



IMPORTANT:

Please read the following information and instructions in their entirety before proceeding with installation.

- To ensure the full benefit of warranties, these instructions and maintenance procedures must be followed.
- Hardwood flooring is a beautiful product with natural variations in color, tone and grain. We cannot warrant against color variations within a floor nor variations between samples and the installed floor.
- Subfloors must be dry, level and clean.
- Both room and flooring must be properly acclimated to temperature and humidity conditions.
- Installers: Inform your customers of the details in section: "Installers – Advise Your Customer of the Following."
- Do not open flooring packages until you are ready to begin installation.
- Work out of several cartons at the same time to ensure color and shade mix.
- Do not use water based adhesives over sheet vapor barriers or sound insulation.
- Not recommended for bathroom or other high moisture installations.
- Use of stain, filler or putty stick for defect correction during installation should be accepted as normal procedure.
- Great Northern[®] may be laid over radiant heating provided there is effective and uniform heat distribution over the entire floor. The floor's surface temperature must never exceed 80°F. in any place. Maple, Beech, Ash and Asian Jatoba expand and contract more than other wood species. There is a greater risk of gaps occurring with these species especially when installed over radiant heating systems. Such gaps are NOT manufacturing defects and are not covered by the warranty.

INSTALLER/OWNER RESPONSIBILITY

Beautiful hardwood floors are a product of nature. Our wood floors are manufactured in accordance with accepted industry standards, which permit a defect tolerance not to exceed 5%. The defects may be manufacturing or natural.

- When flooring is ordered, **5% must be added to the actual square footage needed** for cutting and grading allowance.
- The installer assumes all responsibility for final inspection of product quality. This inspection of all flooring should be done before installation. Carefully examine flooring for color, manufacturing, factory finish and quality before installing it. The installer must use reasonable selectivity and hold out or cut off pieces with defects, whatever the cause. If material is not acceptable, do not install it, and contact the seller immediately.
- Prior to installation of any hardwood-flooring product, the installer must **determine that the job-site environment and the subfloors involved meet or exceed all applicable standards** and recommendations of the construction and materials industries. These instructions recommend that the construction and subfloor be dry, stiff and flat. The manufacturer declines any responsibility for job failure resulting from or associated with sub-surface or job-site environmental deficiencies.

ATTENTION INSTALLERS: CAUTION WOOD DUST

Sawing, sanding and machining wood products can produce wood dust. Airborne wood dust can cause respiratory, eye and skin irritation. The International Agency for Research on Cancer (IARC) has classified wood dust as a nasal carcinogen in humans.

Precautionary Measures: If power tools are used, they should be equipped with a dust collector. If high dust levels are encountered, use an appropriate NIOSH-designated dust mask. Avoid dust contact with eye and skin.

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

Material Safety Data Sheets are available at www.greatnorthernhardwood.com

TOOLS NEEDED FOR INSTALLATION

- Circular saw or jigsaw
- Pencil
- Handsaw
- Tapping block
- Chisel
- Chalk line
- Hammer
- Tape measure
- Wooden or plastic spacer wedges

For **glue down installations**, use Parabond's Millennium 2002[®], Bostik Best[®], Taylor 2071[®] or equivalent flooring adhesive. (See your distributor for adhesive recommendations.) Follow manufacturer's guidelines and tool recommendations when using adhesive. Do not use water based adhesives over sheet vapor barriers or sound insulation.

CAUTION: By not using proper tools, "puckering" may result on the face of the plank. Great Northern[®] is not responsible for problems caused by use of improper tools. See your distributor for tool recommendations and use.

Note: Never hit the planks directly with a hammer—always use a wooden block to protect the edges of the boards.

INSTALLERS - ADVISE YOUR CUSTOMER OF THE FOLLOWING

SEASONS: HEATING AND NON-HEATING

Recognizing that wood floor dimensions will be slightly affected by varying levels of humidity within your building, care should be taken to control humidity levels within the 45-60% and 65°-75° Fahrenheit temperature range. To protect your investment and to assure that your floors provide lasting satisfaction, we recommended the following:

- **Heating Season (Dry)** A humidifier is recommended to prevent excessive shrinkage in wood floors due to low humidity levels. Wood stoves and electric heat in particular tend to create very dry conditions.
- **Non-Heating Season (Humid, Wet)** Proper humidity levels can be maintained by use of an air conditioner, dehumidifier, or by turning on your heating system periodically during the summer months. Avoid excessive exposure to water from tracking during periods of inclement weather. Do not obstruct in any way the expansion joint around the perimeter of your floor.

