and concrete must be completed and dry.
- Basements and crawl spaces must be dry and well ventilated. Crawl spaces must be a minimum of 18" high from the ground to the bottom of the joist. Dirt floors in crawl spaces should be covered with a 6-10 mil black plastic to reduce moisture migration. Seams should overlap and be sealed with waterproof tape. Perimeter crawl space cross ventilation should equal 1.5% of the square footage. Vents must remain open year round.
- Exterior grading should be complete and drainage should move away from the building structure with a minimum drop of 3" in 10'.

Subfloor Conditions

Subfloors must be:

Clean - Subfloors must be scraped clean and free of debris. Sweep and /or vacuum all debris from the subfloor. Debris on the subfloor may cause over-wood and uneven surfaces in the finished floor, poor fit between planks, and poor adhesive bond in glue-down installations.

Flat - Subfloors must be flat to within 3/16" over any 10' radius and 1/8" over any 6' radius. Check the flatness using a straight edge, laser line or string line. Grind, scrape, sand or shim all high or low spots. On concrete subfloors, grind all high areas and fill low areas using a quality cementitious leveling compound. Ensure that all fasteners securing the subfloor are set flush.

Dry - Check and record all moisture and temperature conditions prior to installation. Visually check the jobsite for potential moisture problems. Look for signs of water intrusion around window and doors. Check for mold or fungus on walls and all other areas. Water intrusion may necessitate structural repairs and/or create conditions unsuitable for flooring installation.

- Plywood and composite subfloors should be checked using a calibrated moisture meter. Be sure to use the correct moisture meter setting for the species being checked. Carefully follow the moisture meter manufacturer's operation instructions. Moisture readings should not exceed 10% in any location and the moisture variation between the subfloor and the flooring should not exceed 2% at time of installation.
- Concrete subfloors must be fully cured, at least 60 days old, and should have minimum 6-mil polyfilm between the concrete and ground. Lightweight concrete can hold more moisture and may take longer to dry out to an acceptable moisture content.
- Installations over concrete require the use of a Calcium Chloride test per ASTM F1869, or an in-situ Relative Humidity test per ASTM F2170. Test all areas where wood will be installed. The results of the Calcium Chloride tests should not exceed 3 lbs per 24 hours per 1000 square feet, and in-situ test results should not exceed 75% RH. Carefully record all results.
- NOTE: These tests give a snapshot of moisture conditions at the time of the test, but do not reflect the permanent year-round condition of the substrate. If Gluing Down on concrete that is on or below grade, it is highly recommended to use a concrete sealer approved by the manufacturer of the adhesive you have chosen, even if you believe the concrete is dry. A concrete slab on or below grade that measures dry today may become moist in the future and cause floor failure. Manufacturer is not responsible for site related moisture issues.

- More stringent requirements regarding the dryness of the subfloor apply when installing over radiant heat. See below under 'Radiant Heat Systems' for details.

Structurally Sound - Wood subfloors must be well fastened. Use screws every 6" and replace subfloor panels/boards as necessary to eliminate all movement and squeaking.

Acceptable subfloor types:

- CDX plywood - at least 5/8" thick for joist spacing up to 16" on center, minimum 3/4" thick for joist spacing greater than 16" on center (19.2" maximum). Plywood subfloors installed over concrete must be installed in accordance with the guidelines set forth by the National Wood Flooring Association (NWFA) – www.nwfa.org).
- OSB - at least 3/4" thick, PS 2-92 rated or PS 1-95 rated.
- Existing hardwood flooring over a suitable subfloor as outlined above. Existing floor must be well-fastened, smooth, and for Glue Down installations, unfinished.
- Underlayment grade particleboard (minimum 40 lb. density) - Glue Down/Floating Floors only.
- Concrete slab - Glue Down/Floating Floors only. Concrete must be at least 3000 lbs. density for Glue Down installations.
- Lightweight concrete (gypcrete) – Floating Floors only. Gluing to concrete that is less than 3000 lbs. density is NOT WARRANTED. Manufacturer provides no guarantee that lightweight concrete or gypcrete will remain structurally sound during the life of the floor. Separation of the flooring from the subfloor caused by deterioration or fracturing of the substrate will not be considered a product failure.
- Ceramic tile – Floating Floor only. Tile must be well-adhered and flat to 3/16" over any 10' radius.
- Resilient tile & sheet vinyl - Glue Down/Floating Floors only; for glue-down, tile/vinyl must be new and non-urethane-coated, and well-adhered to the subfloor.

