



Tongue & Groove Engineered Flooring Installation Instructions • 01/10/17 (S)

Glue: 1/2", 3/4" • **Nail:** 1/2", 3/4" • **Staple:** 1/2", 3/4" • **Float:** 1/2"

Engineered Planks can be installed over most subfloors, and are constructed to be dimensionally stable, making them suitable for installation over all grade levels. See all information and installation guidelines below.

ATTENTION: INSTALLERS

IT IS THE INSTALLER/OWNER'S RESPONSIBILITY TO inspect ALL materials carefully BEFORE installation. Wood is a natural product containing natural characteristics such as variations in color, tone and grain. Some variation in color is to be expected in a natural wood floor. Even though our product goes through many inspections before it leaves the plant, it is the customer and installer/owner's responsibility for final inspection prior to installation. The warranty DOES NOT cover materials with visible defects once they are installed. The manufacturer will not be responsible for claims arising from flooring that has a greater range of grain/color variation than found in the showroom display samples.

NECESSARY TOOLS

Basic tools and accessories: broom or vacuum, chalk line, tapping block, wood flooring surface cleaner, hand or electric jam saw, miter saw, moisture meter, safety glasses, straight edge, table saw, tape measure, square, utility knife, pry bar. Use a moisture-cured urethane wood flooring adhesive and trowel if gluing. If using a pneumatic floor stapler, an 18 gauge 1 1/4" staple with a 1/4" crown is recommended for 1/2" flooring. (Note: A 1/2" adapter must be used with some staplers as appropriate).

3/4" thick engineered planks should be nailed or stapled using a standard 3/4" solid wood flooring nailer or stapler of any brand using the recommended size staple or cleat for 3/4" solid wood installations. The nailing schedule should be 1" to 3" from the ends and 8" to 10" in the field.

Caution: Do not use a rubber mallet to engage the tongue and groove system. Use a tapping block instead. A rubber mallet hitting any finished surface will cause abrasive marks (dull spots) and chipped edges.

PREPARING THE JOBSITE

- Before installing any LM Flooring product, central heat or air conditioning should be operating for a minimum of 14 days.
- LM Flooring product should be stored in a flat position.
- Do not open packages until the day you are ready to begin installation. This prevents the T&G system from potentially absorbing too much moisture and causing a tight fit.
- Remove existing moldings.
- Undercut doorjamb with hand or jamb saw to allow for ease of installation and 1/2" expansion space in all directions.
- This flooring is designed to be installed working from right to left.

JOBSITE CONDITIONS

The room temperature should be 16°C - 26°C (60 - 80° F), with relative humidity of 30% - 60%. These environmental conditions are specified as pre-installation requirements and should be maintained for the life of the engineered wood.

It is the responsibility of the installer/owner to determine if the job site subfloor and job site conditions are environmentally and structurally acceptable for wood floor installation. The manufacturer declines any responsibility for wood failure resulting from or connected with subfloors, subsurface, job site damage or deficiencies after hardwood flooring has been installed.

ATTENTION: INSTALLERS - CAUTION: WOOD DUST

Sawing, sanding and machining wood products can produce wood dust. Airborne wood dust can cause respiratory, skin and eye irritation. The International Agency for Research on Cancer (IARC) has classified wood dust as a nasal carcinogen in humans. Precautionary Measures: Power tools should be equipped with a dust collector. If high dust levels are encountered use an appropriate NIOSH-designated dust mask. Avoid dust contact with skin and eyes. First Aid Measures in case of irritations: Flush eyes and skin with water for at least 15 minutes.

WARNING! DO NOT MECHANICALLY CHIP OR PULVERIZE EXISTING RESILIENT FLOORING, BACKING, LINING FELT, ASPHALTIC "CUTBACK" ADHESIVES OR OTHER ADHESIVES. THESE PRODUCTS MAY CONTAIN EITHER ASBESTOS FIBERS AND/OR CRYSTALLINE SILICA. THE PRODUCTS IN THIS CARTON DO NOT CONTAIN ASBESTOS OR CRYSTALLINE SILICA.

Avoid creating dust. Inhalation of such dust is a cancer and respiratory tract hazard. Smoking by individuals exposed to asbestos fibers greatly increases the risk of serious bodily harm. Unless positively certain that the product is a non-asbestos containing material, you must presume it contains asbestos. Regulations may require that the material be tested to determine asbestos content and may govern the removal and disposal of material. See current edition of the Resilient Floor Covering Institute (RFCI) publication "Recommended Work Practices for Removal of Resilient Floor Coverings" for detailed information and instructions on removing all resilient covering structures.