RADIANT HEATING

See the "Installing Over Radiant Heat" and "Exclusions To Warranty: Radiant Heat" sections for specific details to inform your customers about radiant heating.

FLOOR REPAIR

Minor damage can be repaired with a touch-up kit or filler. Major damage will require board replacement, which can be done by a professional floor installer.

PRE-INSTALLATION PROCEDURES

ACCLIMATING THE HARDWOOD FLOORING

HVAC systems should be fully operational at least 14 days prior to flooring installation, maintaining a consistent room temperature between 65°-75° Fahrenheit and relative humidity between 45-60%. This not only stabilizes the building's interior environment, but also is essential when acclimating hardwood flooring to the job site.

Hardwood flooring should be handled and unloaded with care and stored within the environmentally controlled site. **Leave hardwood flooring in closed cartons in the stabilized room to acclimate for a period of at least 48 hours.** Cartons should be spaced out, not stacked or stored on pallets. Flooring stored upon "on-grade" concrete floors should be elevated at least four inches to allow air circulation under cartons.

ROOM PREPARATION

Remove existing baseboards, quarter rounds, thresholds.

Cut wooden doorjamb and frames so that the floor can slide underneath with ease. Take a piece of the flooring as a guide for the saw, and cut the doorjamb with a thin saw blade. **(Fig. #2)** If the doorframes are not shortened, then an expansion joint of at least 1/2" between flooring and any vertical elements is required.

PRE-INSTALLATION INSPECTION

It is the responsibility of the installer to **inspect each board for visible defects before installation** of each board. Any board with visible defects will be replaced at no cost. If the defective board has been installed, no cost of labor will be paid for repair or replacement of defect.

SUBFLOOR TYPE

Great Northern flooring can be installed over many types of subfloors if properly prepared. See the "Installation Options" chart and note these specifics:

- **Concrete:** Must be clean, dry and smooth within 1/8" over 8'. Follow all procedures in "Testing for Moisture Content" in the following section. At a minimum, concrete subfloors should be at least 60 days old before installing a wood floor.
- **Acoustic Cork:** Must be bonded to the surface. Density must be between 11.4 and 13 lbs/cubic foot. Cork must be a maximum of 1/4" thick, made from pure cork with polyurethane binders.

INSTALLATION OPTIONS

Grade Type	Glue	Float
Above Grade	yes	yes
On Grade	yes	yes
Below Grade	no	yes
Over Radiant Subfloor	no	yes

Subfloor Type	Glue	Float
Concrete (701 lbs. cu. ft. density or higher)	yes	yes
Lightweight concrete	no	yes
Association-grade underlayment plywood	yes	yes
Association-grade underlayment particle board	yes	yes
Stamped Underlayment Grade OSB (Oriented Strand Board)	yes	yes
Old wood floors—above grade only	no	yes
Asphalt tile	no	yes
Vinyl asbestos tile	no	yes
Cushion vinyl	no	yes
Rubber tile	no	yes
Solid vinyl tile	no	yes
Steel	no	yes
Marble	no	yes
Ceramic	no	yes
Carpet	no	no

- **Terrazzo and Ceramic Tile:** Should be lightly sanded and cleaned with mineral spirits. Allow the mineral spirits to dry prior to spreading the adhesive. If grout lines are too deep they need to be filled and allowed to dry before installation.
- **Wood Type Subfloors:** Includes plywood, OSB and underlayment particle board and tongue and groove boards. Must be smooth and between 6-12% moisture content. Squeaks and popping areas should be screwed down prior to spreading adhesive.
- **Vinyl:** Includes sheet and vinyl tile. Vinyl must be securely fastened to the subfloor with full spread adhesive. Loose laid or perimeter glued sheet vinyl must be removed. Lightly sand vinyl and clean with mineral spirits and allow to dry prior to spreading adhesive.

For other types of subfloors please contact your distributor.

SUBFLOOR PREPARATION

Subfloor must be:

- clean and free of wax, paint, oil, and debris. Scrape smooth and sweep prior to installation.
- leveled with unevenness not to exceed 1/8" over an 8' radius. If subfloor prep work is required, "hills" should be sanded down and "valleys" filled with an underlayment patch, developed by a reputable manufacturer for use with hardwood flooring. Do not sand sub-surfaces such as vinyl or synthetic tiles that may contain asbestos. For small depressions, less than 1/4", it is possible to use dry sand as a leveler. Never use foam or soft fillers.
- structurally sound prior to installation. Screw down loose areas to reduce squeaking and replace water damaged or delaminated subflooring or underlayments.

