johnson.hardwood

ENGINEERED HARDWOOD
INSTALLATION GUIDELINES

(Revised Sept 3, 2026)

Our engineered wood flooring products are designed for on grade, above grade and below grade applications.

PLEASE REFER TO JOHNSON'S WEB SITE FOR CURRENT / UPDATED REVISIONS.

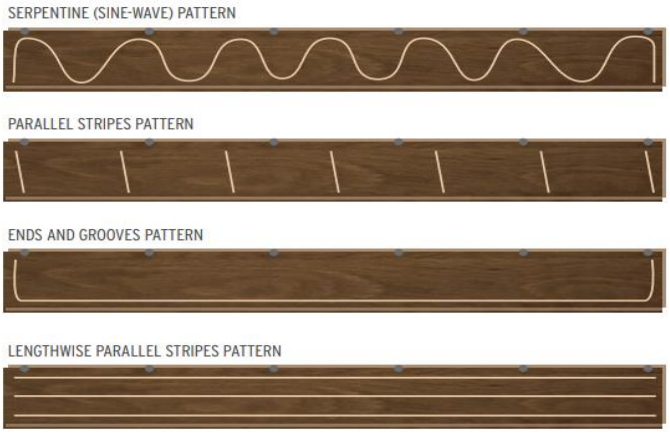
Johnson Engineered wood flooring can be installed in one of the following manners: (1) glue-down using a "high quality" urethane base adhesive along with a moisture vapor protection system**.** (2) staple-down using 18-gauge 1/4" crown staple by 1-1/2" long for 3/8" to 1/2" thick flooring; 18-gauge cleats 1-1/2" to 1-3/4" long for 9/16" to 5/8" thick flooring; 16-gauge cleats or 15.5-gauge staples by 1-3/4" long for 3/4" thick flooring. Or (3) the floating method using a recommended tongue and groove adhesive such as Roberts 1406; Titebond 2104; and/or Precision Components. (**Note: We do not recommend floating 3/8", 5/8" or 3/4" thick flooring products).**

RECOMMENDED INSTALLATION METHODS: (REFER TO THE FOLLOWING INSTALLATION GUIDELINES FOR SPECIFIC INSTALLATION INSTRUCTIONS FOR EACH OF THE BELOW-MENTIONED FLOORING TYPES AND MATRIX on pg 13).

- **1/2" H x 7.5" W x RANDOM LENGTHS (UP to 7' LONG) with 2MM WEAR-LAYER (STAPLE, GLUE or FLOAT).**
- **5/8" H x UP TO 9.5" W x RANDOM LENGTHS (UP to 7' LONG) with 4MM WEAR-LAYER (CLEAT or GLUE).**
- **3/4" H x UP TO 9.5" W x RANDOM LENGTHS (UP to 7' LONG) with 4MM WEAR-LAYER (STAPLE, CLEAT, or GLUE).**
- **3/4" H x Up TO 9.5" W x RANDOM LENGTHS (UP to 7' LONG) with 6MM WEAR-LAYER (STAPLE, CLEAT, or GLUE).**

NOTE: JOHNSON REQUIRES GLUE ASSIST FOR PLANKS EXCEEDING 7.5" IN WIDTH WHEN USING CLEATS OR STAPLES AS THE PRIMARY MEANS OF ATTACHMENT. PLEASE SEE THE BELOW GLUE ASSIST APPLICATION ILLUSTRATION TAKEN FROM THE NATIONAL WOOD FLOORING ASSOCIATION (NWFA) INSTALLATION GUIDELINES.

c. Listed are a few common methods and applications for each:



READ BEFORE INSTALLATION
STOP! IMPORTANT INFORMATION

GUIDELINE DISCLAIMER: COMPLETELY READ AND UNDERSTAND THESE GUIDELINES BEFORE INSTALLATION BEGINS. FAILURE TO DO SO CAN/WILL RESULT IN THE FOLLOWING DAMAGE TO YOUR FLOOR: CUPPING, WARPING, BOWING, TWISTING, BUCKLING, SHRINKING, END-JOINT PEAKING, ROLLING SHEAR SEPARATION, GAPPING, CHECKING, CRACKING, SPLITTING, WOOD FIBER TEAR-OUT (AKA SPLINTERS), WATER DAMAGE, MOISTURE VAPOR TRANSMISSION DAMAGE, DISCOLORING, EARLY WEAR, MARING, PET RELATED DAMAGE, ADHESIVE ETCHING, MALLET IMPACT DAMAGE, EDGE CRUSH, DENTING, SCRATCHING, HOLLOWS, FINISH BLISTERS, FINISH SHEAR, COMPRESSION STRESS, COMPRESSION SET, UV LIGHT DAMAGE, FADING, DARKENING, SQUEAKS, CRACKLING, POPPING, NOISY FLOOR SYNDROM, AS WELL AS ADHESIVE BOND RELEASE. FAILURE TO ABIDE BY THESE GUIDELINES CAN/WILL VOID ANY/ALL WARRANTIES OFFERED BY JOHNSON.
(NOTE: JOHNSON DOES NOT WARRANTY INSTALLATIONS, NOR DO WE WARRANTY THE PERFORMANCE OF OTHER MANUFACTURER'S PRODUCTS, I.E., IN THE EVENT THAT JOHNSON RECEIVES A CLAIM INVOLVING SQUEAKY FLOOR SYNDROM, HOLLOWS, DISCOLORATION, BOND RELEASE AND/OR MOISTURE EMISSION CAUSED/RELATED FAILURE AND/OR DAMAGE, JOHNSON WILL REFER YOU TO THE ADHESIVE MANUFACTURER FOR ANY/ALL APPLICABLE WARRANTY COVERAGE).

Prior to installing Johnson engineered wood flooring, materials MUST be tested for recommended moisture content (i.e., 7 to 10 percent). Jobsite temperature and relative humidity levels MUST also be carefully measured and recorded daily during the installation process. Note: The homeowner/contractor MUST maintain the temperature and relative humidity level in the required ranges (i.e., 60 to 80f and 35 to 55rh) to ensure maximum performance and moisture content of the flooring for the life of the installation.

Newly Constructed Building: In newly constructed buildings, hardwood flooring should be one of the last items installed. All work involving water or moisture **MUST** be completed prior to the delivery of wood flooring to the job site. In addition, all doors and windows **MUST** be installed and weather striped.

