

ENGINEERED HARDWOOD INSTALLATION GUIDELINES

(Revised September 5, 2017)

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 with its corresponding vapor retarder, (2) staple-down using 18-gage ¼" crown staple by 1 ½" long for 3/8" to ½" thick flooring, and 18-gage cleats 1 ½" to 1 ¾" for 9/16" to 5/8" thick flooring. Or (3) the floating method using a recommended tongue and groove adhesive such as Roberts and/or Precision Components. Note: We do not recommend floating 3/8" products due to the inherent lightness of the product.

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, CROWNING, WARPING, BOWING, TWISTING, BUCKLING, SHRINKING, END-JOINT PEAKING, DELAMINATION, ROLLING SHEAR, GAPPING, CHECKING, CRACKING, SPLITTING, DISCOLORING, FADING, ADHESIVE HAZE AND/OR RESIDUE, EARLY WEAR, DENTING, SCRATCHING, HOLLOWING, SPLINTERING, URETHANE BLISTERS, MOLD DEVELOPMENT, URETHANE SHEAR, TAPE CAUSED URETHANE RELEASE DUE TO USING A NON RECOMMENDED TAPE, COMPRESSION STRESS, COMPRESSION SET, AS WELL AS ADHESIVE BOND RELEASE, SIDE EDGE CRUSH, SURFACE ABRASIONS, URETHANE MARRING, MALLET ABRASION MARKS ETC... 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, HOLLOWING, BOND RELEASE AND/OR MOISTURE EMISSION CAUSED/RELATED DAMAGE, JOHNSON WILL REFER YOU TO THE ADHESIVE MANUFACTURER FOR ANY/ALL APPLICABLE WARRANTY COVERAGE).**

Prior to installing Johnson engineered 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. The homeowner/contractor **MUST** maintain the temperature and relative humidity level in the recommended ranges (60 to 80f and 35 to 55rh) to ensure maximum performance and moisture content of the floor.

Newly Constructed Buildings: 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 delivering of wood flooring to the job site. In addition, all doors and windows must be installed and weather stripe. Moreover the HVAC system **MUST** be operating at least 5-days prior to the delivery of the flooring to the job site, as well as during the installation, and after the installation for the life of the installation. Also, the system **MUST** be set to create ambient conditions of 60 to 80f and 35 to 55rh. **NOTE:** This may require the addition of a humidification and/or dehumidification system in order to produce/maintain the required ambient conditions.

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). By doing so you may return to a floor that has experienced one or more of the above-mentioned issues, which are not covered under Johnson's warranty program.

Acclimation: Johnson engineered wood floors **do not require** pre-installation acclimation for "any" specific amount of time. However, 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 job-site and continue for the life of the floor. **All** doors and windows **MUST** be installed and weather striped prior to delivering the flooring to the job-site.

OWNER/DEALER/INSTALLER RESPONSIBILITY

Johnson Premium Hardwood Floorings are manufactured according to accepted industry standards, which permit 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. Carefully examine the flooring for moisture content (7.0% to 10.0%), color, grade, finish quality or any damage during transit **before** installing it. 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 Johnson Premium Hardwood dealer immediately. **Once the flooring is installed, there is no question as to its acceptability.**

Informing the Homeowner: Homeowner(s) **MUST** be made aware of color variations, graining ranges, 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, **especially exotic woods**. **All products from Johnson Premium Hardwood will change color over time. The degree of change depends on the species and the amount of UV exposure. Typically speaking, wood usually darkens over time, however, some wood species will actually lighten when exposed to UV light.**

Waiver: Unless a waiver or letter of protest listing exceptions exists, installation constitutes acceptance of wood flooring, the subfloor/substrate, the job site itself – including the ambient conditions i.e. temperature and relative humidity at the time of installation, and all impacting variables that may affect a wood floor.

Environment: Prior to installation, the installer **MUST** determine that the environment of the job site and the conditions are suitable to the material that is being installed. The installer is responsible for determining the moisture content/emission rate of the sub floor/sub-strate 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 prior to installing the flooring. Johnson Premium Hardwood declines any responsibility for job failure from or associated with inappropriately or improperly prepared sub-floors or job site environment deficiencies. Also, Johnson "HIGHLY" recommends that the installer/contractor take daily readings of the ambient conditions (of the interior 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 **MUST** be made aware of the effect that moisture has on wood flooring e.g. moisture gain and/or loss can result in: cupping, crowning buckling, shrinking, gapping, cracking, splitting, checking, warping, bowing, twisting, splinters, blisters, discoloration/darkening, mold development, side edge crush, urethane shear, wear-layer delamination/separation and/or cross-ply delamination, rolling shear, separation from the sub-floor and possible damage to surrounding walls, tile/stone floors, cabinetry.

