

# MILLWORKS FLOORING

## Engineered Hardwood Installation Instructions

### OWNER/INSTALLATION TECHNICIAN RESPONSIBILITIES:

When the flooring is ordered, a minimum of 5% (recommended 7% - 10%) must be added to the actual square footage to allow for overage (cutting) and selection (grading) allowance (recommended 15% for diagonal installations). The allowance for overage depends on the complexity of the space the flooring will be installed in.

Before any hardwood flooring is installed, the installer must make sure that the job-site environment and the condition of the sub-surface involved meet or exceed the standards and recommendations as outlined in the SUB-FLOOR and JOB SITE PREPARATION sections below.

The owner/installation technician assumes final responsibility for inspecting product quality. Carefully examine each board for quality, color, and finish prior to installation – using reasonable selectivity to hold out or cut off pieces with defects. If an individual piece is doubtful as to grade, color, or finish, the installer should not install that piece. The manufacturer is not responsible for boards/floors installed with visible defects.

It is strongly advised to keep these products in controlled conditions with humidity within the 35%-55% range 72 hours before installation and continuously thereafter.

As far as the sub-floor moisture is concerned, it is VITAL that the concrete is within safe moisture parameters (determined via moisture test/Calcium Chloride Test).

Correcting a minor defect during installation using filler, stain, or a putty stick is a normal procedure.

*WARNING: Manufacturer is not responsible for damage caused by negligent installation practices or misuse of installation tools. It is CRITICAL to use the proper adhesives and ensure that the groove is filled adequately with it. If the wrong adhesive is used, or not enough of it applied to the groove of the product, it will create problems - such as board separation after installation. Also, it is completely normal for a newly installed, glued hardwood floor to cup or peak slightly after installation. This is caused by the moisture in the adhesive or concrete. The floor will settle flat over time (generally within a few weeks) as the moisture evaporates into the air.*

Generally accepted industry procedures and methods can be obtained from the National Wood Flooring Association (NWFA) at [www.nwfa.org](http://www.nwfa.org).

### **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 on Cancer (IARC) has classified wood dust as nasal carcinogen in humans.

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

First Aid Measures: In case of irritation, flush eyes and skin with water for at least 15 minutes. If irritation persists, contact a physician.

### HANDLING AND STORAGE:

Engineered hardwood flooring should be protected from moisture at all times during transportation, storage and installation. The flooring must be stored in a dry place prior to installation. Be sure to provide a 4" air space between the flooring must be stored in a dry place prior to installation. Be sure to provide a 4" air space between the flooring cartons and the on-grade concrete subfloor to ensure proper airflow and to prevent flooring from absorbing moisture from the concrete subfloor. The wood subfloor should not exceed 13% moisture content. Use a reliable wood moisture meter to measure and document the moisture content of both the wood subfloor and the wood flooring. The difference between the moisture content of the wood subfloor and the wood flooring must not exceed 4%.

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Hardwood flooring should be acclimated to the environment in which it is expected to perform. Open Cartons without removing the flooring and allow the flooring to acclimate to live-in, jobsite conditions prior to installation.

## NAIL/STAPLE-DOWN - TOOLS AND/OR ACCESSORIES NEEDED:

- Broom
- Pencil
- Tape Measure
- Moisture Meter
- Safety Equipment (Goggles and Mask)
- Circular or Hand Saw; Miter or Table Saw
- Chalk Line and Chalk
- Hammer; Rubber Mallet (Light Colored)
- Pneumatic Brad-Nailer with 1" brads OR Drill Bit 4d-6d Screw Shank Nails
- 15 lb. Asphalt Saturated Felt
- Nail Punch
- Duct Tape
- Pry Bar
- Glue Coated Staples
- Stapling Machine
- Hardwood Flooring Cleaner
- Utility Knife
- 6 mil Polyethylene Film (if installing over a concrete subfloor using screed/sleeper system)

## GLUE-DOWN INSTALLATION - TOOLS AND/OR ACCESSORIES NEEDED:

- Broom
- Pencil
- Terry Cloths (for wiping off adhesive squeeze-out)
- Tape Measure
- Moisture Meter
- Safety Equipment (Goggles and Mask)
- Circular or Hand Saw; Miter or Table Saw
- Chalk Line and Chalk
- Hammer; Rubber Mallet (Light Colored)
- Pry Bar
- Hardwood Flooring Cleaner
- Trowel
- 3-M Blue Painter's Tape

## INSTALLATION INSTRUCTIONS: NAIL/STAPLE-DOWN AND GLUE-DOWN

### STEP 1: Pre-Installation Jobsite Inspection

Prior to installation, the building must be structurally complete and enclosed. All exterior windows and doors must be installed. Any "wet" work inside the house (masonry, drywall, and paint) must also be complete – allowing adequate drying time to eliminate unnecessary moisture content within the building. Concrete should be at least 60 days old, but preferably 120 days old (it takes 4 months generally for a newly poured concrete slab to completely dry out).

Permanent HVAC (heating/air conditioning) systems must be operating for at least 14 days before installation, maintaining a constant room temperature between 60-75 degrees Fahrenheit and a relative humidity of 35-55%. Exterior drainage – including gutters and downspouts, must be in place and drain away from the building.

This product can be installed on, above, or below grade, although they are not recommended for full bathroom installations. Basements and crawl spaces must be dry. Crawl spaces must be a minimum of 24" from the ground to the underside of the joists. A vapor barrier (6-8 mil black polyethylene film) must be put in crawl spaces with joints overlapped and taped.