HVAC System: **NEVER** turn off the Heating Ventilation Air-Conditioning or Humidification (HVAC) system when you're away from your home/building (i.e., during times of absence such as vacations etc.). By doing so you may return to a floor that has cupped, buckled, or has experienced shrinking related gapping, splitting, checking, finish shear and/or rolling shear separation failure, which are not covered under Johnson's warranty program.

Acclimation: Engineered wood floors **require 72 hours of** pre-installation acclimation. **Note:** the environment **MUST** represent "normal live-in conditions," which is interpreted to mean an environment maintained at 35 to 55 percent relative humidity and a temperature of 60 to 80 degrees Fahrenheit respectively. These conditions **MUST** have been established at least 5 days prior to delivering the flooring to the jobsite and continue for the life of the installation. **All** doors and windows **MUST** be installed, and weather striped prior to delivering the flooring to the jobsite.

OWNER/DEALER/INSTALLER RESPONSIBILITY

Note: Products are manufactured according to accepted industry standards which permits a defect tolerance of 5%

Product Quality: **The contractor/installer/end-user assumes all responsibility for final inspection of product quality.** The flooring **MUST** be inspected at time of delivery and prior to installation. Make sure that the delivered flooring product identification label matches that of the product description as listed on the Sales Order and/or Job Ticket. Carefully examine the flooring for moisture content (7.0% to 10.0%), color, grade, finish quality and/or any/all damage during transit **before** commencing with the installation. The installer should use reasonable selectivity to cull out or cut off unacceptable pieces. If the flooring material is considered unacceptable, **"STOP DO NOT INSTALL THE FLOOR,"** but contact the dealer immediately. **Once the flooring is installed there is no question as to its acceptability.**

Informing the End-User: End-Users **MUST** be made aware of color variations, graining variation, grading conditions, special effects such as resin fill and/or filler, the effect that moisture has on wood flooring; the importance of maintaining a controlled environment (60 to 80f and 35 to 55rh respectively) before, during and after the installation for the life of the floor. Also, the proper way in which to maintain wood floors and the effect that UV light has on wood. **Note: all products offered by this Manufacturer will change color over time. The degree of change depends on the amount of UV exposure.**

Environment: **Prior to installation, the installer MUST determine that the environment of the job site and the conditions are suitable for the material being installed.** The installer is responsible for determining the moisture content of the sub floor and/or the moisture transmission rate of the concrete slab as per the National Wood Flooring Association (NWFA) installation guidelines, SECTION V – Appendix AA Moisture Testing Procedures for Concrete Slabs, (specifically the Calcium Chloride test) and Appendix AB Moisture Testing for Wood. All test results **MUST** be carefully **documented** and made available to the homeowner/end-user prior to installing the flooring. **Note:** Manufacturer declines any/all responsibility for job failure from or associated with improperly prepared sub-floors and/or job site environment deficiencies. In addition, the installer/contractor **MUST** take daily readings of the ambient conditions of the environment in which the flooring will be installed (i.e., temperature and relative humidity levels) and record the results on a daily log sheet as well as take periodic moisture readings of the wood floor and sub floor during the installation process and record the results of those readings as well.

The homeowner/end-user **MUST** be made aware of the effect that moisture has on wood flooring e.g., moisture gain can result in wood rot, discoloration, development of mold, finish blisters, finish flaking, finish chipping, cupping, crowning, buckling, cracking, splitting, checking, warping, distortion, rolling shear separation, and possible damage to surrounding walls, tile/stone floors, cabinetry etc. Moisture loss can result in splitting, rolling shear separation gapping, surface checking and/or end checking, splinters, finish shear, finish flaking, finish chipping, and everything else mentioned with moisture gain. The importance of maintaining a controlled environment (60 to 80f and 35 to 55rh respectively) before, during and after the installation for the life of the floor **must** be understood.

During Installation: It is the installer's responsibility to protect the floors from any/all damage i.e., dings, dents, scratches, moisture, sand, debris of any/all kinds, etc. Installation/construction related damages are not covered under manufacturer structural and/or finish warranties.

Delivery/Storage: **NEVER** deliver wood flooring during adverse weather conditions such as rain and/or snow unless the flooring can be completely and thoroughly protected from becoming wet and or gaining moisture during transit to the jobsite. **NEVER** store wood flooring in an "uncontrolled environment" e.g., patios, driveways, garages, sheds, storage pods, storage containers, storage units, vans, enclosed trucks or even in the structure in which the flooring will be installed. Deliver the flooring to the jobsite **ONLY** when a controlled environment has been established according to Manufacturer/NWFA installation/environment requirements.

JOB SITE INSPECTION AND PRE-INSTALLATION REQUIREMENTS

Note: In newly constructed buildings and/or remodeling's, wood flooring should be one of the last items installed. All work involving water or moisture MUST be completed prior to delivering the flooring to the job site. In addition, all doors and windows MUST be installed and weather stripping in place. Additional information can be found in the National Wood Flooring Association's Technical Publication No. A100 Water and Wood. "How Moisture Affects Wood."

Moisture: **The** job site must be dry with no visible moisture. To ensure the job site is ready for hardwood flooring, installer **MUST** conduct necessary moisture tests (i.e., Calcium Chloride testing when installing over a concrete slab, or with an approved Calibrated Pin Type Moisture Meter when installing over wood sub floors). All testing results **MUST** be carefully **recorded** and made available to the homeowner **before** work begins. **Note: Electronic moisture**

meters designed to measure moisture content in concrete slabs are NOT recognized by this Manufacturer as a viable way to determine if a moisture vapor retarding system is needed/necessary prior to installing the floor.

Job-Site Evaluation: Contractor/installer **MUST** perform a pre-installation job site evaluation. The contractor/installer **MUST** determine the following: Does the lot/structure sit on an alluvial plain? If so, is water run off directed away from the side of the building? Does the roof gutter system direct water to a main drainage system that carries water away from the side of the building? Is there adequate drainage around landscape and hardscape to carry water away from the side of the building? Also, check the surrounding concrete walkways and driveways for signs of efflorescence and/or algae growth. Check surrounding planters for overwatering as well as make sure sprinklers are directing water spray away from the side of the building.

Wet Work: All wet work such as plastering, painting and/or any/all masonry or tile work MUST be completed prior to delivering the flooring to the jobsite.