SUBFLOOR PREPARATION AND RECOMMENDATIONS FOR ALL INSTALLATIONS

Concrete Subfloors New concrete slabs require a minimum of 60 days drying time before covering them with a wood floor.

Concrete subfloors must be dry, smooth (level within 3/16" in a 10' radius 1/8" in 6') and free of structural defects. Hand scrape or sand with a 20-grit #3-1/2" open face paper to remove loose, flaky concrete. Grind high spots in concrete and fill low spots with a Portland based leveling compound (min. 3,000 psi).

Concrete must be free of paint, oil, existing adhesives, wax, grease, dirt and curing compounds. These may be removed mechanically but **DO NOT** use solvent-based strippers under any circumstances. The use of residual solvents can prohibit the satisfactory bond of flooring adhesives. It is important to ensure a proper bond between the adhesive and the concrete, and planks or strips. Engineered hardwood flooring may be installed on-grade, above grade, as well as below grade where moisture conditions are acceptable.

Lightweight Concrete

Lightweight concrete with a dry density of 100 pounds or less per cubic foot is only suitable for engineered wood floors when using the floating installation method. Many products have been developed as self-leveling toppings or floor underlayments. These include cellular concrete, resin-reinforced cementations underlayments, and gypsum-based materials. Although some of these products may have the necessary qualifications for underlayment for wood flooring installations, others do not. To test for lightweight concrete, scrape a coin or key across the surface of the subfloor. If the surface powders easily or has a dry density of 100 pounds or less per cubic foot, use only the floating installation method.

To ensure a long lasting bond, make sure that the perimeter of the foundation has adequate drainage and vapor barrier.

Wood Subfloors

Wood subfloors must be well nailed or secured with screws. Nails should be ring shanks and screws need to be counter sunk. The wood subfloor must be structurally sound and dry. It should not exceed 13% moisture prior to installation. If the subfloor is single layer, less than 3/4" thick, add a single cross layer for strength and stability (minimum 5/16" thick for a total 1" thickness). This is to reduce the possibility of squeaking. Wood subfloors must be free of paint, oil, existing adhesives, wax, grease, dirt, urethane, varnish, etc. Underlayment grade OSB (not the wax side) is also a suitable subfloor. Particleboard is not an acceptable subfloor for staple or nail down installations but can be used as a subfloor in glue-down or floating installations. When installing over existing wood flooring, install at right angles to the existing floor.

Subfloor Moisture Check

Engineered hardwood flooring may be used for above-, on-, and below- grade applications. On all common substrates, on- and below-grade applications are susceptible to moisture and should be tested for moisture prior to installation in several locations within the installation area. Acceptable conditions for above-, on-, and below- grade applications are:

- **Less than 3 lbs. /1000 SF / 24 hrs. on a calcium chloride test**
- **Or an acceptable reading on an electronic concrete moisture meter**
- **Wood substrates must have a moisture reading of less than 13% when using an electronic wood moisture meter**

To correct any subfloor problems concerning moisture, either wait until the subfloor dries to meet specifications or use an appropriate moisture barrier.

Subfloors other than Wood or Concrete

Note: Perimeter glued resilient vinyl and rubber tiles are unacceptable underlayments and must be removed.

Terrazzo, tile and any other hard surfaces that are dry, structurally sound and level, as described above, are suitable as a subfloor for installation of engineered hardwood flooring. As above, the surface must be sound, tight and free of paint, oil, existing adhesives, wax, grease and dirt. Terrazzo and ceramic tile must be scuffed to assure adhesion.

Warning! Do not sand existing resilient tile, sheet flooring, and backing or felt linings. These products may contain asbestos fibers that are not readily identifiable. Inhalation of asbestos dust can cause asbestosis or other serious bodily harm. Check with local state and federal laws for handling hazardous material before attempting the removal of these floors.

Radiant Heated (HYDRONIC) Subfloors (FLOATING INSTALLATION RECOMMENDED) SEE APPROVED WOOD SPECIES BELOW.