During Installation: It is the installer's responsibility to protect the flooring from any/all damage (i.e. dings, dents, scratches, moisture, sand, debris etc.). Note: Installation/construction related damages are not covered under Johnson's 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 job-site. **NEVER** store wood flooring in an "uncontrolled environment" e.g. patios, drive ways, garages, sheds, storage units, or even in the structure in which the flooring will be installed. Deliver the flooring to the job-site **ONLY** when a controlled environment has been established according to Johnson/NWFA installation/environment requirements.

JOB SITE INSPECTION AND PRE-INSTALLATION REQUIREMENTS

Note: In newly constructed buildings, wood flooring should be one of the last items installed. All work involving water or moisture **MUST** be completed prior to the delivering of 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: 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 approved Calibrated Pin Type Moisture Meters when installing over wood sub floors). All testing results **MUST** be carefully recorded and made available to the homeowner before work begins. Electronic moisture meters designed to measure moisture content in concrete slabs are **NOT** recognized by Johnson 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 over watering 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 any/all masonry or tile work **MUST** be completed prior to delivering the flooring to the job-site.

Grade Level: Johnson engineered flooring is designed to be installed on all grade levels: on grade, below grade and above grade. However, you **MUST** follow the adhesive manufacturer's guidelines since they can/will take precedence over Johnson's installation recommendations when it comes to sub-strate preparation, moisture testing and attachment to the sub-strate. **NOTE: if any part of the soil surrounding the structure is 3" 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 at least **5 days** before 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.

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.

Crawl Space: The soil within the crawl space **MUST** be covered with "black" 6-mil polyethylene sheeting overlapping the seams a minimum of 12" followed by taping the entire length of the over-laps with 3" wide clear packing tape. Make sure to run the poly sheeting up the stem wall 4 to 6" but DO NOT tape, as this will allow for "controlled" evacuation of gaseous water vapors into the crawl space atmosphere, which in turn should be carried out through the venting system. Per industry standards in order to foster proper airflow there **MUST** be at least 1 ½ vents for every 100 sq. ft. of crawl space area. The distances 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 amount 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 poly sheeting **will not** be warranted by Johnson Premium Hardwood Flooring.

Moisture Emission: Per NWFA/Johnson's 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/manufacture 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 substrate 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 F-1869-4, 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, greases, drywall mud/dust, release agents and all other types of residues/contaminates.

Floor Flatness: The subfloor should be level in general however; it **MUST** be flat to within 3/16" over a 10-foot radius, in all directions. When using a self-leveling or 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(s).**

Raised Foundation - Sub-Floor: When plywood/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 sub-floor. Sub-floor panels should conform to U.S. Voluntary Product Standard PS-1-07, 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 sub-floor panels are appropriate sub-flooring 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. Cross kerf the back of each panel every 1' x 3/8" deep. **Plywood/OSB sub-floor should run at a 45-degree angle (preferred) or perpendicular to the direction of the floor joists.**

ATTENTION: ENGINEERED FLOORING CANNOT BE INSTALLED DIRECTLY OVER 1" X 6" PLANK TYPE SUB-FLOORING. JOHNSON REQUIRES AN ADDITIONAL LAYER OF 1/2" PLYWOOD (CDX or better) BE PLACED AND SECURED TO THE SURFACE OF THE 1" X 6" SUB-FLOOR FOR ADDITIONAL SUPPORT. RECOMMENDED FASTENERS: 1 ¼" TO 1 ½" LONG DECK SCREWS (screwing schedule 6" to 8" around perimeter and every 12" in the field). IN ADDITION, JOHNSON ENGINEERED WOOD FLOORING **CANNOT** BE MECHANICALLY FASTENED OVER A FOAM/FELT TYPE PAD/UNDERLAYMENT AS IT CAN/WILL RESULT IN SQUEAKY FLOOR SYNDROM, WHICH IS **NOT** A COVERED UNDER JOHNSON'S WARRANTY PROGRAM...