Grade Level: Engineered wood flooring is designed to be installed on all grade levels (i.e., on grade, below grade and above grade). **Note**: When installing the floor via the glue down method the installer **MUST** follow the adhesive manufacturer's guidelines since they can/will take precedence over the wood flooring manufacturer's installation requirements and/or recommendations when it comes to substrate preparation, moisture testing and attachment to the substrate. **NOTE: if any part of the soil surrounding the structure is 3 inches above the floor of any level, consider that level below-grade.**

HVAC System: The installation site **MUST** have a consistent room temperature of 60 to 80 degrees Fahrenheit and 35 to 55 percent relative humidity, respectively. The structure **MUST** be fully enclosed with interior climate controls operating for a minimum of **5 days** prior to delivering flooring to the jobsite. Moreover, recommended temperature and humidity levels **MUST** continue during and after installation for the life of the floor. If heating/air-conditioning/humidification systems are in operating condition, they need to be operating. If it is not possible for the permanent heating/air-conditioning/humidification systems to be operating before, during and after installation, a temporary heating/air-conditioning/humidification system that mimics "Manufacturer" specified temperature and humidity conditions can enable the installation to proceed until a permanent heating/air-conditioning/humidification system has been installed and is operating. **Note: Johnson does Not recommend the use of propane heaters as a means of heating up the interior environment as said type of heating can/will increase the relative humidity level within the structure.**

Sub-floor: The sub-floor **MUST** be free from paint, oil, grease, dust, drywall mud, sealers, release agents and all other types of residues/contaminates that can/will act as bond breakers.

Crawl Space: The soil within the crawl space **MUST** be covered with "black" 6-mil polyethylene sheeting overlapping the seams a minimum of 12 inches followed by taping the seams the entire length of the over-laps with 3 inch wide packing tape. Make sure to run the poly sheeting up the stem wall and/or piers 4" to 6", then apply stucco tape horizontally over 50% of the poly sheeting and 50% onto the stem wall and/or piers. Per industry standards to foster proper airflow there **MUST** be at least 1-1/2 vents for every 100 sq. ft. of crawl space area. The distance between the surface of the soil and the bottom of the sub floor should/must have a clearance of 18 to 24 inches. **It is the installer's responsibility to determine (prior to installing the flooring) that the perimeter of the crawl space contains the correct number of vents for the size of the crawl space and that no vents have been blocked i.e., by masonry concrete patios, etc. Local building codes may differ. Follow local building codes. See Figure 1-1. NOTE:** It is not uncommon to have as much as 14 to 17 gallons of water emitting from the soil in a 24-hour period, over 1000 sq. ft. of crawl space. Moisture related failures resulting from not covering the crawl space soil with 6-mil black poly sheeting **will not** be warranted by this Manufacturer.

Moisture Emission: Per Manufacturer/NWFA recommendations/requirements, it is generally recognized when installing **engineered wood** flooring directly to the surface of a concrete slab (without the use of an industry/manufacturer approved vapor retarding system), the maximum "allowable" moisture emission rate

(passing through the surface of the slab) as expressed by the Calcium Chloride test is 3.0 pounds per 1,000 sq. ft. per 24 hours before, during and after installation for the life of the floor.

SUB-FLOOR REQUIREMENTS

Concrete Slab: The concrete slab must be dry. Newly poured Concrete slabs will require a minimum 120 to 210 day drying period depending on the size and depth of the slab and weather conditions. **Please follow ASTM standard F1869-22 which is the specific preparation/application instruction for calcium chloride testing.**

Cleanliness: For glue down applications, the subfloor **MUST** be free from any/all paint, oil, grease, drywall mud/dust, release agents and all other types of residues/contaminates that can/will function as bond breakers.

Floor Flatness: The subfloor/concrete slab should be level in general; however, it **MUST** be flat to within 3/16" in 10-feet in all directions. To achieve the required flatness tolerance the subfloor and/or concrete slab can be sanded, ground, or floated to bring the subfloor/concrete slab into the required flatness tolerance as per manufacture/industry requirements. **Note:** When using a Portland cement-based self-leveling and/or Portland cement-based patch type product to correct for floor flatness issues, **ALWAYS consult with the adhesive manufacturer for recommendations as to what self-leveling/patching material is compatible with their specific adhesive product being used to attach the floor to the subfloor/substrate.**

Raised Foundation Sub-Floor: When plywood and/or OSB is used as a sub-floor the moisture content difference **MUST NOT** exceed more than 4% between the finished wood floor and the plywood/OSB subfloor. Subfloor panels should conform to U.S. Voluntary Product Standard PS1-07, Construction and Industrial Plywood and/or U.S. Voluntary PS 2-04 and/or Canadian performance standard CAN/CSA 0325.0-92 Construction Sheathing. Other CSA standards also apply. Note: Both CD EXPOSURE 1 plywood and OSB Exposure 1 subfloor panels are appropriate subflooring materials. Plywood size for sub-floor is suggested to be standard ¾" x 4' x 8' panels, with an expansion gap of ¼" between panels, and stagger full sheets by ½. **Plywood/OSB subfloor should run at a 45-degree angle (preferred) or perpendicular to the direction of the floor joists.**

ATTENTION: ENGINEERED WOOD FLOORING CANNOT BE INSTALLED DIRECTLY OVER 1" X 6" PLANK TYPE SUB-FLOORING (AND/OR PARTICLE BOARD WHEN USING EITHER THE GLUE DOWN METHOD OR MECHANICAL FASTENERS TO INSTALL THE FLOOR). **NOTE:** MANUFACTURER REQUIRES AN ADDITIONAL LAYER OF 1/2" PLYWOOD (CDX PLYWOOD or BETTER) BE PLACED AND SECURED TO THE SURFACE OF THE 1" X 6" SUBFLOOR FOR ADDITIONAL SUPPORT. RECOMMENDED FASTENERS: 1-1/4" TO 1-1/2" LONG DECK SCREWS (screwing schedule 6" to 8" around perimeter and every 12" in the field)**.** NOR CAN ENGINEERED WOOD FLOORING BE MECHANICALLY FASTENED OVER FOAM, RUBBER AN/OR FELT TYPE PAD/UNDERLAYMENT AS IT CAN/WILL RESULT IN SQUEAKY/NOISY FLOOR SYNDROM, WHICH IS **NOT** COVERED UNDER ANY/ALL APPLICABLE WARRANTIES OFFERED WITH THE PRODUCT.

Terrazzo or Vinyl: Before installing with a glue-down method over terrazzo or vinyl type surfaces etc., first consult with the chosen adhesive manufacturer as they have detailed information regarding the steps that are required to properly prepare the surface for installation.