WOOD SUBFLOOR MOISTURE TESTING

Check moisture content of subfloor especially adjacent to exterior walls and plumbing fixtures. Moisture content of subfloor must not exceed 12% or have more than a 4% difference than moisture level of product being installed. If more than a 4% difference, determine the source of moisture and remedy prior to installation.

TESTING FOR MOISTURE CONTENT

All concrete subfloors must be tested for moisture content, especially adjacent to exterior walls and plumbing fixtures. Several tests are outlined below.

These tests do not guarantee a dry concrete slab year-round. With that in mind, a moisture barrier using a minimum of 6 mil poly film must be installed between the ground and concrete. See "Moisture Barrier System" below.

- **3% Phenolphthalein in Anhydrous Alcohol Solution** — Do not apply solution directly to concrete surface. First, chip 1/4" deep into concrete test area and apply several drops of the solution. If any change in color is observed, further testing is required.
- **Calcium Chloride** — Moisture transfer should not exceed 3 lbs/1000 square feet with this test. One test must be performed every 250 square feet.
- **Tramex Concrete Moisture Encounter Meter** — Moisture readings using a metering device should not exceed 3.5 on the upper scale.

MOISTURE BARRIER SYSTEM

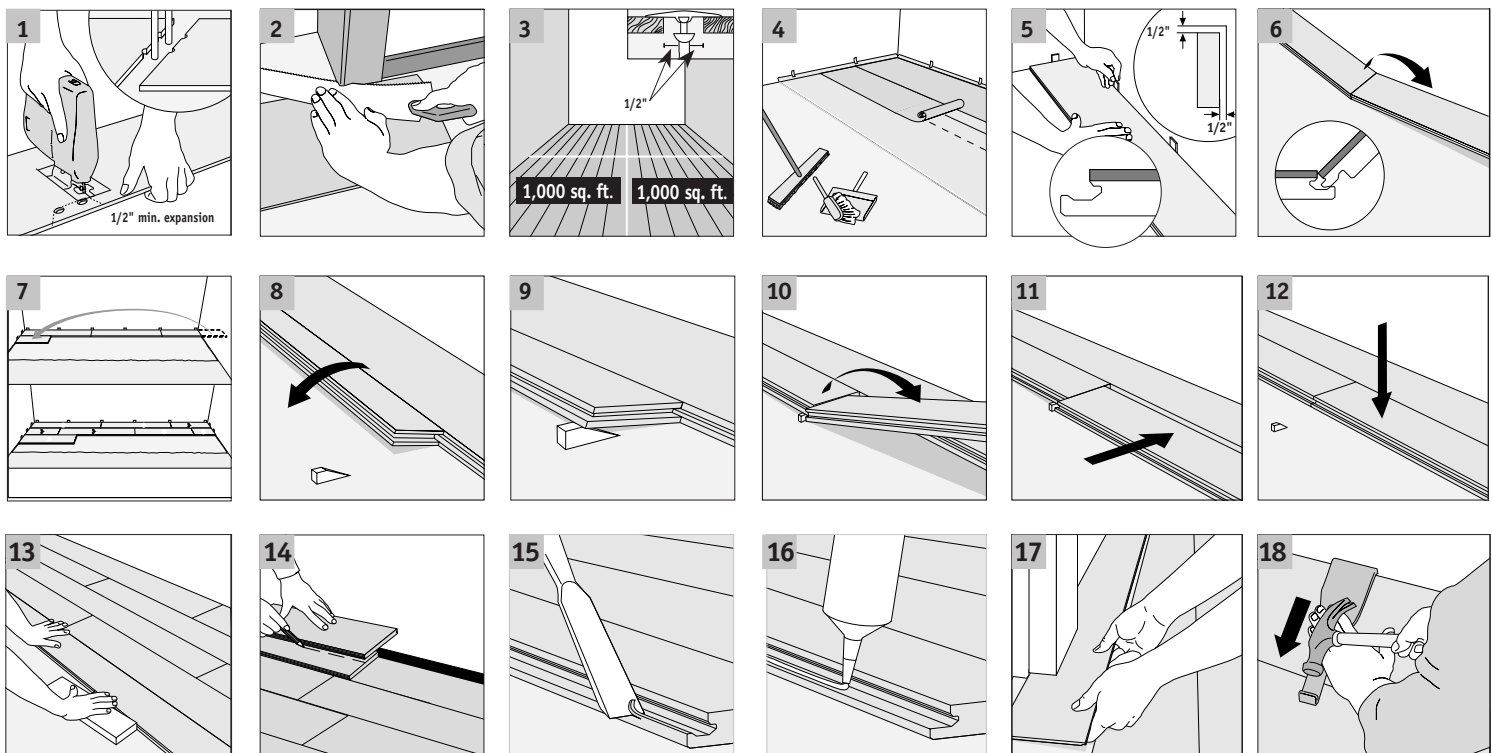
If the above tests reveal unacceptable moisture levels, install sheet vinyl (PVC) directly to concrete slab. Follow instructions from sheet vinyl manufacturers, using a premium grade alkaline resistant adhesive and full spread application system to bond vinyl to sub-floor. Overlap sheets a minimum of 8" and tape.

