

# Solid Wood Flooring Installation

Please read all of these instructions completely before beginning installation.

## Owner/Installer Checklist & Responsibility

It is crucial that any solid flooring is acclimated/conditioned in the climate-controlled area where it will be installed until its moisture content reaches the specified levels (See **Flooring Acclimation and Storage Section** for details). This step allows the moisture content level in the floor to equalize with the home's levels. Proper acclimation is determined by moisture level readings at the time of the installation, not by the length of time that the floor is acclimated. The wider the flooring plank, the more time it will take to acclimate properly. Failure to acclimate the floor correctly could cause the floor to crack, split, cup, etc. after installation.

Real wood floors are a natural product and every plank is unique. These features can include (but are not limited to) natural color variation, knots, worm holes, distinctive grain, etc. and are not flaws. The underside of the planks may have unfilled knots, worm holes, bark, etc. which will not be visible after installation and are OK to install. It is permissible to install planks with partially missing tongues as long as the nailing scheduled can be followed. These features will not affect the performance of the floor. Our hardwood floors are manufactured to accepted industry standards which permit natural and/or manufacturing grading defects not to exceed 5%.

The owner/installer assumes all responsibility for the final inspection of the product prior to installation. Retailer's sample boards may darken over time or vary due to the natural characteristics of wood. Check the actual flooring BEFORE installation and immediately contact your dealer or retailer if you feel the material is not acceptable. Warranties do NOT cover material with visible defects, undesired stain color or grain variation once they are installed. If the owner elects to not inspect/verify the floor prior to or during installation, then the installer is being given and accepting the responsibility. Installation is acceptance.

It is the responsibility of the installer/owner to determine if the job site subfloor and conditions are environmentally and structurally acceptable for wood flooring installation. Manufacturer is not responsible for wood floor failure resulting from or connected with subfloor, subsurface, job site damage or deficiencies after the flooring has been installed.

The installer must document all site tests (subfloor and planks' moisture levels, room temperature, home's relative humidity) at the time of installation and these should be retained. These records, along with the original proof of purchase (itemized sales receipt or customer agreement) will be needed if a warranty claim is ever filed.

Visit the National Wood Flooring Association's (NWFA) website at [www.woodfloors.org](http://www.woodfloors.org) for installation and care tips.

## Job Site Must Be Ready

The structure must be completely enclosed. All plumbing and dry wall work should be complete. The heat and air conditioning systems must be operating at 60-80 degrees F and the relative humidity (RH) should be normal (35-55%) for 14 days prior to the flooring installation. These temperature and RH levels must be maintained during and after the installation.

The use of a dehumidifier or humidifier may be required in some areas of the country to maintain these levels. Cupping, gapping, etc. can occur if a proper environment is not maintained.

Check basements and crawl spaces to insure they are dry and well ventilated. Earthen crawl spaces must have a minimum of 6 mil black polyurethane film with seams overlapped and taped.

## Installation Methods

Flooring planks must be nailed (cleats) or stapled down.

Only use nailers or staplers that are specifically designed for installation of  $\frac{3}{4}$ " hardwood floors.



(Fig. 1)

The use of a foot for manual and air nailers/staplers in order to protect the finish is recommended (See Fig. 1).

For installation over  $\frac{3}{4}$ " wood type subfloors that are installed over joist or truss systems, a minimum 2" long cleat/nail or staple should be used.

If installing over a concrete subfloor, a wood subfloor must be added. Refer to the National Wood Flooring Association's (NWFA) *SubFloor Guidelines*. Use 1-1/2" cleats/nails or staples.

The floor may **NOT** be fully glued directly to a sub-floor. For flooring 4" or wider, please see glue assist instructions on next page.

## Installation Locations

May be installed on 1st floor (ground level) or upper floors (2nd story or above). Do **NOT** install below ground level (basements or walk out basements).

Not warranted for installation in full bathrooms with showers and/or bathtubs due to the potential for excessive moisture.

## Installing with Floor Heating Systems

May **NOT** be installed over subfloor radiant heating systems.

## Flooring Acclimation and Storage

Store the unopened cartons of flooring in a climate-controlled dry area between 60-80 degrees F and a relative humidity (RH) of 35-55% preferably where the flooring will be installed.

Flooring should be left in cartons.