Preparing the Perimeter

- Undercut door trim, jambs and casings to the thickness of the flooring plus any adhesive or underlayment being used.
- All wood flooring expands and contracts with changes in humidity. It is essential to install the floor leaving adequate expansion space between ALL sides of the flooring and ALL vertical obstructions, including door trim, jambs, studs, plumbing, cabinets, etc. This space will be covered with base molding. **Failure to provide adequate expansion space in any single location can damage the entire floor.**

    - **Minimum expansion space for 5/16" – ½" thick flooring is ½"**
    - **Minimum expansion space for 9/16" – ¾" thick flooring is 5/8"**

- **Never install cabinets or other permanent fixtures on top of the floor. All permanent fixtures should be installed on the subfloor prior to flooring installation and appropriate expansion space maintained between any fixture and the flooring.**

Layout

Whenever possible, use an exterior wall as the starting wall.

On plywood subfloors, if the subfloor is fastened to joists or trusses, the flooring should be installed perpendicular or at a 45° angle to the joists/trusses. If the subfloor is solid wood planking, flooring should be installed perpendicular or at a 45° angle to the solid wood planking. When installing over a radiant heated subfloor, install perpendicular to the main direction of the heating elements.

For floating installations, no contiguous area of installed flooring should exceed 30' across the widths of the planks or 50' along the lengths of the planks. For spaces wider or longer than these dimensions, add expansion space midway through the span and cover with a T-molding or other transition piece.

General Tools and Accessories recommended (all installation methods):

- Pencil; Tape Measure; Safety Glasses; Utility Knife; Pin-type Moisture Meter; Hammer; Shim Wedges; Tapping Block; Rubber Mallet; Rags; Carpenter square; Pry Bar or Pull Bar; Prefinished Wood Filler; Scraper; Dust Mask; Chalk Box & Chalk; Recommended Saws: Power Miter Saw, Table Saw, Jamb Saw.
- FILLERS: if filler is needed to repair voids, do not use oil-based fillers, as these can permanently discolor the wood beneath the finish if too much is applied. Large voids between planks suggest problems that should be addressed by means other than filler. If the flooring is not fitting together correctly, STOP the installation and contact your Sales Representative immediately.

- **Avoid the use of tape on the surface of the floor. Any use of tape may damage the finish. Instead, use strap clamps to pull and hold planks tight together. If you choose to use tape against this recommendation, use ONLY 3M Advanced Delicate Surfaces 2080EL Tape, and be sure to remove any tape within 20 minutes of application. Never tape temporary protective covering directly to the floor – only tape it to itself. Claims will not be accepted for damage to the floor surface caused by tape.**

Once all of these General Requirements are met, continue the installation using the instructions for the type(s) of installation you have chosen (Nail Down, Nail + Glue, Glue Down, Floating Floor, and Radiant Heat Systems).

NAIL DOWN (NAIL ONLY) INSTALLATION INSTRUCTIONS – **not recommended for planks wider than 5" or for installations over radiant heat. Over radiant heat, use the 'Glue Down' or 'Floating Floor' installation methods (see below). In nail down installations of planks 5" and wider, adhesive is also required, using either the Full Spread or Glue Assist methods (see below under 'Nail + Glue Installation Instructions' for details).**

This Engineered Wood Flooring can be nailed to plywood, OSB and existing wood flooring meeting the requirements outlined above under 'Subfloor Conditions.'