CDX Plywood: CDX plywood (when properly installed over the surface of a concrete slab or lightweight concrete sub-straight following manufacturer/industry guidelines/standards), **MUST** be covered with an additional layer of 15 lb. tar saturated felt paper, or an asphalt laminated paper meeting UU-B-790a, Grade B, I, Style 1a (Aqua Bar), prior to installing the floor (via mechanical fastening only) to the plywood subfloor. **NOTE:** If the plywood is glued down it is **mandatory** that the installer(s) follow the adhesive manufacturers guidelines so as not to void any/all applicable warranties offered by the flooring manufacturer and adhesive manufacturer.

Raised Foundation: Ground level of a raised foundation sub-floor **must** be completely covered with an industry approved moisture vapor retarding system such as 1 layer of 15 lb. tar saturated felt paper, or an asphalt laminated paper meeting UU-B-790a, Grade B, Type I, Style 1a (i.e., Aqua Bar). Installations over raised foundations (joist type or pier and beam type construction) must conform to the following requirements: Joist span of 16" on center requires a "minimum" of 5/8" CDX (or better) plywood. 19.2" span requires a minimum of 3/4" CDX (or better) and 24" spans require a minimum of 1" interlocking tongue and groove CDX (or better) plywood**. Note: If OSB is used as a subflooring material, please refer to SECTION: Plywood Subfloor under SUB-FLOOR REQUIREMENTS. Note: If the floor is to be glued down to the surface of OSB, first consult with the adhesive manufacturer to determine compatibility of the adhesive and the OSB as most OSB contains wax which can/will function as a bond breaker.**

Vapor Protection Systems/Adhesives: Engineered wood flooring CANNOT BE INSTALLED DIRECTLY TO THE SURFACE OF A CONCRETE SLAB WITHOUT THE USE OF A VAPOR RETARDING SYSTEM IF THE MOISTURE EMISSION RATE (based on the calcium chloride test) EXCEEDS 3 lbs. IN 24 HOURS OVER 1,000 SQ. FT. OF CONCRETE FLOORING SURFACE. If the moisture emission rate exceeds 3 lbs. before, during and after the installation for the life of the floor, then consult with the adhesive manufacturer to determine which of their products best suits your installation needs. Failure to do so can/will void all applicable warranties. NOTE: MANUFATURE DOES NOT OFFER WARRANTY COVERAGE AGAINST MOISTURE RELATED FAILURES…ANY/ALL MOISTURE RELATED CLAIMS, AS WELL AS BOND RELEASE RELATED CLAIMS FALLS UNDER THE WARRANTY COVERAGE OF THE ADHESIVE MANUFACTURER. IN THE EVENT OF A MOISTURE CAUSED/RELATED CLAIM, AND/OR BOND RELEASE RELATED CLAIM, THE MANUFACTURER WILL DIRECT YOU TO THE ADHESIVE MANUFACTURER AS SAID CLAIM TYPES FALL UNDER THEIR WARRANTY PROGRAMS, NOT THE WOOD FLOORING MANUFACTURER'S.

INSTALLING THE FLOOR

Required Tools and Accessories for Nail and Glue down Installations:
Please refer to the National Wood Flooring Association's Technical Publication N0. A300 Tools of the Trade. "What Contractors Need for Hardwood Flooring Installation."

Control Environment: Meter the moisture content level of the flooring again and make sure it has stabilized with the surrounding **controlled environment** based on 35 to 55 percent relative humidity and 60 to 80 Fahrenheit. **NOTE: An uncontrolled environment can/will lead to the following conditions: Shrinkage/gapping, cupping, warping, twisting, buckling, checking, splitting, compression stress, splinters, blisters due to finish shear, and even wear-layer and/or inner ply separation due to rolling shear. Johnson will not warrant any/all damages caused by moisture/atmospheric related causes/conditions.**

Undercut Door Casings and Jambs: Undercut all door casings and jambs 1/16" higher than the thickness of the "finished" flooring being installed. You can achieve this by using a hand jamb saw using a piece of the flooring as your height gauge or use an adjustable power jamb saw adjusted to the appropriate height.

Box Rule (3-5): Prior to beginning the installation, providing proper layout of flooring by working out of multiple boxes of material (3 to 5) is recommended to achieve a more uniform color tone and grain appearance throughout the installation.

Blending Rule: Where wood flooring transitions into support moldings (i.e., stair treads, stair nosing's, reducer's, T-molds, endcaps etc.) pick boards that better blend to the color tone of the molding to avoid a drastic change in color tones between the trim molding and the floor. Your goal is to gradually transition into the molding's color tone to avoid a distinct color variance between the wood floor and the trim moldings.

Expansion Space: Allow at least 1/2" (minimum) of expansion space at all wall and vertical obstructions. Expansion space will be concealed using baseboard and/or quarter round trim. Wood flooring will change dimensionally according to changes in the ambient conditions within the structure (i.e., temperature and relative humidity levels).

Insufficient expansion space can result in cupping, buckling, blisters, edge crush, compression stress, rolling shear failure, splinters, cracking, splits and checking in the flooring. Note: Johnson <u>will not</u> provide warranty coverage for any/all damage caused by improper installation.

<u>Lightweight Concrete:</u> For installations over lightweight concrete **always** consult with the adhesive manufacturer prior to beginning the installation, as they will be able to provide instructions on how to properly prep the surface of the lightweight to avoid a potential de-bonding failure. Always follow the adhesive manufacturer's recommendations/requirements for proper use.

GLUE-DOWN INSTALLATION

IMPORTANT:
Johnson Premium Hardwood does not recommend and/or condone the use of water-based adhesives, acrylic based adhesives, and/or pressure sensitive adhesives. The installer understands that by using such types of adhesives voids any/all applicable warranties offered by the wood flooring manufacturer for the product(s) being installed.

<u>Adhesive</u>: <u>Use a high-quality urethane-based adhesive along with a moisture vapor protection system. Note: Adhesive manufacturer's may offer moisture emission warranty coverage subject to their installation and jobsite recommendations/requirements. Always follow the recommendations/requirement as set forth in the adhesive manufacturer's installation guidelines as the adhesive manufacturer will have detailed information on testing, preparation, application, and cleaning procedures. Failure to follow the recommended/required guidelines can/will result in loss of warranty coverage by both the adhesive manufacturer as well as Johnson Premium Hardwood.</u>

<u>Starting Line & Expansion Space:</u> Snap a working line parallel to the starting wall in multiples of the plank's width, plus an expansion space of ½" minimum along all vertical obstructions. Be careful to ensure that you do NOT end up with a width of less than 2 inches at the final opposing wall. If you do end up with a rip cut less than 2" in width, adjust by ripping down the width of the first row.