Allow the flooring to acclimate/condition in the climate-controlled area where it will be installed until the following moisture levels are achieved. Moisture should be checked at the time of installation using a reputable wood flooring moisture meter. Multiple readings should be taken from several cartons and areas of the subfloor. It will take longer for the planks in the middle of cartons or at the bottom of the carton stacks to acclimate fully.

Wood or plywood sub-floors should not exceed 14%.

When installing wood planks that are 2-1/4", the moisture content between the wood flooring planks and the subfloor should not exceed 4%.

When installing wood flooring planks that are WIDER than 2-1/4", the moisture content between the flooring planks and the subfloor should not exceed 2%.

Do **NOT** install the flooring planks until these moisture content levels are achieved.

Utilize the chart on following page to record the environmental readings at the time of installation. Retain this information with your records.

**Moisture Testing Wood Sub-Floor. Take a Minimum of 20 Readings per 1000 sq. ft.**

**Average Reading (add all readings together and divide by 20)**

1_____	5_____	9_____	13_____	17_____
2_____	6_____	10_____	14_____	18_____
3_____	7_____	11_____	15_____	19_____
4_____	8_____	12_____	16_____	20_____

**Moisture Testing Wood Flooring Planks. Take a Minimum of 40 Readings per 1000 sq. ft.**

**Average Reading (add all readings together and divide by 40)**

1_____	9_____	17_____	25_____	33_____
2_____	10_____	18_____	26_____	34_____
3_____	11_____	19_____	27_____	35_____
4_____	12_____	20_____	28_____	36_____
5_____	13_____	21_____	29_____	37_____
6_____	14_____	22_____	30_____	38_____
7_____	15_____	23_____	31_____	39_____
8_____	16_____	24_____	32_____	40_____

## Subfloor Construction

These types of wood subfloors are acceptable.

Plywood that is a minimum of 5/8" thick (3/4" is preferable and recommended), installed with long edges at a right angle to 16" on center floor joists and staggered so that the end joints in adjacent panels meet over different joists.

Nail at each bearing with 6d threaded or 8d common nails spaced 10" on center along intermediate joists

**1" x 4" to 6" wide, square edge, kiln dried coniferous lumber**, laid diagonally over 16" center wooden joists. The ends of all boards should be cut parallel to the center of the joists for solid bearing. Face nail each board at every bearing on the joists with two nails (7d threaded or 8d common).

**23/32" minimum OSB on 19.2-inch maximum center floor joists** properly nailed or minimum 7/8" Plywood or 33/32 OSB subfloor on 24" center floor joists or trusses.

Particle board of any thickness is NOT allowed.

## Installing a solid floor over concrete. Additional subfloor is required.

**Moisture Test the Concrete first.** Test several areas including near exterior walls. Acceptable tests for subfloor moisture include:

Electrical Impedance Test and Electrical Resistance Test (Concrete Moisture Meters). Follow the manufacturer's instructions and do not install the floor if the meter shows there is excess moisture.

Relative Humidity Test (standard test method for determining relative humidity on concrete slabs is utilizing Situ Probes). If test shows over 75%, a vapor retarder must be used or wait for further curing.

Calcium Chloride Test (ASTM F-1869). Reading over 5 lbs. are unacceptable and must be corrected prior to installation.

**This floor may not be installed directly over concrete.**

An additional wood subfloor is required over the concrete. Refer to the National Wood Flooring Association's *SubFloor Guidelines* for additional information and guidance.

**Tools Needed**

- Moisture meter for wood and/or concrete
- Moisture inhibitor (such as 15 lb. asphalt saturated felt, Silicone Vapor Shield paper and Aquabar ®B)
- Premium grade urethane (if using, see under Subfloor and Preparation)
- Tongue and groove adhesive or wood glue (if installing any boards that have been ripped lengthwise to a width of 1" or less)
- Chalk line and chalk
- $\frac{3}{4}$ " Wood or plastic spacers
- Pencil
- Tape measure
- Hammer
- Safety glasses
- Dust mask
- Circular/rip saw-80 tooth blade
- Jamb saw
- Flooring nailer with proper size fasteners (see Installation Methods)
- Electric drill and bits
- 6-8d finish nails
- Putty / Stain repair pen

**Subfloor and Preparation**

Subfloors must be flat to within 3/16" in a 8' radius. Use a straight edge to determine flatness throughout. Subfloor irregularities may cause any wood flooring installation to develop hollow spots between the floor and subfloor. Irregularities should be corrected before proceeding with the installation. If the floor flexes, it may cause squeaking or over time the fasteners may work loose.