For Nail Down Installations, you will need the General Tools and Accessories, plus:
Nail set; Tack Stapler or 1" roofing nails (for felt); 6-d Finish Nails or Pneumatic Finish Nailer with 1 1/4" to 1 ½" fastener; Edge or Blind Stapler/Nailer (Manual or Pneumatic) with 1 ½" - 2" Fasteners for flooring 5/8" – ¾" thick, or 1-1/4" to 1-1/2" fasteners for flooring 5/16" – 9/16" thick (always do a test plank to verify that fasteners are seating properly and not causing dimpling on the surface); Compressor with hose (if pneumatic tools are used); 15 lb. roofing felt, #15 hardwood floor underlayment felt, or Aqua Bar underlayment paper.

Nailing Down the Floor
1. After installing 15 lb. felt or Aqua Bar per the manufacturer's instructions, measure out from the starting wall the width of one flooring plank plus the appropriate expansion space for that thickness of flooring. Mark two points toward each end of the starting wall and snap a chalk line along the full length of the wall through the marks.
2. Lay the tongue side of the first row of flooring along the chalk line. Face nail (top nail) the first row of flooring in place. Place the fasteners approximately 3/4" from the wall side (groove side) of the flooring board every 4" to 6". Continue the first row installation blind/edge nailing every 4" to 6" along the tongue and every 2" to 3" from every end joint. Note: Blind/edge nailing of the first row may require the installer to use 6-d finish nails or the pneumatic finish nailer along the tongue.
3. Continue the installation across the room, blind/edge nailing every 4" to 6" and 2" to 3" from each end joint.
4. Stagger end joints by at least 8". Avoid creating "H" patterns (where an end joint is adjacent to another end joint in the second to last row installed). Use cut ends to start the next row, discarding any pieces shorter than 8".
5. Trim the last row of flooring to maintain the minimum expansion space at the far wall.
6. At the far (finish) wall, it may be necessary to face-nail the last 2-3 rows due to the angle of the stapler/nailer. The last row or two of flooring may need to be pulled together using a pulling bar.
7. Complete the installation by reinstalling or installing new base moldings.

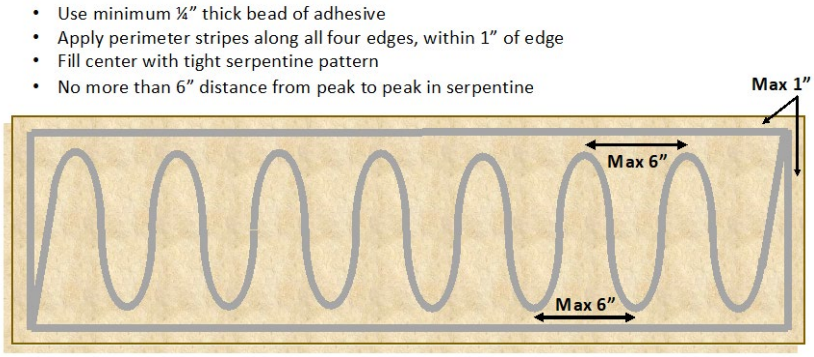
NAIL + GLUE INSTALLATION INSTRUCTIONS –**required when nailing down planks over 5" wide. Not recommended for installations over radiant heat. Over radiant heat, use the 'Glue Down' or 'Floating Floor' installation methods (see below). When nailing planks over 5" wide, choose either the Full Spread application or the Glue Assist application as detailed below.**

This Engineered Wood Flooring can be nailed + glued to plywood, OSB and existing wood flooring meeting the requirements outlined above under 'Subfloor Conditions' using a glue assist or full spread adhesive application.