<u>Backer Board/Flooring Installation:</u> Install a backer board along your initial starting line, this will provide needed support for the first 3 to 4 feet of flooring installation. Backer boards are typically made from 1/2" to 3/4" (MDF) Medium Density Fiber Board cut into pieces 4 or 5 inches wide by 8 feet long. Secure the backer board to the subfloor/substrate using the appropriate length fasteners (deck screws for raised foundation applications and Tap Con screws for applications over concrete slabs) being careful not to exceed the thickness of the raised foundation sub floor.

<u>Installing the Floor:</u> After securing the backer board to the starting line spread out the recommended amount of adhesive (per the adhesive manufacturer's recommendation) to the subfloor/substrate surface and then place your starting row boards into the adhesive (one at a time) tongue facing the backer board making sure to seat the board into the adhesive according to the adhesive manufacturer's directions/specifications. Continue to install each row of flooring by offsetting the end joints a minimum of 10 inches. Additionally, it is important that the floors end joints take on a random effect and that you avoid stair step and/or H joint patterns. **Note:** When installing the individual boards place the tongue into the groove. **Note:** This method of installation will help to prevent glue from being scooped up and into the groove resulting in glue squeezing out between the boards seams and a lot of unnecessary work removing glue from the surface of the floor. To keep the planks from moving and the seams from opening use **Scotch 3M # 2080 Tape for Delicate Surfaces (Note: Said type of tape is light purple in color),** applying the tape perpendicular to the direction of the grain. **Note: Remove the tape within 24 hours of being applied. NOTE: REMOVE ALL GLUE SMEAR/RESIDUE FROM THE FLOORS SURFACE BEFORE IT DRIES. THE RULE OF THUMB IS YOU CLEAN AS YOU GO. Note: Follow the adhesive manufacturers process and procedures for removing adhesive**

smear/residue from the floors surface. Failure to remove adhesive smear/residue from the floors surface can/will result in perminate damage to the floors protective urethane coating through a condition known as chemical etching.

Foot Traffic: Limit foot traffic on the newly installed wood floor according to the adhesive manufacturer's recommendations.

NAIL-DOWN INSTALLATION

IMPORTANT: Be sure not to over-drive the fastener beyond the fastener slot as this can/will lead to a condition known as a telegraphing fastener. A telegraphing fastener is the visible effect of excessive pressure being placed on the wood fibers which causes the appearance of a bump to occur on the surface of the board just above the fastener(s). This condition becomes most apparent when natural or artificial light reflects across the surface of the floor causing the bump to become visible. This condition can be difficult to see so make sure to thoroughly examine the first few rows of flooring to make certain telegraphing does not exist. **Note:** Johnson's Limited Structural Warranty and/or Limited Finish Warranty does not offer warranty coverage against said type condition as telegraphing fasteners are not the result of a manufacturing related defect. However, if you encounter this condition, immediately stop the installation, and contact the Johnson's Technical Department and/or the manufacturer of the nailer for technical advice. Note: It is essential that the flooring installer makes sure that the nailer/stapler is properly adjusted for the particular floor being installed i.e. the fastener(s) MUST enter the fastener slot at the correct location, angle and height, do not over-drive the fastener(s), by doing so can/will cause irreversible damage to the board in the form of telegraphing fasteners, broken or split tongues, peaking, ledging, squeaking, or crackling noises to occur. **NOTE: FLOORING CANNOT BE MECHANICALLY FASTEN OVER AN UNDERLAYMENT PAD OF ANY TYPE AND/OR KIND DUE TO THE LIKELIHOOD OF DEVELOPING SQUEAKY/NOISY FLOOR SYNDROM, WHICH IS NOT COVERED UNDER ANY/ALL APPLICABLE WARRANTY COVERAGE. IN ADDITION, JOHNSON'S ENGINEERED WOOD FLOORING CANNOT BE MECHANICALLY FASTENED TO PARTICLE BOARD AND/OR 1" X 6" SUBFLOORING PLANKS.**

Fastener Requirements for the Different Flooring Thicknesses:

- 3/8" to 1/2" flooring requires the use of 18-gauge x 1/4" wide x 1-1/2" long flooring staple.
- 5/8" flooring requires the use of 18-gauge flooring cleat x 1-1/2" long when attaching flooring to 3/4" subflooring attached to the surface of a concrete slab. **Note:** Installations over raised foundation wood subfloor paneling requires the same type and gauge of fastener, but 1-3/4" long.
- 3/4" flooring requires the use of 15.5-gauge x 1/2" wide x 1-1/2" long flooring staple when attaching flooring to 3/4" subflooring attached to the surface of a concrete slab. **Note:** Installations over raised foundation wood subfloor paneling requires the same type and gauge of fastener, but 1-3/4" long. **Note:** 3/4" flooring can also be attached using 16-gauge flooring cleats of the same lengths.

Fastener Schedule: (Note: Failure to abide by the required fastening schedule can/will result in squeaky/noisy floor syndrome which is Not covered under any/all applicable warranties offered with the product).

- 3/8" to 1/2" flooring requires a fastening schedule of 1 to 2 inches from the end of the planks and 3 to 4 inches thereafter.
- 5/8" flooring requires a fastening schedule of 1 to 2 inches from the end of the planks and 4 to 6 inches thereafter.
- 3/4" flooring requires a fastening schedule of 1 to 3 inches from the end of the planks and 6 to 8 inches thereafter.

Starting Line & Expansion Space: Snap a working line parallel to the starting wall in multiples of the plank's width, **plus** an expansion space of 1/2" minimum (for 1/2" to 5/8" thick flooring) and 5/8" to 3/4" (for 3/4" thick flooring)

along all vertical obstructions. Be careful to ensure you do NOT end up with a width of less than 2 inches at the final opposing wall. If you do end up with a rip cut less than 2" in width, adjust by ripping down the width of the first row.