Clean the subfloor by removing any paint, wax, plaster, sheetrock, mud, etc. Sweep or vacuum thoroughly.

As part of your subfloor prep, remove any existing quarter round, shoe molding or doorway thresholds. They can be replaced after installation in such a way as to allow the required expansion space around the perimeter of the room. All door casings should be notched out or undercut to avoid difficult scribe cuts and allow the flooring to easily go under the casings. Use a piece of the new flooring on the subfloor as a height guide for your hand-saw or jamb saw (See Figure 2).

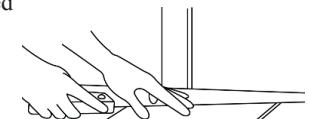


Fig.2

Once an acceptable subfloor is prepared, cover the subfloor wall-to-wall with an acceptable moisture inhibitor such as 15 lb. asphalt saturated felt, Silicone Vapor Shield paper and Aquabar ®B. Overlap the edges by 4" and put a double layer around all heat ducts in the floor. Red rosin paper, Kraft paper and wax paper are not acceptable moisture inhibitors. A moisture inhibitor must be used over wood subfloors. They help slow down moisture flow from subfloors and lessen the chance the floor will cup, cracking, etc.

**When installing wider plank wood floors (4" and wider) flooring movement due to seasonal changes may be reduced by utilizing both glue and the mechanical fasteners (nails/staples) specified. Do NOT use a moisture inhibitor with this application since glue assisted applications must have direct contact with the wood subfloor. Utilize a premium grade urethane construction glue (such as Liquid Nails® or Locktite® Urethane Wood to Wood Glue) and apply glue in a serpentine fashion to the subfloor (see Figure 3).**

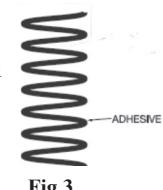


Fig.3

## Plan Your Installation

Measure the installation area and decide which direction the planks will run. If possible, install the planks perpendicular to the flooring joists and parallel to the longest wall in the room.

A floor will expand and contract with environmental changes such as temperature and relative humidity so it is imperative that a  $\frac{3}{4}$ " expansion space be left around the perimeter of the room and around all vertical features (such as cabinets, stairways, etc.). This space can be covered by baseboard and/or quarter/shoe moldings.

Rooms larger than 20' x 20' or if the flooring is being installed in a typically damp climate (coastal, etc.), extra expansion space may be needed. Call Technical Services at 855-296-6857 for additional guidance.

It is best to pre-plan your flooring layout based upon the floor width. Normally one row of planks must be ripped lengthwise in order to fit. You may elect to rip both the first and last rows of flooring in order to balance the appearance. If planks are ripped to a width of less than 1" wide, see instructions below.

Install planks from several cartons of flooring at the same time so that you can balance dark and light boards, plank lengths, plus other variations in a pleasing manner.

Since both moldings and the floors are made from real wood, they can sometimes vary in appearance. It is best to identify a flooring plank that coordinates closely with the molding. Plan to install the complementary flooring plank next to the molding.

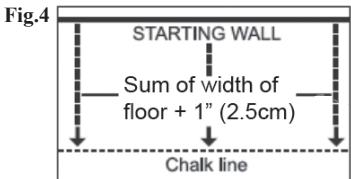
Boards that are slightly bowed (curved) or crooked are normal in solid flooring. They are not defective and can be installed. They will be held in place by the fasteners. A pull bar may be needed to hold the planks into place while nailing.

The tongues and grooves on the short ends are used for placement only and do not fit together tightly. The fasteners hold the planks in place.

Boards must be staggered so that there is a minimum of 6" between the short ends of planks in adjoining rows. Avoid repeating end joint locations visually across the installed floor.

Determine if your room is square by taking several measurements. If the room is not square, you will need to cut the first board to the contours of the wall to insure you are working from a straight line.

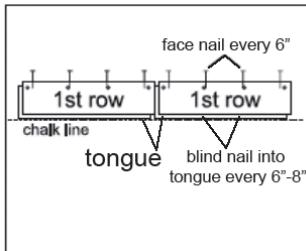
## Installing the Floor



**Fig.4**

Establish a straight line by measuring a point out from the starting wall in at least three places equal to the width of the flooring face, plus  $\frac{1}{4}$ " for the tongue and  $\frac{3}{4}$ " for the expansion space. Snap a chalk line.