For Nail + Glue Installations, you will need the General Tools and Accessories, plus:
Premium Wood Flooring Adhesive: Franklin 771, 811, or 821, Bostik GreenForce, BEST, or VaporLock, or Bona R851; For Full Spread Application: adhesive trowel recommended by the manufacturer of the adhesive selected; For Glue Assist Application: adhesive applicator gun; Adhesive Remover: Pacific Pride Orange Adhesive Remover; Nail set; Tack Stapler or 1" roofing nails (for felt); 6-d Finish Nails or Pneumatic Finish Nailer with 1 1/4" to 1 ½" fastener; Edge or Blind Stapler/Nailer (Manual or Pneumatic) with 1 ½" - 2" Fasteners for flooring 5/8" – ¾" thick, or 1-1/4" to 1-1/2" fasteners for flooring 5/16" – 9/16" thick (always do a test plank to verify that fasteners are seating properly and not causing dimpling on the surface); Compressor with hose (if pneumatic tools are used)

Nailing + Gluing the Floor -
1. Measure out from the starting wall the width of one flooring plank plus the appropriate expansion space for that thickness of flooring. Mark two points toward each end of the starting wall and snap a chalk line along the full length of the wall through the marks.
2. Full Spread application: trowel spread the adhesive on the subfloor along the chalk line wide enough to allow the first row of flooring to be installed, being careful not to cover the line.
   Glue Assist application: apply a minimum ¼" thick bead of adhesive using adhesive gun to backs of planks, carefully following the 'Serpentine + Perimeter' pattern shown below. Failure to follow this pattern could result in movement, squeaking/popping sounds in the finished floor, and other problems.

'Serpentine + Perimeter' Glue Pattern for Glue Assist Nail Down Install



3. Follow the adhesive manufacturer's recommendations for wet lay times before proceeding to the next step.
4. Lay the tongue side of the first row of flooring along the chalk line. Face nail (top nail) the first row of flooring in place. Place the fasteners approximately 3/4" from the wall side (groove side) of the board every 4" to 6". Once the face nails are set, use 6-d finish nails or the pneumatic finish nailer to blind/edge nail along the tongue of the first row, every 4" to 6" and every 2" to 3" from every end joint. Check to make sure the first row is still straight along the chalk line before proceeding.
5. Full Spread application: trowel spread enough adhesive to install 2-3 more rows.
   Glue Assist application: apply adhesive to the back of each plank following the 'Serpentine + Perimeter' pattern.
6. Install the second row by sliding the groove side on to the tongue of the first row. Blind/edge nail it in to place, with fasteners every 4" to 6" and 2" to 3" from each end joint. Stagger end joints by at least 8".
7. Continue the installation across the room, blind/edge nailing every 4" to 6" and 2" to 3" from each end joint.
8. Stagger end joints by at least 8". Avoid creating "H" patterns (where an end joint is adjacent to another end joint in the second to last row installed). Use cut ends to start the next row, discarding any pieces shorter than 8".
9. Most adhesives require that the installer clean the adhesive off the flooring boards during the installation. Follow the adhesive manufacturer's recommendations for this procedure. If adhesive remover is needed, use only the recommended Pacific Pride Orange Adhesive Remover and use it only as needed to remove localized adhesive spots. Never use any adhesive remover to clean large areas.
10. Trim the last row of flooring to maintain the minimum expansion space at the far wall.
11. At the far (finish) wall, it may be necessary to face-nail the last 2-3 rows due to the angle of the stapler/nailer. The last row or two of flooring may need to be pulled together using a pulling bar.
12. Complete the installation by reinstalling or installing new base moldings.
13. Do not allow foot traffic on the floor for 24 hours after installation is complete.

GLUE DOWN INSTALLATION INSTRUCTIONS – for all plank widths

This Engineered Flooring can be glued down to concrete, plywood, OSB, underlayment grade particleboard, and existing wood floors meeting the requirements outlined above under General Conditions/Subfloor Conditions. This Engineered Flooring can also be glued to other surfaces such as well-adhered sheet vinyl, vinyl tile, ceramic, etc., but the performance of the adhesive is the responsibility of the adhesive manufacturer and careful adherence to the adhesive manufacturer's installation instructions for that particular subfloor surface is crucial. The wood floor manufacturer does not warrant the adhesive bond between the subfloor and the wood flooring.