APPROVED WOOD SPECIES: W. OAK / R. OAK / WALNUT

Species such as JATоба, HICKORY AND HARD MAPLE are very dense and may split or check when subjected to rapid changes in temperature and/or relative humidity. EXOTIC SPECIES, HICKORY AND HARD MAPLE are not recommended or warrantied for installation over radiant heated subfloors. Prior to the installation of engineered hardwood flooring over a radiant heated flooring system the following guidelines must be followed in order to prevent unsatisfactory results for the flooring:

- Previously noted concrete subfloor requirements apply
- It is highly recommended that the radiant heat system be designed to accept a wood floor. Electric systems are not recommended.
- The floating installation method is recommended. Glue-down or staple down methods are approved. Follow heating system manufacturer guidelines.
- Relative humidity of the jobsite must be maintained between 30 – 55%. Use of a humidification system may be required to maintain humidity level. Failure to maintain the humidity range noted can result in excessive drying of the flooring which may lead to surface checking.
- The radiant heat system should be set to run at 2/3 maximum output for a minimum of 2 weeks prior to installation of flooring to further allow dissipation from the concrete slab. This must be done in both warm and cold seasons.
- Before installation (5 days) reduce the temperature to 18° C (65° F) and maintain temperature range of 18 - 20° C (65 - 68° F) during the installation.
- After completion of the installation, wait 48 hours and then gradually raise the temperature of the heating system 1° C (3° F) per day over a five day period or until the preferred setting is reached.

Caution: The floor surface must never exceed 27°C (80° F) in temperature.

Room temperature should not vary more than 15° F from season to season. Seasonal gapping should be expected when installed over radiant heat.

SITE PREPARATION

Remove all moldings and wall-base, and undercut all door casings with a hand or power jam saw using a scrap piece of flooring as a guide.

Racking the Floor

Whether your choose to install the floor using the glue, float or staple method, start by using random length planks from the carton or by cutting four to five planks in random lengths, differing by at least 6". As you continue working across the floor, be sure to maintain the 6" minimum spacing between end joints on all adjacent rows. Never waste material; use the leftover pieces from the fill cuts to start the next row or to complete a row.

Note: When installing a pre-finished wood floor be sure to blend the wood from several cartons to ensure a good grain and shading mixture throughout the installation.

GLUE DOWN INSTALLATION GUIDELINES

There are two ways to install when using a moisture cured urethane wood flooring adhesive (wet lay; meaning to lay directly into wet adhesive, and dry-lay method; meaning to allow the adhesive to flash or to tack up).

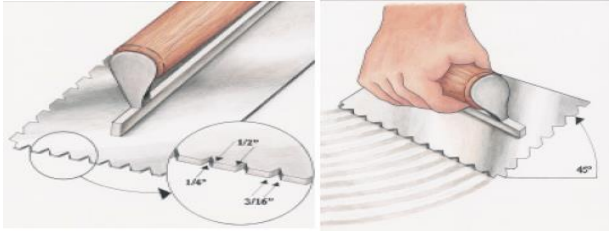
Caution: Whether you choose to install using the dry or wet method, follow all guidelines set by the adhesive manufacturer and the instructions below. By not adhering to the guidelines the warranty on the floor can be voided.

Beginning installation

Note: Expansion space is required around the perimeter of rooms. A 10mm (3/8") expansion space is recommended. For very large rooms an expansion space of 12mm (1/2") is recommended.

Wet Lay Method - Step 1

Select a starter wall. It is recommended to start the installation along an exterior wall because it's more likely to be straight and square with the room. Measure out from the wall the width of two planks, plus expansion space, and mark each end of the room and snap your chalk line.



Wet Lay Method - Step 2

Spread the moisture cured urethane wood flooring adhesive from the chalk line to the starter wall using the recommended trowel size specified by the glue manufacturer. It is important to use the correct trowel at a 45° angle to get the proper spread of adhesive applied to the subfloor, which will produce a proper and permanent bond. Improper bonding can cause loose or hollow spots.

Step 3

Install the first row of starter planks with the tongue facing the starter wall and secure into position. Alignment is critical and can be achieved by securing a straight edge along the chalk line (2x4's work well), or by top nailing the first row with finishing nails (wood subfloor), or sprig/pin nails (concrete subfloor). This prevents slippage of the planks that can cause misalignment.

Note: The planks along the wall may have to be scribed and cut to fit in order to maintain a consistent expansion space since most walls are not straight.

Step 4

Once the starter rows are secure, spread 2 1/2" to 3 feet of adhesive the length of the room. (Never lay more adhesive than can be covered in approximately 2 hrs.) Place tongue into groove of plank and press firmly into adhesive; never slide planks through adhesive.