**Fig.5**



**Fig.5 Installing the first rows.** Select very straight boards to use in the first rows. The groove side should be facing the wall. At least the first two rows will have to be face & blind nailed as there will not be enough clearance to use the flooring nailer. At the end of the first row, put a 3/4" spacer along the wall, measure the length of the last plank to fit and cut.

Predrill nail holes approximately  $\frac{1}{2}$ " from the groove edges using a 1/32" bit. Space holes at least every 6" and be sure there are holes within 3" of all ends. Also predrill holes at the same intervals at a 45-degree angle down through the top of the tongue. Ensure the first row is lined up on the chalk line. Utilize 6 or 8d nails. Face-nail the groove side through the predrilled holes, countersink the nails and use matching putty to cover. Then blind nail at a 45-degree angle through the holes on the tongue side ensuring the nails are countersunk to allow engagement of the next row. Take care to not damage the face or edge of the flooring.

Utilize the leftover cut piece from the first row to start the second row if it is 6" or longer. Planks must be staggered. The minimum distance between short ends in adjoining parallel rows should not be less than 6". The 2nd row should be face nailed and blind nailed in the same manner as the first row.

Continue face and blind nailing rows until you have enough clearance to begin using your flooring nailer/stapler.

**Dry lay/rack several additional rows of the flooring** by working from several cartons of flooring. Check the floor to ensure the boards are arranged in a visually pleasing manner. Utilize any boards with undesirable features at the ends of rows cutting out the undesirable portion. Do NOT cut the end boards at this point. Wait until the other planks in the row are installed to ensure the last plank is cut to the proper length.

**Use a board for practice** so you can verify the settings on the nailer are correct. Check for surface, tongue and edge damage. Adjust as necessary.

**Install all other rows of flooring.** Follow the nailing schedule below and only nail through the tongue side at a 45-degree angle. Utilize 2" long cleats/nails or staples in wood sub-floors and 1-1/2" fasteners if installing into a wood sub-floor that has been built over concrete. It is permissible to install planks with partially missing tongues as long as the nailing schedule can be followed.

Width of Flooring	Nail/Staple Spacing	Nailing Spacing from Both Ends	Stagger End Joints with Parallel Rows
2-1/4"	Every 8-10"	2-3" from ends	Minimum of 6"
3" & Wider	Every 6-8"	2-3" from ends	Minimum of 6"

**Installing under cabinet toe kicks, door jambs, etc.** may require the use of a pull bar to pull planks together.

**The last rows** will need to be installed in the same manner as the first rows. Follow the same schedule, pre-drill and face nail.

**Rip the planks in the last row lengthwise to fit** if necessary. If the width is less than 1", glue the last row to the previous row BEFORE you install it. Then face-nail these two rows as one row.

**Once the Flooring Installation is Complete**

Remove the spacers.

Install any necessary moldings taking care that they do not impede the floor's ability to expand and contract. Baseboards should be installed so that they are slightly above the finished floor but not nailed into the floor.

Utilize putty and/or a stain pen as needed.

Do not apply tape directly to the floor's finished surface. If a protective paper or cloth covering is being utilized, tape this covering to its self rather than taping directly to the floor.

**Care and Maintenance for Your New Floor**

Regularly sweep or vacuum up loose dirt that can dull your finish. Ensure your vacuum is designed and safe for hardwood floors.

Periodically use a spray floor cleaner specifically designed for hardwood floors. Do not use liquid/paste wax, oil, oil soap, silicone, ammonia-based cleaners as they can permanently dull or cloud the finish.

Floors should not be wet mopped. Do not use power scrubbers or steam cleaners.

Use felt protectors under furniture legs.

Hard castors can dent the floor.

Spike heels, sport cleats can damage the floor.

Protect the floor when dragging heavy furniture or appliances over it.

Keep pets' nails trimmed.

Use door mats to catch dirt and grit.

Maintain a normal temperature of 60-80 degrees F and a relative humidity of 35-55%. The use of a dehumidifier or humidifier may be required in some areas of the country to maintain these levels. Cupping, gapping, etc. can occur if a proper environment is not maintained.

**WARNING:** Drilling, sawing, sanding or machining wood products can expose you to wood dust, a substance known to the State of California to cause cancer. Avoid inhaling wood dust or use a dust mask or other safeguards for personal protection.  
For more information go to [www.P65Warnings.ca.gov/wood](http://www.P65Warnings.ca.gov/wood)