For Glue Down Installations, you will need the General Tools and Accessories, plus:

Strap Clamps; Premium Wood Flooring Adhesive: Franklin 771, 811, or 821, Bostik GreenForce, BEST, or VaporLock, or Bona R851; Adhesive Remover: Pacific Pride Orange Adhesive Remover; Adhesive Trowel recommended by the manufacturer of the adhesive selected.

Gluing Down the Floor

1. Measure out from the starting wall the width of one flooring plank plus the appropriate expansion space for that thickness of flooring. Mark two points toward each end of the starting wall and snap a chalk line along the full length of the wall through the marks. Install backer boards as guides along the wall side of the chalk line. Anchor the backer boards in place with screws or finish nails. Over concrete subfloors, anchor the backer boards with concrete screws or concrete nails. These boards will be removed later.
2. Lay the first row of flooring, but do not glue into place. Align the tongue side of the flooring against the backer board. Use cut ends to start the subsequent row, discarding any pieces shorter than 8". Dry lay the next two rows of flooring in place, sliding the tongue into the groove. End joints should be staggered by at least 8". Pull the rows of flooring boards out away from the backer board approximately 24" to allow for the glue to be spread.
3. Trowel spread the adhesive on the subfloor along the backer board wide enough to allow the first three rows of flooring to be installed. Follow the adhesive manufacturer's recommendations for wet lay times before proceeding to the next step.
4. Install the first row of flooring, pressing the tongue to the backer board. Slide the tongue of the next row of flooring into the groove of the first row and continue until the first three rows are done.
5. Trowel spread adhesive and continue the installation across the room. Be careful not to move the installed flooring out of position. Some flooring boards may need to be tapped or pulled into place with a tapping block or pull bar. Use strap clamps to pull rows tight and hold them together while the adhesive sets. Trim the last row of flooring to maintain the minimum expansion space at the far wall.
6. Most adhesives require that the installer clean the adhesive off the flooring boards during the installation. Follow the adhesive manufacturer's recommendations for this procedure. If adhesive remover is needed, use only the recommended Pacific Pride Orange Adhesive Remover and use it only as needed to remove localized adhesive spots. Never use any adhesive remover to clean large areas.
7. Once the room is finished, remove the backer boards at the starter row.
8. Dry lay the first row of flooring to replace the backer board. Trowel spread the adhesive on the back of the flooring boards (not on the subfloor) and install the flooring, sliding the groove onto the tongue of the already installed starter row. Doorways and other openings may require installation of the flooring the same way. Slide the flooring boards under the previously cut door trims and casings.
9. Complete the installation by reinstalling or installing new base moldings.
10. Do not allow foot traffic on the floor for 24 hours after installation is complete.

FLOATING FLOOR INSTALLATION INSTRUCTIONS – for all plank widths 4" or wider

This Engineered Wood Flooring can be installed as a floating floor system over almost all types of subfloors including Plywood, OSB, Existing Wood Floor, Vinyl, Vinyl Tile, and Ceramic Tile provided they are clean, flat, dry and structurally sound, meeting the requirements outlined above under 'Subfloor Conditions.' Note: Engineered Wood Flooring boards must be at least 4" wide to be installed as a floating floor system.

For Floating Floors, you will need the General Tools and Accessories, plus:
Strap Clamps; Tongue and Groove Glue: Franklin Titebond III or Equivalent PVA adhesive; Underlayment Pad: ~1/8" thick Two-in-One pad (pad plus vapor barrier) or ~1/8" thick pad with 6 mil polyfilm sheeting beneath.