SET UP

- In order to have sufficient material at hand, **calculate area and add 5%** of material to allow cutting waste and for minor natural or manufacturers defects.
- **Work out of several cartons at the same time** to ensure color and shade mix.

LAYOUT

- Layout should be designed to save labor and materials as well as to enhance the appearance of the floor. The floor will be stronger and more stable if you lay it so that the joints in the rows are staggered at least 10 inches. Staggered or irregular joints mean less material waste and a better overall appearance. Stair stepping and "H" joints are not as visually pleasing as randomly staggered end joints and will waste labor and material.
- Plan the layout so that the last row of flooring (which usually needs to be cut length-wise) is not too narrow. In some cases, it may be necessary to cut the first row as well as the last row. Measure across the entire room to calculate the width of the last board. The last board cannot be less than 2" wide. If necessary, rip your first row (remove tongue edge) so last board can be at least 2" wide.
- Great Northern® is normally laid parallel to the incoming daylight. However, flooring should be laid at right angle to the floor joist and, if possible, in the directions of the longest dimension of the room.



- In long, narrow rooms or hallways we recommend laying it lengthwise.
- Allow a minimum of 1/2" for expansion space along all walls and fixed objects (e.g. door frames, pipes, threaded joints, electrical installations, etc.) (**Fig. #1**)
- Rooms with walls under 25' of length or 1,000 sq. ft. area can be laid in one piece without additional expansion space in the middle of the floor.
- Rooms with off square areas (for example: L, F, T or U shaped rooms) require expansion joints between the rectangular areas.
- The greater the surface area, the greater the room for expansion required. For rooms larger than 1,000 sq. ft. or exceeding 25' in any direction the perimeter expansion space must be increased 1/16" for every additional 3'. Also, additional expansion joints must be added in the middle of the room or in appropriate doorways and archways. (**Fig. #3**) The expansion space should be covered with transition moldings (T-moldings). Do not fill the expansion gaps.

INSTALL UNDERLAYMENTS

Install 6 mil Polyethylene vapor barrier over entire flooring surface. Overlap sheets of Polyethylene 16 inches and tape together creating an airtight seal. Using 1/8" foam padding, roll out one roll at a time over vapor barrier being careful not to poke holes or otherwise damage material during installation. Run padding up walls 1" to 1.5" and secure in place with tape. Join padding sections with tape strip. Tape down any additional loose edges. (**Fig. #4**) A "2-in-1" foam padding/moisture barrier may be substituted for Polyethylene and foam padding.

GLUE DOWN INSTALLATION

GLUING THE PLANKS

- To determine a straight first starting row, use a snap line the width of a few boards plus 1/2" expansion space from the wall. To keep first rows straight and in place, nail a straight 1" x 2" or 1" x 4" holding board on the first snap line.
- Make another snap line at a comfortable working distance from the holding board (about 24").
- Spread adhesive in first working area. Do not spread more adhesive than can be covered within 20 minutes.
- When the first section is complete, strike another parallel snap line from the last row installed, spread the adhesive and complete the section.
- Repeat section by section until the job is finished. Remove the starting board, spread adhesive and complete the area from the starting board to the wall.
- Fit in the last row by laying the plank exactly on top of the second-to-last board. Using an off-cut piece of the original width, transfer the run of the wall onto the panel as if using a template. Take the 1/2" minimum expansion space distance from the wall into account in the process. (**Fig. #14**) Turn it over, fit it and glue in place.

INSTALLATION OVER RADIANT HEAT— FLOATING INSTALLATION ONLY

Note: Special care should be taken into consideration when choosing a wood species to be installed over radiant heat. Maple, Beech, Ash and Asian Jatoba expand and contract more than other species. There is a greater risk of gaps occurring especially when installed over radiant heating systems and may void the warranty. See the "Warranty Exclusions: Radiant heat" for more detail before installing these species over radiant heat.