(Note: Do not use a rubber mallet to butt the ends of the material together as it can burnish the finish and cause marring). Use a tapping block to fit planks snugly together at side and butt ends.

Clean any adhesive off the surface before it cures using clean terry cloth towels, mineral spirits or adhesive manufacturer's glue removal product. Do not allow adhesive to cure on the finish. Cured finish may be difficult to remove.

Use straps to hold planks securely in place as you are installing and continue the process throughout the installation.

Note: Never work on top of the flooring when installing with the wet lay method.

Dry Lay Method

Step 1

Start by selecting your starter wall and measure out from the wall 30" for 3" or 5" planks, or as required for wide planks. This will allow adequate working space. Snap a chalk line.



Step 2

Apply adhesive from the chalk line out 2 1/2 to 3 feet. Allow adhesive to flash as per the instructions affixed to the adhesive container.

Note: Variations in humidity may affect the flash times. Check adhesive specifications for additional information.

Secure your starter rows with a straight edge (2x4's). Install planks and fasten with straps as you continue throughout your installation. If you must work on top of the newly laid flooring use a kneeling board.

Once the remainder of the floor has been installed, go back to the beginning and remove the straight edges and spread adhesive on the remainder of the open subfloor. Allow to flash for the appropriate time and lay flooring as instructed. Remember that the planks closest to the wall may have to be scribed and cut to fit due to irregularities along the wall. Roll the floor per adhesive manufacturer's recommendations.

Clean Up

Use clean white terry cloth towels to clean as you go using mineral spirits or using a cleaner provided by adhesive manufacturer. Adhesive that has cured on the surface of the flooring can be difficult to remove and will require the use of a urethane remover. Use only a cleaning product that has been recommended by the adhesive manufacturer, as the finish of your engineered hardwood floor may otherwise be damaged.

Light foot traffic is allowed after 12 hours but wait 24 hours after installation to remove straps or edge spacers.

STAPLE OR NAIL-DOWN INSTALLATIONS

Engineered hardwood floors may be installed over wood subfloors using staples or flooring cleats. When installing engineered wood planks by nailing or stapling, it is necessary to use the proper type of flooring stapler or nailer made for the thickness of the engineered wood flooring that is being installed. Note that it is recommended wide plank flooring be nailed and glued. See installation guidelines below:

Recommended Pneumatic Floor Stapler

1/2" thick engineered planks should be nailed using a 20 gauge or 18 gauge 1-1/4" staple or longer with a 1/4" crown. **Note:** For some staplers you may be required to use an appropriate adapter to adjust to the thickness of the flooring. The nailing schedule which is 1" to 2" from the ends and 4" to 6" in the field. 3/4" thick engineered planks should be nailed or stapled using a 3/4" solid wood flooring nailer or stapler of any brand. You must use the recommended size staple or cleat for 3/4" solid wood installations, typically 18 gauge and 1-1/2" to 2" length. The nailing schedule which is 1" to 3" from the ends and 4" to 6" in the field

For products with a width greater than 7 inches, please see glue-assist method below:

Staple/Nail Method

Ensure the plywood or OSB subfloor decking is suitable for staple down installation of hardwood flooring. It is recommended that a layer of 15 lb felt or resin paper be installed over the subfloor prior to the installation of the engineered wood flooring. This reduces squeaks and noises created by the opposing floors.

You must use the recommended nailing schedule for placement of staples, which is 1" to 3" from the ends, and 8" to 10" in the field. This will help insure a satisfactory installation. It is recommended to initially set the compressor at 80 PSI and adjust the pressure as needed in order to properly set the fastener and keep the staples from going through or breaking the tongues. Improper stapling techniques can cause squeaks in the floor.

Adjustments may be necessary to provide adequate penetration of the nail or staple into the nail bed. The nail or staple must set flush in the nail pocket. Use a scrap piece of flooring material to set tools properly before installation.

Note: Installation over crawlspace: Before installation of the engineered flooring begins, install a 6-mil polyethylene layer to completely cover the ground. Install approximately 6" up the foundation walls. The seams of the 6-mil poly should overlap 4" to 6" and should be taped to the foundation walls using an aggressive tape such as Duck tape. This will retard moisture from below that is emitted from the soil.

Layout the job

Where possible, lay the flooring at 90° angles to the floor joists.