Floating the Floor

1. If installing over underlayment pad plus a separate layer of polyfilm, install the 6 mil polyfilm first, taping all seams with waterproof tape, and then install the pad. Roll out the first run of pad from wall to wall parallel to the starter wall. On the installed pad mark two points toward each end of the starting wall and chalk a line the full length of the wall through the marks. This is the starter line.
2. Lay the first row of flooring using only long boards. The first flooring board and the last flooring board in this row should be a minimum of 12" long and cut to provide the appropriate expansion space on each end. Apply a 1/8" continuous bead of T&G glue on the bottom side of the groove of each end joint. Align the tongue side of the starter row along the chalk line and engage the end joints together. Use shims along the long wall and at both ends of the row to keep the floor in place and maintain the right expansion space.
3. Lay the second and third row of flooring boards. End joints should be separated by a minimum of 8" from the adjacent row. Spread a 1/8" bead of T&G glue along the bottom side of the long groove and each end joint groove on the second row of flooring. Engage the groove side of the second row with the tongue of the starter row. Engage the end joints at the same time, aligning them and cutting at the end of each row to allow for appropriate expansion space. Avoid creating "H" patterns (where an end joint is adjacent to another end joint in the second to last row installed). Use cut ends to start the next row, discarding any pieces shorter than 8". Continue this procedure for the third row. These three rows must be aligned straight to ensure that the rest of the installation remains straight.
4. Continue using the same procedure. If boards do not easily engage together, use a tapping block or pull-bar. Use strap clamps to pull rows tight and hold them together while the T&G glue sets. Trim the last row of flooring to maintain the minimum expansion space at the far wall.
5. Avoid working on top of the installed flooring to prevent breakage of the glue joint.
6. Complete the installation by reinstalling or installing new base moldings.
7. Do not allow foot traffic on the floor for 24 hours after installation is complete.

RADIANT HEAT SYSTEMS

Installations over radiant heated subfloors must use the 'Glue Down' or 'Floating Floor' installation methods. Do not use the 'Nail + Glue' or 'Nail Down' methods.

NOTE: the following plywood-backed products are NOT WARRANTED in installations over radiant heat:

- **All Hickory/Pecan and Maple products, regardless of plank dimensions**
- **Any product with a plank width greater than 8-5/8"**

The following plywood-backed products ARE WARRANTED for use over radiant heated subfloors: Arborea, European Oak, White Oak, Red Oak, Ash, Japanese Ash (Tamo), Japanese Chestnut (Kuri), Japanese Oak (Nara), Walnut, and Teak with planks not wider than 8-5/8". If the product you plan to install is not described above, please contact your retailer or distributor for clarification before finalizing product selection.

In all installations over radiant heat, the warranty will be void if any of the following system design, installation, or operation requirements are not adhered to:

System Design

- The radiant heat system must be designed and warranted by the system manufacturer for use under wood flooring.
- The system must have in-floor temperature sensors in all heating zones and a control mechanism or cutoff that will never allow the surface temperature of the wood floor to exceed 80°F.
- It is highly recommended to install embedded data loggers (embedded in the back of the plank) such as a Floor Sentry® or Fidbox® that continuously record temperature and relative humidity. Data loggers should be installed in each separate heating

zone. Data from these units can help prevent flooring failures by alerting the occupant to conditions that might void the warranty and damage the flooring.

- Electric systems in direct contact with the underside of the wood flooring must be classified by NWFA and system manufacturer as a fabric heating underlayment or mat with built-in thermal cutoff.
- Radiant heat systems embedded in a cementitious subfloor must have a minimum of 3/4" of concrete or gypcrete above the heating system.
- The radiant heat system design engineer and radiant heat system installer should design the heating system to restrict the operating temperature to never allow the surface of the installed wood floor to exceed 80°F while being heated by the in-floor heating system.
- The radiant heat system, once fully operational, must have a maximum heat output of 20 BTU/hr/sf or, for electric systems, 6 WATTS/hr/sf, for each zone receiving wood flooring.
- The system design must evenly distribute the heat across the entire wood floor area, such that the surface temperature of the wood floor never varies more than 3°F at any point in time across the surface of the heated flooring, as inspected with a thermal imager. The following methods can help achieve and maintain this requirement:

    1) embedding heating elements at least 3/4" deep below the flooring in a cementitious layer
    2) having a heat-conducting metal layer at least 0.020" thick well bonded to the surface of the subfloor
    3) having a plywood layer (minimum ¾" thick) between the heating elements and the flooring, with heat conducting metal flashing above the tubing on the underside of the subfloor.
    4) utilizing a system manufactured with with fixed spacing between heating elements that is designed to achieve temperature consistency across the entire floor to within 3°F.