- Place the starter row (groove side) against the backer board. Next, blind-fasten the fastener into the fastening slot located towards the back of the top side of the tongue making sure to follow the required fastening schedule for the fastener being used (see fastening schedule). Continue to install each row of flooring offsetting the end joints a minimum of 10 inches. **Note:** Upon completion of the installation the end joints should take on a random/staggered appearance. **Avoid Stair Stepping patterns as well as H-Joint patterns.**

- When you can no longer use the fastening device you can install the last few rows by placing carpenters glue (i.e., Titebond II) in the groove of each plank, being careful not to over glue to avoid glue from being squeeze out between the joints. Then engage the planks tongue and groove until the side and end-joints are fully engaged. The final step is to fasten the board to the sub-floor by use of a brad nailer in 18-gauge. Place the brad approximately 1/2" from the opposite side you just glued (i.e., the long edge of the plank). The brads should be placed approximately 1-2" from the board ends and 6 to 8" thereafter. Note: Brad nails should be at least 1-1/2" long.

FLOATING ENGINEERED WOOD FLOORING

NOTE: Manufacturer does <u>not</u> recommend floating 3/4" flooring.

IMPORTANT: Manufacturer <u>requires</u> the use of a manufacturer approved vapor retarding system to be applied over the surface of the wood sub floor or concrete slab prior to installing the floor when using the floating floor system. NOTE: <u>most</u> 2 in one and 3 in one underlayment's ONLY protect against 4 lbs. of moisture emission over 1,000 sq. ft. in 24 hours. Therefore, it is MANDATORY that the slabs surface be covered with a layer of 6-mil polyethylene sheeting prior to installing a 2-in-one or 3-in-one padding/vapor retarder.

NOTE: T-MOLD BRAKES ARE REQUIRED AT <u>ALL</u> DOORWAY TRANSITIONS LESS THAN 6' IN WIDTH AND FLOORING INSTALLATIONS THAT EXCEED 25 FEET IN LENGTH AND WIDTH.

<u>Concrete Slab:</u>
Place a layer of 6-mil polyethylene sheeting over the slabs surface overlapping the seams by 10" to 12". Make sure that the entire length of the seams is completely and thoroughly tapped together using 3" wide clear packing tape, and that the sheeting is flat and wrinkle free. Then place a high quality 2 in 1 or 3 in 1 high density closed cell foam padding (not to exceed 2 mm thick) over the surface of the poly sheeting.

<u>Wood Sub-Floors:</u>
For installations over wood sub floors, place a layer of 30-30-30 single layer asphalt laminated paper meeting UU-B-790a, Grade B, Type I, Style la or a single layer of 15 lb. tar saturated felt paper over the surface of the sub floor overlapping the seams 4 to 6 inches and staple in place followed by a high quality 2 in 1 or 3 in 1 high density closed cell foam padding.

<u>Starting Line & Expansion Space:</u> Snap a working line parallel to the starting wall, in multiples of the plank's width, plus an expansion space of 1/2" for 1/2" to 5/8" thick flooring (**3/4" thick flooring cannot be floated)** along all vertical obstructions. Be careful to ensure you do NOT end up with a width of less than 2 inches at the final opposing wall. If you do end up with a rip cut less than 2" in width, adjust by ripping down the width of the first row.

<u>Backer Board/Install:</u> (Follow the above-stated directions for making and installing a backer board).

<u>Installing the Floor:</u> Begin by placing flooring planks along the length of the backer board leaving 1/2" to 5/8" expansion space along the walls. All rows following the initial row will require gluing of the tongue and groove (Use

glue that is specifically designed for this purpose). **Note:** Tongue and groove glue can be purchased at your local flooring dealer or at your local big box store or online. **Note: do not use standard carpenters glue as the floor (when walked upon) can/will produce a crackling sound. Note: Follow the glue manufacturer's directions for the proper application and placement of glue.** To keep the planks from moving and the seams from opening, use Scotch 3M # 2080 tape for sensitive surfaces (color light purple) applying the tape perpendicular to the direction of the grain and/or long access of the planks, making sure to overlap the joints of the planks. **NOTE: REMOVE TAPE WITHIN 24 HOURS OF BEING APPLIED. WHEN REMOVING TAPE, DO NOT LIFT STRAIGHT UP BUT RATHER KEEPING THE TAPE CLOSE TO THE SURFACE OF THE FLOOR AND CAREFULLY PULLING AT A 45 DEGREE ANGLE SO AS NOT TO PULL THE URETHANE FINISH.**

Disclaimer: Upon completion of the installation of a random length floating wood floor, the floors surface may not appear as continuously flat as compared to a traditional long strip floating floor. Hollow sounds and squeaking should be expected since the flooring is not secured to the sub-floor or concrete slab by means of chemical fastening (i.e., gluing) or by mechanical fastening (i.e., staples, cleats, or nails). Hollow sounds and/or squeaks are NOT a defect caused by manufacturing, but rather the result of the way in which the floor is assembled. Note: it is considered acceptable when floating engineered wood flooring to expect an over-wood/under-wood condition in accordance with acceptable industry standards. Some vertical movement between planks could also occur over time.

INSTALLING OVER RADIANT HEAT SYSTEMS

NOTE: JOHNSON HARDWOOD REQUIRES THAT OUR ENGINEERED WOOD FLOORING PRODUCTS (THAT QUALIFY FOR INSTALLATION OVER HYDRONIC RADIANT HEAT TYPE OF SYSTEMS) BE INSTALLED AS PER THE GUIDELINES SET FORTH BY THE NATIONAL WOOD FLOORING ASSOCIATIONS GUIDELINES FOR INSTALLING OVER RADIANT HEAT PRIOR TO INSTALLING OVER A RADIANT HEATED SUB FLOOR SYSTEM. FAILURE TO DO SO CAN/WILL RESULT IN LOSS OF ANY/ALL APPLICABLE WARRANTIES.

NOTE: The use of low voltage radiant heat mat type of systems is not recommended by this manufacturer.

NOTE: Only the 1/2" x 7.5" with a 2mm thick wear-layer or less can be installed over radiant heat subfloor systems. Our 5/8" thick and 3/4" thick engineered wood flooring products with 4mm and 6mm wear-layers cannot be installed be installed over radiant heat subfloor systems.

NOTE: Species Such as Hickory and/or Brazilian Chery are NOT Candidates for Installation Applications Over Radiant Heat Type of Systems.

NOTE: Tar saturated felt paper and/or tar laminated paper cannot be used as vapor retarders over radiant heat type of systems due to the potential for off gassing as the tar heats up.