Expansion space is required along the perimeter of rooms. A 10mm (3/8") expansion space is recommended. For very large rooms (greater than 400 ft²) an expansion space of 12mm (1/2") is recommended.

Place the planks with the tongue facing away from the wall and along a chalk line, measured out from the wall one board width, plus expansion space. Use brads or small finishing nails, nailed through the plank face to secure the first starter row along the wall. Fastener spacing is 2" to 3" from the ends and every 6" to 8" along the side. Place the nails in a dark grain spot in the board. Counter sink the nails and fill with wood filler that blends with the flooring installed. The base or shoe molding will cover the nails after completion of the flooring installation.

Blind nail above the tongue at a 45° angle. It will be necessary to blind nail several rows by hand. A brad nailer with 1" to 1 3/8" brads can be used to blind nail, until you have worked out from the wall far enough to use a flooring stapler. Once out from the wall sufficiently, continue the installation using an engineered wood flooring nailer/stapler, using staples or nails recommended by the nailer or stapler manufacturer.

Glue Assist Installation for Wide Plank Engineered Flooring:

It is not necessary, but it is recommended that installation of products with a board width of 6" and wider, installed using the nail-down installation method, be supplemented by the use of adhesive. Without the supplement with adhesive, nail-down installations of wide plank flooring may result in board movement. Noises that emanate from installed flooring are not considered to be a manufacturing defect. These noises are always related to movement caused by insufficient fastening, un-level subfloors, or pressure related to lack of expansion space.

Adhesives used in the glue-assist method may be trowelled, or laid down in a bead, using a cartridge or sausage adhesive. Follow adhesive manufacturer's general guidelines. If using the trowel method, spread rows of adhesive perpendicular to the plank direction, no more than 12" apart. If laying down a bead of adhesive, apply the bead in a serpentine pattern, directly onto the subfloor, in the direction of the planks.

Recommended adhesives:

Trowel Method; Moisture Cured Urethane (e.g. Bostik Best, or equivalent)

Bead method: Bona R850T (or equivalent)

Do not use PL Premium or similar construction adhesives. The adhesive must remain flexible to allow normal expansion and contraction of the wood flooring.

Be sure to follow adhesive manufacturers cleaning guidelines as adhesive that cures on the flooring surface will be difficult to remove.

An alternative glue-assist method is to glue the tongue and groove joints using a standard PVA T&G adhesive, normally used in the floating installation method.

INSTALLING AS A FLOATING FLOOR

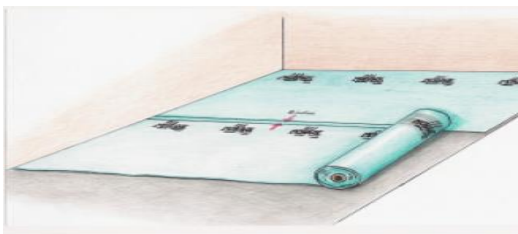
Subfloor Preparation:

Preparation of a subfloor is more critical for a floating engineered floor than for a staple or glue down application, the floor must be flat to 3/16" in a 10' radius. If the floor requires correction, the high areas can be ground down and the low areas may be filled using a latex fortified Portland leveling compound. The leveling compound must be allowed to dry according to the manufacturers instructions before the floor is installed over it. The use of sand or extra padding to fill low areas is not acceptable.

Important: Do not install cabinets or walls on top of the flooring when using the floating installation method.

Floating Floor Underlayment

Floating installation requires the use of poly-foam underlayment designed for engineered hardwood floating floors, with a minimum thickness of 1/8" and a minimum 2.0lb density. Underlayment requirements are very critical in a floating installation. Excessive pad compression or compaction can cause seam failure.



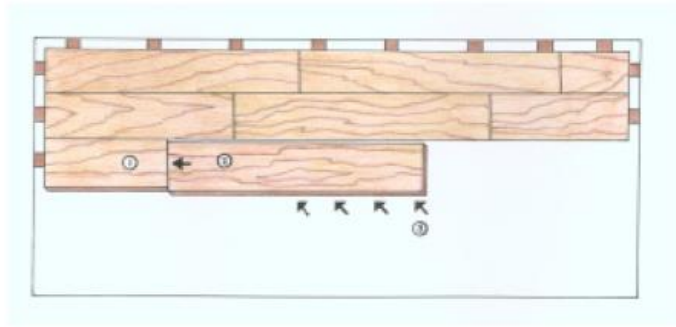
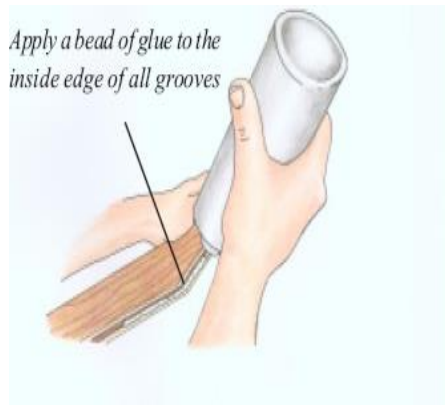
Floating Floor Expansion Space:

