

HM ENGINEERED HARDWOOD BY GREEN WHOLE WOOD FLOORING – Hardwood Specialists Since 1990

INSTALLATION GUIDELINES

(Revised October 15, 2014)

HM Engineered flooring can be installed in one of the following manners: Urethane adhesive, 20-gage cleat, 18-gage staple or floating method using recommended tongue and groove adhesive. It is recommended to glue, staple, or float. In addition, we do not recommend floating 3/8" product due to the inherent lightness in weight.

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 WOOD FLOOR: CUPPING, WARPING, BOWING, TWISTING, BUCKLING, SHRINKING, DELAMINATION, GAPPING, CHECKING, CRACKING, SPLITTING, DISCOLORING, EARLY WEAR, DENTING, SCRATCHING, HOLLOWING, AND RELEASING FROM THE SUBFLOOR. FAILURE TO ABIDE BY THESE GUIDELINES CAN/WILL VOID ANY/ALL WARRANTIES OFFERED BY HM.

Prior to installing HM engineered flooring; materials MUST be tested for recommended moisture content. 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.

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 delivering 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 vacation time periods. If you do, you may return to a floor that is cupped, or has a severe case of shrinking/gapping, splitting, checking and/or wear layer separation caused by shear.

Acclimation: HM engineered wood floors **do not require** pre-installation acclimation for "any" specified period. 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/INSTALLER RESPONSIBILITY

HM 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 (6.8 to 10.8%), 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 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 HM 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 subfloor/substrate, the job itself – including the ambient 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 emission rate of the sub floor/sub straight 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.** HM Hardwood declines any responsibility for job failure from or associated with inappropriately or improperly prepared subfloors or job site environment deficiencies. Also, HM "HIGHLY" recommends that the installer/contractor 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 **MUST** be made aware of the effect that moisture has on wood flooring e.g. moisture gain can result in cupping, buckling, cracking, splitting, checking, warping, wear-layer delam/shear, and/or cross-ply separation from the sub floor and possible damage to surrounding walls, tile/stone floors and cabinetry etc. Moisture loss can also result in splitting/separation of the segments, gapping, surface and or end checking 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 should be understood.

During Installation: It is the installer's responsibility to protect the flooring from any/all damage i.e. dings, dents, scratches etc. Installation/construction related damages are **NOT** covered under HM'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 getting 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 NWFA recommendations.

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 striping 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 moisture tests (i.e., Calcium Chloride Tests 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** any work begins. Electronic moisture meters designed to measure moisture content in concrete slabs are **NOT** recognized byHM 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 all 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: HM engineered flooring is designed to be installed on all grade levels: on grade, below grade and above grade. However, you **MUST** follow adhesive manufacturer guidelines because they can/will take precedence over HM's installation recommendations. **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 is operating.

Subfloor: The sub floor **MUST** be free from any type of 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 duct taping the seams the entire length of the over-laps. Make sure to run the poly sheeting up the stem wall 4 to 6" but DO NOT tape, 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. 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. crawl space. Moisture related failures resulting from not covering the crawl space soil with 6-mil poly sheeting **will not** be warranted by HM Hardwood Flooring.

Moisture Emission: Per NWFA's recommendation, 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/SUB STRAIGHT 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 F-1869-4, which is the specific preparation/application instructions for calcium chloride testing.**

Cleanliness: For glue down applications, the subfloor **MUST** be free from any/all type of 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 chosen adhesive manufacturer for recommendations as to what self-leveling/patching material is compatible with their specific adhesive product(s).**

Plywood Sub-Floor: If plywood/osb is used as a subfloor, the moisture content difference **MUST NOT** exceed more than 4% between the finished wood floor and the plywood/OSB subfloor. Sub floor 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 sub floor panels are appropriate sub flooring materials. Plywood size for subfloor 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 subfloor should run at a 45-degree angle (preferred) or perpendicular to the direction of the finished wood floor. ATTENTION: "ENGINEERED" FLOORING CANNOT BE DIRECTLY INSTALLED OVER 1'X6" SUBFLOORING. THE NWFA REQUIRES AN ADDITIONAL LAYER OF 1/2" PLYWOOD BE PLACED AND SECURED (screwing schedule 6" to 8" around perimeter and every 12" in the field using the appropriate length fastener) TO THE SURFACE OF THE 1"X 6" SUBFLOOR FOR ADDITIONAL SUPPORT."**

ATTENTION: ENGINEERED FLOORING CANNOT BE INSTALLED DIRECTLY OVER 1" X 6" PLANK TYPE SUBFLOORING. HM 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).