Radiant Heat: The heat source is directly beneath the flooring, so the flooring may dry out faster than a similar floor in a home with a conventional forced air heating system. Engineered wood floors can be installed over radiant heat as long as you understand radiant heat and how it can impact wood flooring, what precautions to take, and what type of wood flooring to use. Failure to follow guidelines can/will produce unsatisfactory results, not to mention voiding any/all applicable warranties.

Temperature/RH Requirements: Make certain that the temperature of the installed wood floor **does not exceed 80 degrees Fahrenheit** and that the temperature within the atmosphere is maintained between 60-80 degrees Fahrenheit and the relative humidity is maintained between 35-55 percent, respectively. Moreover, make sure that the floor's moisture content does NOT fall below 7%. It is critical that the relative humidity does not drop below 35%, otherwise you may experience the following condition(s) with your floor: Gapping due to shrinkage, checking, cracking, splitting, splinters, warping, bowing and/or wear-layer and/or inner ply separation, which is due to rolling shear failure, which is Not the same as glue bond failure (aka delamination). **Note:** Expect some heating season

separations between the edges of each plank. Once it has been determined (through testing) that the site conditions are suitable for the installation, then, and only then can the installation proceed forward.

Thermostats: It is recommended to have three thermostats: one to control the tubing water supply temperature, one to control the room temperature with different zone controls and one for outside the house. This three-thermostat system is kindest to wood flooring because it moderates the floor temperature. People tend to crank up the heat inside the structure which can/will overheat your floor resulting in cracking, splitting, wear-layer and/or inner ply separation (aka rolling shear failure), shrinking, gapping, cupping, buckling etc. **Note:** Subtle changes to the setting 2 to 3 degrees up or down in a 24-hour period is recommended, otherwise you may experience the aforementioned conditions.

Subfloor: The essential requirement in proper application of wood flooring over radiant heated systems is to avoid penetration of the heating element. Radiant heated subfloor systems can be concrete, wood or a combination of the two. The type of subfloor determines subfloor preparation.

Concrete Subfloor: If the sub-floor is concrete and it has cured, turn the heat on, regardless of season, and leave it on for at least 5-6 days to drive out residual moisture before installation of the wood flooring. Some installation systems, particularly glue-down applications, require the heat to be reduced or even turned off before installation of the flooring begins, so the adhesive does not cure prematurely and/or excessively. ALWAYS check with the adhesive manufacturer for recommendations.

Water Heated System: With a water-heated radiant heat system(s), a pressure test **MUST** be performed and documented by a qualified plumber or the system installer prior to beginning the installation of the wood flooring.

Note: One of the above-mentioned installation methods can be used to install engineered wood flooring over a radiant heated sub floor. For glue-down applications consult with the adhesive manufacturer prior to beginning the installation as they will have specific requirements/guidelines when it comes to gluing down over radiant heated sub floor systems.

Disclaimer of Non-Responsibility:

Statement/disclaimer of non-responsibility (voids any/all applicable warranties offered by this Manufacturer) pertaining to labor, material, loss of use, pain and suffering, attorney fees, court costs etc., moving expenses, travel expenses, fuel reimbursement, medical expenses, hotel expenses, rental expenses, mortgage payments, house cleaning, disposal fees, meals, storage units, any all costs and/or damages caused to any/all cabinets, furniture, counter tops, built-in ranges/stoves, moldings/trims, furniture, wall units, wall paper, painting, specialized plaster coatings, drywall etc., as a result of removal of the flooring, cupping, buckling, twisting, bowing, shrinking, lifting, electrical, moving etc., this Manufacturer reserves the right to void any/all warranties if and when any of the above mentioned or non-mentioned item(s) are installed over the surface of the wood floor where the floor experiences a manufacturer or non-manufacturer related failure which requires the removal of the flooring in part, or in its entirety. **Note:** Wood flooring products **MUST NOT** be installed prior to the installation of cabinetry and or any other fixed furniture etc., as outlined above. The general contractor/flooring contractor/retailer/flooring installer/designer/homeowner/renter etc., assume **ALL** responsibility for any/all damages/costs incurred if flooring is laid prior to the installation of the above mentioned or non-mentioned items. Said parties absolve This Wood Flooring Manufacturer from any/all liability/responsibility of any claims now or in the future.

WARNING: DO NOT INSTALL MOLDINGS/TRIMS IF THERE IS ANY QUESTION TO THEIR ACCEPTABILITY AS INSTALLATION CONSTITUTES ACCEPTANCE OF THE MATERIAL BEING INSTALLED!

Manufacturer **WILL NOT** be responsible/liable for any/all costs i.e., **LABOR** associated with any/all claims involving **color difference** issues within the wood floor and any/all supporting trim components e.g., stair treads, stair nosing's, reducers, T-moldings, end caps etc., after the molding/trims have been installed. It is the responsibility of the flooring

contractor/installer/dealer to make certain that the moldings/trims color blend (to the flooring) is acceptable before moving forward with the installation.

Precautionary Statement: BEFORE MIXING MATERIALS, I.E. WOOD FLOORING FROM DIFFERENT RUNS/LOTS, MAKE SURE THE COLOR TONE IS ACCEPTABLE BEFORE STARTING THE INSTALLATION. **NOTE:** IT IS THE RESPONSIBILITY OF THE DESIGNER, ARCHITECT, BUILDER, RETAILER, GENERAL CONTRACTOR, HOMEOWNER, FLOORING CONTRACTOR, ETC., TO DISCUSS WITH THE FLOORING INSTALLER(S) THE ACCEPTABLE COLOR TONE RANGE OF THE FLOORING BEING INSTALLED. THE APPROVED FLOORING SAMPLE MUST BE SHOWN TO THE INSTALLER(S) BEFORE COMMENCING WITH THE INSTALLATION. MOREOVER, THE APPROVED COLOR TONE SAMPLE MUST BE USED/VIEWED AS A GO-NO-GO TOOL. ONCE INSTALLED, THERE IS NO QUESTION AS TO THE FLOORS ACCEPTABILITY, AS INSTALLATION CONSTITUTES ACEPTANCE OF THE MATERIAL BEING INSTALLED. MANUFACTURER WILL NOT BE RESPONSIBLE FOR ANY/ALL COSTS FOR MATERIALS AND OR LABOR ASSOCIATED WITH CLAIMS INVOLVING COLOR TONE OR GLOSS RELATED ISSUES AND/OR CONCERNS. **NOTE: JOHNSON ALLOWS UP TO (PLUS OR MINUS) 5 DEGREE GLOSS VARIANCE BETWEEN PRODUCTION RUNS AND UP TO (PLUS OR MINUS) 5 PERCENT DIFFERENCE IN COLOR TONE BETWEEN PRODUCTION RUNS.**

MAINTENANCE AND PROTECTION:

NOTE: Do not use vacuums with beater bar attachments, steel and/or plastic bases, and/or plastic wheels as they can/will scratch and/or mar the urethane finish which will not be covered under any/all applicable warranties offered with this product. We recommend using a canister type of vacuum such as the Miele brand. Miele canister vacuums have firm rubber wheels which are gentle to floors surface and come with a semi firm China bristle attachment that attaches to a wand that won't scratch and/or mar the floors surface.