Terrazzo or Vinyl: Before installing with a glue-down method over terrazzo or vinyl type surfaces, you must first consult with the adhesive manufacturer as they can/will provide you with specific information pertaining to the steps required for a successful installation.

CDX Plywood: CDX plywood when properly installed over the surface of a concrete slab, or lightweight concrete sub-straight (following manufacturer/industry standards), it is **strongly recommended** that the plywood 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. **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.

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 plywood; 19.2" span requires a minimum of ¾" CDX and 24" spans require a minimum of 1" interlocking tongue and groove CDX plywood. **NOTE: If OSB is used as a sub-flooring material, please refer to SECTION: Raised Foundation/Sub-Floor, under SUB-FLOOR REQUIREMENTS.**

Vapor Protection Systems/Adhesives: Johnson's 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: JOHNSON DOES NOT OFFER WARRANTY COVERAGE AGAINST MOISTURE RELATED CLAIM/FAILURES...ANY/ALL MOISTURE RELATED CLAIMS, AS WELL AS BOND RELEASE RELATED CLAIMS, FALL UNDER THE WARRANTY COVERAGE OF THE ADHESIVE MANUFACTURER...NOT JOHNSON. IN THE EVENT OF A MOISTURE CAUSED/RELATED CLAIM, AND/OR BOND RELEASE RELATED CLAIM, JOHNSON WILL TURNDOWN THE CLAIM AND DIRECT YOU TO THE ADHESIVE MANUFACTURER AS SAID CLAIM TYPES FALL UNDER THEIR WARRANTY PROGRAMS.**

INSTALLING THE FLOOR

Required Tools and Accessories for Nail and Glue down Installations:

Please refer to the National Wood Flooring Association's Technical Publication NO. 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, blisters due to urethane shear, wear-layer and/or inner ply separation, and any/all previously mentioned issues/concerns, and/or failure types... NOTE: Johnson Premium Hardwood 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 gage or use an adjustable power jamb saw adjusted to the appropriate height.

Box Rule (3-5): Before beginning the actual installation, provide proper layout of flooring by working out of multiple boxes of material (3 to 5) is recommended in order 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, end-caps 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 so as to avoid a distinct color variance between the wood floor and the trim moldings. **NOTE:** Failure to abide by these guidelines (where the floor was installed prior to the delivery of the stair nose trims, or the flooring and stair nose trims color tones were NOT properly blended), which results in a mismatch in color tones between the flooring and the stair nose trims, which results in rejection by the end-user, will not be warranted by Johnson. Johnson WILL NOT be responsible for the replacement costs for the trims, and/or the labor to remove and reinstall new trims.

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 quarter round trims. **NOTE:** Wood flooring will change in size according to changes in ambient conditions (i.e., temperature and relative humidity) found within the structure throughout different times of the year. **Insufficient expansion space can result in cupping, buckling, blisters, edge crush, delamination, damage to cabinets and/or the structure, cracking, splits and checking in the flooring. Johnson Premium Hardwood will not warrant any damages caused by improper installation.**

Lightweight Concrete: For installations over lightweight concrete slabs always consult with the adhesive manufacturer prior to beginning installation, as they can/will offer instruction on how to properly prep the surface of the substrate so as to avoid a potential de-bonding failure. Always follow the adhesive manufacturer's recommendations/requirements for proper use.

GLUE-DOWN INSTALLATION

IMPORTANT:

Johnson Hardwood does not recommend and/or condone the use of water/acrylic base adhesives. The installer understands that by using such adhesives voids any/all warranties offered by Johnson.

Adhesive: Use a high quality adhesive and moisture vapor protection system as per the preparation/application requirements set forth by the adhesive manufacturer. Adhesive manufacturers' may offer moisture emission warranty coverage subject to their installation and job-site recommendations. 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, proper trowel size/configuration, application and cleaning procedures. Failure to follow the recommended/required guidelines can/will result in loss of warranty coverage by both the adhesive manufacturer and Johnson Hardwood.

Starting Line & Expansion Space: Snap a working line parallel to the starting wall in multiples of the planks width, **including** an expansion space of 3/4" preferably to 1/2" minimum to set up the base baseline for installation. Be careful to assure you do NOT end up with a width of less than 2 inches at the final opposing wall **Note:** For questions on how to square out a room, contact Johnson's technical department at 800-910-3047.