- The radiant heating elements must run perpendicular to the wood flooring planks.
- Thermal gain from windows can have a huge impact on the surface temperature of the floor. Window treatments such as UV-blocking films, blinds, drapes, etc. are often necessary to ensure compliance with the above requirements.
- Rugs, mattresses, exercise mats, pet beds, furniture without legs, or other insulating products that cover the floor will trap heat and increase the temperature of the floor, which can result in irreversible damage. When the floor is expected to be covered, the radiant heating design engineer and the radiant heating installer should calculate and factor in the R-value of the specific insulating item and make adjustments to the heating output as necessary. The end-user must be informed of the effects of heat build-up and subsequent damage.

Installation and Operation of System

- For concrete subfloors, conduct and document Calcium Chloride Tests per ASTM F1869. Test results must not exceed **2.0 lbs.** per 1000 square feet per 24 hours.
- For wood subfloors, use a pin type meter to document the moisture content of the subfloor. Moisture readings should not exceed **8%** in any location and readings for the subfloor must be within 2% of the flooring at the time of installation.
- For systems where the heating elements are embedded or installed below the subfloor, the heat must be on and operating at normal output for a minimum of 7 days prior to bringing the wood on site for acclimation, in order to allow any moisture in the subfloor to flash off.
- Wood flooring must be delivered to the jobsite and thoroughly acclimated to jobsite temperature and humidity conditions with the radiant heat system on and functioning (see ACCLIMATION above).
- Wood flooring performs best with subtle changes in temperature. The floor should temperature should never be increased or decreased by more than 5°F per day.
- Relative humidity at the jobsite must be maintained between 35% and 55% at all times. Failure to maintain proper humidity levels will void all warranties.
- The system must be kept on and within 15°F of normal operating temperature at all times.
- Temperature in the installation area must be controlled between 60°F and 80°F at all times.
- After installation, do not cover a radiant-heated wood floor with protective covering for longer than a few hours. Leaving any type of protective covering on top of a heated floor can create an 'oven effect' and damage the wood.
- Excessive or uneven heat, rapid heating, and/or failure to maintain humidity levels between 35% and 55% may cause cracking, cupping and other forms of failure and will void the warranty.
- NOTE: in wood flooring installations over radiant heat, moderate surface checking, cracking (especially at the ends of boards and around knots), shrinkage, gapping between planks, and slight cupping are all to be expected and do not constitute a product defect.

Once these instructions and requirements are met, continue the installation by following the instructions for your specific installation method as outlined above.

INSTALLING BASE AND TRANSITIONS

Once the installation is complete, install base moldings and transition moldings to cover the perimeter expansion space. Never glue or fasten base or transition moldings to the flooring. Doing so eliminates the expansion space and can cause severe damage to the entire floor area. The flooring must be free to expand and contract underneath the moldings.