Terrazzo or Vinyl: Before installing with a glue-down method over terrazzo or vinyl type surfaces, first consult with the adhesive manufacturer as they will be able to provide you with specific information regarding the necessary steps that are required in order 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 standards) it is **strongly recommended** that the plywood be covered with an additional layer of 15 lb or 30 lb tar saturated felt paper, or an asphalt laminated paper meeting UU-B-790a, Grade B, I, Style 1a, prior to installing the floor. NOTE: If the plywood is glued down, it is recommended to follow the adhesive manufacturers guidelines as to not void the HM warranty.

Raised Foundation: Ground level of the raised foundation sub floor **must** be completely covered with an industry approved moisture vapor retarding system such as 1 layer of 15 lb or 30 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.

Vapor Protection System/ Calcium Chloride Testing: HM'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 FLOORING SURFACE.** If the moisture emission rate exceeds 3 lb before, during and after the installation for the life of the floor, then a manufacturer approved vapor-retarding system **MUST** be applied to the slabs surface prior to commencing with the installation. Failure to do so can/will void all applicable warranties.

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. **An uncontrolled environment can lead to the following conditions: Shrinkage/gapping, cupping, warping, twisting, buckling, checking, splitting and even wear-layer and/or inner ply separation. HM Hardwood will not warrant any damages caused by moisture/atmospheric related causes.**

Undercut Door Casings and Jamb: Undercut all door casings and jamb 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. Your goal is to gradually transition into the molding 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 quarter round trim. Wood flooring will change in size according to changes in the ambient conditions of the structure i.e. temperature and relative humidity levels.

Insufficient expansion space can result in cupping, buckling, cracking and checking in the flooring. HM 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. They will be able to offer instruction on how to properly prep the surface of the substrate to avoid a potential de-bonding failure. Always follow the adhesive manufacturer's recommendations for proper use.

GLUE-DOWN INSTALLATION:

IMPORTANT:

HM Hardwood does not recommend the use of water/acrylic base adhesives or 2-in-1 hybrid adhesives (Hybrid adhesives are essentially an adhesive and moisture protection system all in one) in connection with the installation of any/allHM wood flooring products. The installer understands that by using such adhesives voids any/all warranties offered by HM.

Adhesive: Use a "HIGH" quality urethane adhesive in conjunction with the adhesive manufacturers vapor retarding system. Follow the adhesive manufacturer's guidelines for determining the correct trowel configuration, spread rate and cure time for the adhesive being used. The adhesive manufacturer will have detailed information outlining the correct method of application and cleanup. It is imperative that the installer follow ALL

recommendations made by both HM Hardwood, as well as the adhesive manufacturer with regards to testing the moisture emission rate of the concrete slab according to ASTM F-1869-4 prior to commencing with the installation.

Follow the adhesive manufacturer's recommendations on the proper way to prepare the surface for the substrate during the installation process. Consult with the adhesive manufacturer on how to best remove adhesive from the surface of the floor. Failure to follow all recommendations/requirements can/will void any/all applicable warranties offered by HM.

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 so, adjust by ripping down the width of the first row.

Backer Board/Install: 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 ½" to ¾" (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/sub straight 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. 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 specifications. 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. Also, when installing the individual boards place the tongue into groove, this method of installation will help to prevent glue from being scooped into the groove resulting in glue squeeze out between the board(s) seams and a lot of unnecessary work removing glue from the floors surface. 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.