Backer Board: Install a backer board along your initial starting line, this will provide needed support for the first 3 to 4 feet of flooring installation. **NOTE:** Backer boards can be made from 1/2" to 3/4" (MDF) Medium Density Fiber Board cut into pieces 4 or 5 inch wide, by 8-feet long. Secure the backer board to the sub-floor using the appropriate length fasteners (i.e., 1 1/4" long deck screws for raised foundation applications and 1 1/4" long Tap Con screws for applications over concrete slabs) being careful not to exceed the thickness of the raised foundation sub floor. **CAUTION: PRIOR TO DRILLING INTO A CONCRETE SLAB, MAKE CERTAIN THERE ARE NO PIPED RUNING THROUGH THE SLAB...ALSO, MAKE SURE THE SLAB DOES NOT CONTAIN POST TENSION CABLES...** After securing the backer board to the starting line spread out the recommended amount of adhesive (per the adhesive manufacturer's recommendation) to the sub-floor 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 offsetting the end joints a minimum of 6 to 8 inches, and make sure doing the installation that you watch out for any H-Joint patterns. Also, when installing the individual boards place the tongue into grove, this method of installation will help to prevent glue from being scooped up and into the grove resulting in glue squeeze out between the board(s) seams and a lot of unnecessary work removing glue from the surface of the floor. **NOTE:** To keep the planks from moving, and the seams from opening, use 3M Scotch Blue tape # 2080EL applying the tape perpendicular to the direction of the grain, over-lapping the seams as you go. Once the adhesive has dried, (typically within 24-hrs) remove the tape by grabbing the corner edge of the tape and pull the tape at a 45 degree angle making sure that your hand remains in contact with the surface of the floor as you remove the tape. **CAUTION...DO NOT PULL THE TAPE STRAIGHT UP AND OFF OF THE FLOOR AS THIS CAN/WILL RELEASE THE URETHANE FINISH FROM THE FLOORS SURFACE.**

Foot Traffic: Limit foot traffic on the newly installed wood flooring 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 telegraphing fasteners. 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 sometimes be difficult to see, so make sure to thoroughly examine the first few rows of flooring to make certain telegraphing does not exist. Johnson Premium Hardwood does not warrant against said type condition as telegraphing is not the result of a manufacturing related defect. However, in the event that you encounter said type condition immediately stop the installation and contact 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 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, bumps along the side edge of the planks, broken or split tongues, squeaking, or crackling noises to occur.

Fastener Gauge: ¼" crown 18 gage staples by 1 ½" long for flooring thicknesses 3/8" up to 1/2". For 9/16" to 5/8" thick flooring, use 18-gage cleats 1 ½" to 1 ¾" long.

Fastener Length: For installation over raised foundations the fastener **must** be 1-1/2" to 1 ¾" long.

Fastener Schedule: Required fastening schedule for ¼" 18-gage staples is 1 to 2 inches from the boards' ends and then every 3 to 4 inches thereafter. For 18-gage cleats, place the fasteners 2 inches from the boards' ends and then every 4 to 5 inches thereafter. **Failure to follow required fastening schedule can/will result in squeaky board/floor syndrome, which will not be covered under Johnson's warranty program.**

Starting Line & Expansion Space: Snap a working line parallel to the starting wall in multiples of the planks width, plus an expansion space of ¼" preferable to ½" minimum to set up the base baseline of installation. Be careful to assure you do NOT end up with a width of less than 2 inches at the final opposing wall. If you determine your rip piece will be less than 2" adjust by ripping down the width of the first row. **Note:** For questions on how to square out a room, contact Johnson's technical department at 800-910-3047.

- Place your 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 6 to 8 inches. Note: Upon completion of the installation the end joints should take on a random/staggered appearance.
- When you can no longer use the fastening device, you can install the last few boards by placing carpenters glue in the groove (being careful not to over glue). Then engage the 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 a brad nailer in 18-gage. Place the brad approximately ½" from the side joint you just glued. The brads should be placed approximately 1 to 2" from the board ends and 6 to 8" thereafter. Note: Brad nails should be at least 1 ½" long.

FLOATING ENGINEERED WOOD FLOORING

NOTE: Johnson does not recommend floating a 3/8" product because of its inherent lightness and inability to lie as flat as a thicker floor.

IMPORTANT: Johnson Premium Hardwood requires the use of a manufacturer approved vapor retarding system 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: most 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 ALL DOORWAY TRANSITIONS AND FLOATING INSTALLATIONS THAT EXCEED 25 FEET IN WIDTH.