INSTALLERS—ADVISE YOUR CUSTOMER OF THE FOLLOWING

- **Maximum allowable wood surface temperature is 80° Fahrenheit.** Note that rugs can increase surface temperatures 5° Fahrenheit or more.
- Maintain 45-60% humidity in radiant heated rooms at all times. If necessary, use humidifiers.
- Room temperature should not vary more than 15° Fahrenheit season to season.

HEATING SYSTEM REQUIREMENTS

- Only low temperature radiant heating systems with accurate control systems that assure that the floor's surface temperatures never exceed 80°F are allowed.
- The entire floor area must be evenly heated. Even with perimeter heating systems the floor's surface temperature must never exceed 80°F.

SETTING THE HEATING SYSTEM FOR INSTALLATION

- System must be fully operating at normal temperature for a minimum of 21 days prior to floor installation.
- The heating system must be turned off 24 hours prior to installation and must remain off for 24 hours after installation.
- Starting 24 hours after completion of installation, turn on the heating system and **gradually increase the temperature over a 7-day period** to normal operating level. Never allow the floor surface temperature to exceed 80° Fahrenheit.

SUBFLOOR

- The floor construction should have a heat dissipating layer that provides an even temperature across the entire floor area and avoids high temperatures in any area. Under plywood subfloors heat transfer plates or insulation must be in place.
- The subfloor should be completely dry. Moisture on a dry weight basis must not exceed 1.5% for concrete, 0.3% or less for gypsum and 6-8% for wood subfloors.
- A vapor barrier should be installed on all concrete, stone, mineral or wood subfloors. It must be directly under and as close to the flooring as possible.
- Heating pipes must be covered with 1" of concrete or be a minimum of 1/8" below bottom of plywood subfloor.
- The wood floor must lie tight against the sub-surface without an air gap that can cause considerable drying out of the wood.

LAYOUT

- Separate floor areas with radiant heat from any adjoining areas without radiant heat with expansion joints.

FLOATING INSTALLATION

STEP 1

Start in a left-hand corner of the room with the tongue facing into the room. For uneven walls, scribe the profile onto the first row and cut planks accordingly. Take care to maintain a minimum 1/2" distance to the walls using spacer wedges. (**Fig. #5**)

STEP 2

Press together the short ends of the next floorboard at approximately a 45° angle and then lay it down. (**Fig. #6**) Continue in this manner for the entire first row.

STEP 3

The last piece in the first row is scribed and cut. Do not forget the 1/2" expansion space at the end of the first row and secure with spacer wedges.

STEP 4

Start the second row with the piece left over from previous row. (**Fig. #7**) It must be at least 20" long. If the leftover is too short take a new full length plank and cut it in half. Make sure the joints are always staggered by at least 20". Place the floorboard at an angle against the floorboard in the previous row, push forward and press down at the same time. (**Fig. #8**)

STEP 5

Put an installation wedge under the short edge of the last board. (**Fig. #9**)

STEP 6

Take full-length plank. (**Fig. #10**) Engage the end joint to the end of the previous plank approx 1/2" from the long edge. Lay down the plank to the level as the previous plank. Keep the wedge under the first plank.

STEP 7

Use a hard sturdy striking block to tap the end joint flush toward the long joint and engage the long edge. (**Fig. #11**) **Never tap the flooring planks directly with a hammer or mallet.**

STEP 8

When the whole row is completed remove the wedge and press the boards down (**Fig. #12**) and then gently tap with the knocking block along the open long seam while applying downward pressure until the board lays flat. (**Fig. #13**)

STEP 9

When three rows are completed pull floor away from starting wall until you have the 1/2" expansion space. Place shims between floor and wall to maintain this space. (**Fig. #5**)

STEP 10

Fit in the last row by laying the plank exactly on top of the second-to-last board. Using an off-cut piece of the original width, transfer the run of the wall onto the panel as if using a template. Take the 1/2" minimum expansion space distance from the wall into account in the process. (**Fig. #14**)

STEP 11

If boards cannot be easily angled under door frames (or similar): cut away locking edge. (**Fig. #15**) Apply white wood glue (PVAC) (**Fig. #16**) and install board, (**Fig. #17**) gently using a pullbar if necessary to pull the floorboard into position. (**Fig. #18**)

OPTIONAL GLUE JOINT

For additional strength and sealant against moisture the joint may be glued. Apply white wood glue (PVAC) to both planks along the long and short side before assembly as shown at right. Remove any excess glue with a damp cloth.

Allow 2 hours before placing furniture on floors and 4 hours before introducing heavy objects or full traffic.

Note: Do not install cabinets or walls on top of floating floors.