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

NAIL-DOWN:

IMPORTANT: Be sure not to over-drive the fastener past the nail slot, this can 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 just above the fasteners. This condition becomes most apparent when natural or artificial light reflects across the surface of the floor causing the bump to become visible to the eye. 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. HM Hardwood does not warrant against this condition since telegraphing fasteners are not manufacturing related. If you should encounter this condition immediately stop the installation and contact the dealer and or the manufacturer of the nailer for technical advice. It is essential that the flooring installer make sure that the nailer/stapler is properly adjusted for the particular floor that is being installed i.e. the fastener(s) MUST enter the nail slot at the correct angle and height, do not over-drive the fastener(s) so as not to cause damage to the board e.g. telegraphing fasteners, broken or split tongues, peaking, squeaking, or crackling noises to occur.

Fastener Gage: ¼" 18 gage staple, or a 20 gage cleat

Fastener Length: When installing "engineered" wood flooring, make sure the fastener length is a 1-¼" long for installations over 5/8" sub floors attached to the surface of a concrete slab. For installation over a raised foundation, the fastener length must be 1 ¼" to 1 ½" long.

Fastener Schedule: Typical fastening schedule when using staples is 3 to 4 inches and 4 to 6 inches when using cleats and regardless of the fastener used 1 to 2 inches from the end joints. **Failure to follow required fastening schedule can/will result in squeaky board/floor syndrome.**

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 so, adjust by ripping down the width of the first row.

Place your starter row (groove side) against the backer board. Next, using a stapler, or cleat nailer 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 using 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 ¼" to 1 ½" long.

FLOATING ENGINEERED WOOD FLOORING:

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

IMPORTANT: HM 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 1 and 3 in 1 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 FLOORING 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 duct taped together and the sheeting is flat and wrinkle free, followed by a high quality 2 in 1 or 3 in 1 foam padding not to exceed 1/8" in thickness.

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 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 so, adjust by ripping down the width of the first row.

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 1/2" to 3/4" 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). That being said, **do not use standard carpenters glue as the floor when walked upon may produce a crackling 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, use 3M Scotch Blue tape # 2080EL applying the tape perpendicular to the direction of the grain.

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 subfloor by means of chemical fastening (gluing) or by mechanical fastening (staples, cleats or nails). Hollow sound is NOT a defect caused by manufacturing, but rather the result of the way in which the floor is put together. Caution: it is considered acceptable when floating HM 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: HM 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 HM.

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 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 the guidelines may/can 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 67-72 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 6.8%. 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, bowing and delamination DUE TO STRESS. Expect some heating season separations between the edges of each plank. Once it has been determined (through testing results) that the conditions are suitable for the installation of flooring over a radiant heated subfloor, 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 could shock your floor resulting in cracking, splitting, wear-layer delamination, shrinking, gapping, cupping, buckling etc. Subtle changes to the setting 2 to 3 degrees up or down in a 24-hour period is recommended, otherwise you may experience the conditions mentioned above.

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 subfloor 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 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 HM) 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, etc., as a result of removal of the flooring, cupping, buckling, twisting, bowing, shrinking, lifting, moving etc. HM 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 a HM 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. HM 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 HM 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!

HM 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 color match to the flooring is acceptable before installing it/them.

Precautionary Statement: Before mixing materials, i.e. Wood flooring from different runs/lots MAKE SURE the color tone is acceptable before installing the floor. IT IS THE RESPONSIBILITY OF THE DESIGNER, ARCHITECT, BUILDER, 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. INSTALLATION CONSTITUTES ACCEPTABILITY OF THE MATERIAL BEING INSTALLED. HM WILL NOT BE RESPONSIBLE FOR ANY/ALL COSTS I.E. MATERIALS AND OR LABOR ASSOCIATED WITH CLAIMS INVOLVING COLOR TONING 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 Swifter Wet Jet or any other like cleaning products. **Only use cleaning products that are specifically recommended and or approved by HM Hardwood.**

Protective Glides: Place protective glides on the bottom of all chairs and furniture legs; they come in a variety of sizes and shapes and can be purchased at your local home improvement center. For your really large furniture such as China cabinets and 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 manufactured piano coasters.