Concrete Slab:

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 overlapped seams are 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 foam padding (not to exceed 1/8" 2 mm in thickness) over the surface of the poly sheeting

Wood Sub-Floors:

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 Ia 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 foam padding.

Starting Line & Expansion Space: Snap a working line parallel to the starting wall, in multiples of the planks width, plus an expansion space of 3/4" preferable to 1/2" minimum to set up the base baseline for installation. Be careful to assure you do NOT end up with a width of less than 2 inches at the final opposing wall. If you determine your rip piece will be less than 2" adjust by ripping down the width of the first row. Note: For questions on how to square out a room, contact Johnson's technical department at 800-910-3047.

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

placing boards along the length of the backer board leaving ½" to ¾" expansion space along the walls. **Note:** Only the end joints (for this row) will be glued. 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). **CAUTION: do not use standard carpenters glue as the floor (when walked upon) may produce a cracking noise. Follow the glue manufacturer's directions for the proper amount and placement of the glue.** To keep the planks from moving and the seams from opening resulting in gaps and/or shifting, use 3M Scotch Blue tape # 2080EL applying the tape perpendicular to the direction of the grain, while making sure to overlap the side joints of the planks.

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

INSTALLING OVER RADIANT HEAT SYSTEMS

NOTE: JOHNSON REQUIRES THAT OUR RADIANT HEAT QUALIFICATION FORM BE FILLED OUT PRIOR TO INSTALLING OVER A RADIANT HEATED SUB FLOOR SYSTEM. FAILURE TO DO SO CAN/WILL RESULT IN LOSS OF ANY/ALL APPLICABLE WARRANTIES OFFERED BY JOHNSON.

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. Most 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 manufacturer guidelines can/will produce unsatisfactory results, not to mention void any/all applicable warranties.

Temperature/RH Requirements: Make certain 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 floors moisture content does NOT go 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/shrinking, checking, cracking, splitting, warping, rolling shear, bowing and/or wear-layer and/or inner ply delamination/separation. CAUSED BY STRESS. 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 over heat your floor resulting in cracking, splitting, wear-layer and/or inner ply delamination/separation, rolling shear, 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 installed in 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 for gluing down over radiant heated sub floor systems.

Disclaimer of Non-Responsibility:

Statement/disclaimer of non-responsibility (voids any/all applicable warranties offered by Johnson) pertaining to labor/material costs and or damages caused to any/all cabinets, furniture, counter tops, built-in ranges/stoves, moldings/trims, fixed furniture/wall units, wall paper, painting, specialized plaster coatings, drywall, the structure itself, as a result of removal of the flooring, cupping, buckling, twisting, bowing, shrinking, lifting, moving etc. Johnson reserves the right to void any/all warranties if and when any of the above mentioned or non-mentioned items (i.e., cabinets, built-in wall units) are installed over the surface of a Johnson 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. Johnson Wood and 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/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 Johnson 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 THERE ACCEPTABILITY. INSTALLATION CONSTITUTES ACCEPTANCE OF THE MATERIAL BEING INSTALLED!

Johnson Premium Hardwood **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 match to the flooring is acceptable before moving forward with the installation. **NOTE:** The dealers display sample must be used as a GO-NO-GO tool in determining the acceptability of the floors color tone.

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, HOME OWNER, 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. INSTALLATION CONSTITUTES ACCEPTANCE OF THE MATERIAL BEING INSTALLED. JOHNSON **WILL NOT BE RESPONSIBLE FOR ANY/ALL COSTS I.E. MATERIALS AND OR LABOR ASSOCIATED WITH CLAIMS INVOLVING COLOR TONE OR GLOSS RELATED ISSUES.**

MAINTENANCE AND PROTECTION:

Cleaning: During routine maintenance, **DO NOT** clean your floor surface with oil soaps, sprays of any kind, silicone oil, wax, water, Windex and water, vinegar and water, conditioners, surface refreshers, solvents of any kind, **non-recommended** flooring cleaners such as Swiffer Wet Jet or any other like cleaning type products. **Only use cleaning products that are specifically recommended and/or approved by Johnson Hardwood.** For more information on how to properly maintain your Johnson wood floor, please see our maintenance guidelines on our web-site www.johnsonhardwood.com under customer support.

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 really large furniture such as China cabinets, hutches, etc., you will definitely need to use protective glide pads that are designed to cover a larger area so as to better protect the flooring from dings, dents and scratches. For pianos, use piano coasters.