An expansion space of at least 1/2" must be maintained around the perimeter of the room, all pipes, counters, cabinets, fireplace hearths, doorframes and any other fixed vertical objects in the room.

Floating Floor Glue and Glue Placement:

Use recommended floating floor glue for use with engineered hardwood floors for installation.

Glue placement is very important. The glue must be placed along the topside of the groove the full length of the grooved side and end. This can be accomplished by inverting the plank and applying a bead of glue (3/32") to the topside of the groove (side of the groove nearest the face of the plank). When the plank is turned back over the glue will run down the back of the groove giving total coverage. Apply only a 3/32" bead of glue; if the groove is filled with glue it will be difficult to close the seam, not allowing a tight fit.



The installation begins in the left hand corner of the room with the long direction parallel to the longest wall of the room. Install three rows of flooring glued together and held in place with blue painter's tape with the groove side facing the wall. Tap boards together with a hammer and tapping block against the tongue side only. Spacers must be used to establish the minimum 1/2" expansion space from the walls. Place spacers against the wall every 2 – 3' and at each plank end joint connection. The three rows must be straight and square because they establish the alignment for the rest of the floor. After putting these three rows together, allow the glue to set (15 to 45 minutes) before proceeding with the installation. After installing 8 or 10 rows of flooring, stand back and check for crowning or heaving due to tension or any damage caused by improper tapping.

CLEAN AS YOU GO

If any glue squeezes out of the seam between the planks, wipe away with a damp cloth immediately, as dried glue is more difficult to remove. If glue has dried, then lightly scrape it away with a plastic scraper or other method recommended by the glue manufacturer.

Floating Floor Final Touches

Install the proper trim molding at the doorways, stairs and along the walls to cover the perimeter space, allowing the floor to expand and contract freely.

MAINTENANCE

Engineered Hardwood Floors are very easily maintained. No wax, no mess. Simply use a cleaner made for use with urethane coated hardwood floors and a terry cloth flooring mop.

Step One:

Sweep your floor to remove any particles that could scratch your floor.

Warning:

Vacuums with a beater bar or power rotary brush head can damage a wood floor and never should be used.

Step Two:

Apply hardwood surface cleaner directly to the terry cloth flooring mop, instead of the floor!

Step Three:

Use a back and forth motion with the mop. When the terry cloth cover becomes soiled, simply replace it with a clean one. Cleaning the floor with a soiled cover could cause streaking. The covers are re-usable, so wash and dry the covers periodically as you would a towel.

Tips & Warnings:

Maintain a normal indoor relative humidity level (30 – 55 %) throughout the year to minimize the natural expansion and contraction of the wood.

- I. Heating Season (Dry): A humidifier is recommended to prevent excess shrinkage due to low humidity levels. Wood stoves, electric heat and in-floor radiant heating systems tend to create very dry conditions.**
 - II. Non Heating Season (Wet): An air conditioner, dehumidifier, or periodically turning on your forced air system will help to maintain humidity levels during summer months.**
- Sweep regularly.
 - Remove spills promptly using wood flooring cleaner and a clean white cloth.
 - Use felt protectors under heavy pieces of furniture and chairs.

- Use protective mats at all exterior entrances.
- Spiked heels or shoes in need of repair can severely damage your floor.
- Never wet or damp mop your wood floors. Water can cause damage to wood flooring.
- Never use oil soaps, wax, abrasive cleaners, steel wool or strong ammoniated or chlorinated type products to clean your floor.
- The sun's UV rays can change the color of your floor.
- Keep animal nails trimmed.
- Protect your floor with a 1/4" piece of plywood or Masonite when using a dolly for moving furniture or appliances.
Never slide or roll heavy furniture or appliances across the floor.
- If your floor becomes scratched or dull, repairs can often be made using repair accessories.

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