NOTE: STEAM CLEANERS ARE NOT TO BE USED TO CLEAN JOHNSON ENGINEERED WOOD FLOORING PRODUCTS.

Cleaning: During routine maintenance, **DO NOT** clean your floors surface with oil soaps, sprays of any kind, silicone oil, wax, water, Windex and water, vinegar and water, conditioners, renovators, rejuvenators, polishes of any kind, citrus cleaners, ammonia, bleach, dish soap, surface refreshers, solvents of any kind, scrubbing pads, scrubbing powdered cleaners, solvents, **non-**recommended flooring cleaners such as Swifter Wet Jet or any other like type cleaning type products. **Only use cleaning products that are specifically recommended and/or approved by The Wood Flooring Manufacturer. Here are a few cleaners we recommend: Bona Wood Flooring Cleaner, Basic Coatings "Squeaky Clean," Bruce Hardwood Cleaner, Mannington Wood Flooring Cleaner and Roberts Wood Flooring Cleaner.** For more information on how to properly maintain your wood floors please refer to the National Wood Flooring Association (NWFA) Maintenance Guidelines, at nwfa.org.

Protective Glides: Place protective glides on the bottom of all chairs and furniture legs. Protective glides come in a variety of sizes and shapes and can be purchased at your local home improvement center. For large furniture such as China cabinets, hutches, pianos, pool tables, etc., you will need to use protective glide pads that are designed to cover a larger area to better protect the flooring from dings, dents, and scratches.

WOOD FLOORING MATRIX

Engineered Flooring Series	Hydronic Radiant Heat Approved	Installation Method	Required Type of Wood Flooring Staple	Required Type of Wood Flooring Cleat	Required Type of Wood Flooring Adhesive	Required Type of Tongue and Groove Glue
English Pub ½" X 7 ½" By 2 mm W-L By 11" to 83" L	Yes, for Maple, No for Hickory	Staple, Glue or Float	18 Gauge By ¼" Crown By 1 ½" Long	N/A	Urethane Based	Roberts 1406 or Titebond T&G Glue
Ale House ½" By 7 ½" By 2 mm W-L By 15" to 83" L	Yes	Staple, Glue or Float	18 Gauge By ¼" Crown By 1 ½" Long	N/A	Urethane Based	Roberts 1406 or Titebond T&G Glue
Oak Grove ½" By 7 ½" By 1.2 mm W-L By 11" to 75" L for ABCD Grade and 20" to 75" L for AB Grade	Yes	Staple, Glue or Float	18 Gauge By ¼" Crown By 1 ½" Long	N/A	Urethane Based	Roberts 1406 or Titebond T&G Glue
Blue Ridge 9/16" By 5 7/8" By 3 mm W-L By 11" to 71" L	Yes	Staple, Cleat, Glue or Float	18 Gauge By ¼" Crown By 1 ½" Long	18 Gauge By 1 ½" to 1 ¾" Long	Urethane Based	Roberts 1406 or Titebond T&G Glue
Tuscan 9/16" By 4 ½", 6", By 7 ½" By 2 mm W-L By 11" to 71" L	Yes, for Maple and Walnut, No for Hickory	Staple, Cleat, Glue or Float	18 Gauge By ¼" Crown By 1 ½" Long	18 Gauge By 1 ½" to 1 ¾" Long	Urethane Based	Roberts 1406 or Titebond T&G Glue
Canyon Ridge ½" By 7 ½" By 1.2 mm W-L By 15" to 74" L	No	Staple, Glue or Float	18 Gauge By ¼" Crown By 1 ½" Long	N/A	Urethane Based	Roberts 1406 or Titebond T&G Glue
Olympus ½" By 11 7/8" By 1.2 mm W-L By 23" to 86" L	No	Staple/Glue Assist or Glue	18 Gauge By ¼" Crown By 1 ½" Long	N/A	Urethane Based	Floating Not Recommended
Texas Timber 3/8" By 7 ½" By 1.2 mm W-L By 15" to 74" L	No	Staple or Glue	18 Gauge By ¼" Crown By 1 ½" Long	N/A	Urethane Based	Floating Not Recommended
British Isles 9/16" By 7 ½" By 3 mm W-L By 11" to 71" L	Yes	Staple, Cleat, Glue or Float	18 Gauge By ¼" Crown By 1 ½" Long	18 Gauge By 1 ½" to 1 ¾" Long	Urethane Based	Roberts 1406 or Titebond T&G Glue
Grand Chateau 9/16" By 8 5/8" By 3 mm W-L By 11" to 71" L	Yes	Staple, Cleat, with Glue Assist, Glue or Float	18 Gauge By ¼" Crown By 1 ½" Long	18 Gauge By 1 ½" to 1 ¾" Long	Urethane Based	Roberts 1406 or Titebond T&G Glue
Countryside Oak 3/8" By 7 ½" By 1 mm W-L By 11" to 71" L	No	Staple or Glue	18 Gauge By ¼" Crown By 1 ½" Long	N/A	Urethane Based	Floating Not Recommended
Nordic (EO) ¾" By 7 ½" By 4 mm W-L By 15" to 83" L	Yes	Staple, Cleat or Glue	15.5 Gauge By ½" Crown. See Installation Guidelines	16 Gauge. See Installation Guidelines	Urethane Based	Floating Not Recommended
Nordic (RO) ⅝" By 9 ½" By 4 mm W-L By 15" to 86" L	No	Cleat, Glue, or Cleat with Glue Assist	N/A	18 Gauge Cleat. See Installation Guidelines	Urethane Based	Floating Not Recommended

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