CARE & MAINTENANCE

General Care of Wood Flooring

- Permanent HVAC should be on and operational and maintained between 60-75°F with relative humidity of 35%-55% throughout the life of the floor. Humidity levels below 35% or above 55% may cause movement in the flooring, gapping between pieces, cupping, cracking and other problems. Use of a humidification or dehumidification system may be required to maintain proper humidity levels, particularly over radiant heat and in desert or mountain regions.
- Flooring should be one of the last items installed in a project. In order to protect the floors while other trades are finishing their work prior to final cleanup and turnover to the owner, use a breathable protective covering such as Ram Board or Floorotex. Do not use Red Rosin paper, and do not use polyfilm or other non-breathing coverings as they can cause damage from humidity buildup. Clean the floor thoroughly before laying the covering to ensure that no debris is trapped underneath. Tape pieces of protective covering together but do not tape them to the wood flooring.
- **Temporary floor covering should never be kept in place longer than a few (1-5) days. For installations over radiant heat, covering should never be left in place for more than a few hours.**
- All wood flooring changes color with exposure to light and air, especially in areas of direct sunlight. Areas covered with rugs will change much more slowly than exposed areas. To avoid dramatic color differences, it's best not to place area rugs for the first few months after installation, when the floor is changing color most rapidly. Once rugs are placed, they should be moved periodically so that previously covered areas can catch up to uncovered areas.
- Place walk-off mats at all entrances to collect dirt and debris that could damage or dull the flooring finish. Mats are also required in areas where people congregate and/or stand for long periods of time, such as in front of ovens, sinks, service counters, and cash registers.
- Install felt floor protectors underneath all furniture.
- In food service areas such as restaurants and cafeterias, top-coating a urethane-coated floor will help prevent against moisture damage caused by frequent spills. See below for recommendations on how to top-coat the specific flooring product you have selected.
- Do not allow people to wear spiked heels on the floor, which will damage even the hardest wood floors and finishes.
- Pet claws should be properly trimmed at all times.
- Work boots and shoes that may have pebbles lodged in the soles should be removed prior to entering.

Regular Cleaning

- Sweep or vacuum frequently. Most damage to wood floor finishes is caused by debris that is walked on.
- All mats or rugs should be cleaned on a regular basis. They should also be moved occasionally to allow natural color changes caused by light to occur evenly in all areas. Do not allow soiled mats or rugs to stay on the floor as they can trap moisture on the surface.
- Clean the floor regularly with Bona Hardwood Floor Cleaner or Basic Coatings Squeaky Commercial Floor Cleaner. Never apply ammonia, vinegar, polishes, waxes, oils, oil soaps, or petroleum-based cleaners under any circumstances. Use adhesive remover only to remove spots of adhesive, not as a cleaner, and use only the recommended Pacific Pride Orange Adhesive Remover. Do not use abrasive cleaning implements or steam mops.
- Never wet-mop your floor, and always clean up spills and standing water as soon as possible. With water or any other cleaning agent, be sure to thoroughly ring out the applicator or mop prior to applying it to the floor. A damp mop is fine as long as the moisture is limited to an amount that will evaporate almost immediately. Moisture that is allowed to seep into the seams between the planks may cause damage to your flooring.
- If the floor will be cleaned professionally, the cleaning personnel must be thoroughly informed about all of these cleaning guidelines.

- With textured floors that have soil embedded in the wood grain, periodic deep cleaning with a power cleaning machine recommended for hardwood floors such as the Bona Power Scrubber or Basic Dirt Dragon may be required to thoroughly clean the floor.

Recoating

- When it becomes necessary to add an additional coat of protection to the floor, we recommend the Bona Prep or Basic Tykote systems in combination with the compatible two-component water-based finish, such as Bona Traffic HD or Basic Pure Matte. These systems clean and prepare the floor to receive the new topcoat, allowing for easy recoating without sanding. Follow the Bona or Basic recommendations carefully. Before proceeding, always do a test to ensure good adhesion of the new coat and to ensure that the gloss level of the new finish is satisfactory.
- In commercial/hospitality settings, top-coating a urethane-coated floor immediately after installation will provide additional durability and help prevent against moisture damage caused by frequent spills.

We want every customer to be happy and satisfied with their purchase. If there are claims or questions, or in the event that you are not totally satisfied with your hardwood floor, contact your local retailer first. If the retailer is unable to answer your questions you may contact us in writing at the following address: Attn: Customer Service, 1741 Junction Ave., San Jose, CA 95112.