Sub-floors must be checked for moisture content using the appropriate metering device for concrete or wood. Examples of calibrated concrete moisture meters that work very well: the Delmhorst Moisture Meter Model G and the Tramex Concrete Encounter.

### Performing Moisture Tests:

**WOOD SUBSTRATES:** Test the moisture of the wood sub-floor using a calibrated moisture meter approved for testing wood moisture according to the meter manufacturer. The reading should not exceed 14%, or read more than 5% different than the moisture content of the product being installed.

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CONCRETE SUBSTRATES: There are multiple ways to test for excess moisture in concrete.

- Use an approved, calibrated moisture meter such as the Delmhorst Moisture Meter Model G or the Tramex Concrete Encounter. On the Tramex Concrete Encounter Meter, moisture readings should not exceed 4.5 on the upper scale.
- Perform a Polyfilm Test. Tape down 2' x 2' polyfilm squares (a clear garbage bag or plastic drop cloth will do) in several places on the floor. Wait 24-48 hours, and then check for the appearance of condensation on the inside of the bag or plastic and for a darkening on the concrete in that area. Either occurrence signals the likely presence of excess moisture, requiring a mandatory Calcium Chloride Test.
- Once you have determined the moisture content and if excess moisture is indeed present, a Calcium Chloride and pH Alkalinity Test must be performed to determine moisture emissions and alkalinity from the concrete slab.
- Perform a Calcium Chloride test. The maximum acceptable reading is 3 lbs./24 hours/1000 sq. ft. for moisture emissions.
- Perform a pH Alkalinity Test (a 3% Phenolphthalein in Anhydrous alcohol solution). Chip the concrete at least ¼" deep (do not apply directly to the concrete surface) and apply several drops of the solution to the chipped area. If any color change occurs, further testing is required. Using the number method on the test, a pH reading of 6-9 on a pH scale of 1-14 is considered acceptable.
- If the tests results exceed this number, the concrete slab should be sealed with an appropriate sealer, such as Bostik's MVP4 (Moisture Vapor Protection) Sealer, prior to installation. The manufacturer is not responsible for Hydrostatic, Hygrostatic, or thermal dynamics resulting from an improper concrete slab installation.

## STEP 2: Storing the Material Prior to Installation

Once the building meets the above conditions, the material can be delivered to the site. Handle and unload the flooring with care and store within the area in which it is expected to perform. Flooring stored on concrete floors should be elevated at least four inches to allow circulation under the cartons. Cartons must be stored horizontally (parallel to the ground). Never store them standing on end. Leave all boxes SEALED while they are acclimating (this way all boards will acclimate within the boxes at the same rate).

*This product must acclimate for 72 hours prior to installation.*

## STEP 3: Recommended Sub-floor Types (Wood and Concrete)

Nail/Staple-Down or Glue-Down Installation:

- Minimum: APA Approved 5/8" (15mm) CDX Grade Plywood; minimum 40 lb. density
- Preferred: ¾" (19mm) CDX Grade Plywood or ¾" (23/32") OSB Underlayment Grade (PS2 Rated) on 16" center floor joists properly nailed
- Existing wood floors (installed perpendicular to new floor)
- Resilient Tile or Vinyl
- Nailing over concrete: Must have a minimum of 3/4" plywood installed as a screed/sleeper system with a minimum of 6 mil polyethylene film vapor barrier secured to the slab. All concrete sub floors should be tested for moisture content.

**WARNING: Do not nail/staple over particle-board or radiant heat sub-floors!**

WHEN NAILING/STAPLING: Using improper adapters and pressure settings can cause severe damage to the flooring while using a nail/staple-down installation. Using the correct adapter and pressure will set the nail/staple correctly in the tongue. It is vital that the tool is adjusted properly so the nails/staples/cleats are being positioned at the proper angle. Air pressures set too high can cause damage to the tongue, putting blisters on the face of the flooring and making it difficult to install adjoining boards. A good test is to set the pressure initially at 70 PSI and adjust it until the staple properly sets in the tongue.

The manufacturer is not responsible for damage caused by mechanical fasteners. If you need to remove a nail/staple/cleat that has gone in crooked, do not pull straight up from the tongue. This will damage the surface of the board. Instead, pull out the staple from the tongue at the front of the board with all pressure from the hammer's head directed into the sub-floor.

Glue-Down Installation Only:

- Concrete Slab

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- Acoustic Concrete
- Cork (acoustic)
- Ceramic, Terrazzo, Marble, or Slate
- Resilient Vinyl or Tile

## STEP 4: Preparing the Sub-floor

All Sub-floors must be:

- **CLEAN:** scraped, sanded, or swept; free of wax, grease, paint, oil, and other debris.
- **SMOOTH/FLAT:** within 3/16" in 10' and/or 1/8" in 6'. Sand high areas or joints. Fill low areas (no more than 1/8") with a cement type filler.
- **STRUCTURALLY SOUND:** Replace any water-damaged, swollen or delaminated sub-flooring or underlayment, as they are unable to properly hold staples or fasteners. Plywood sheets should be laid with grained outer plies at right angles to joists; adjacent rows staggered four feet and nailed every 6" along each joist with 7d or larger nails. When installing directly over old wood or strip floor, sand any high spots, re-nail old floor to eliminate squeaks or loose boards, and install new planks at right angle (perpendicular) to the old floor, or overlay old floor with 1/4" plywood underlayment. Leave a 1/8" gap at the edges and nail with 7d or larger nails every 6" at the edges and every 12" in both directions and through the interior of each sheet of plywood. It is normal for mechanically (staple/nail/cleat) fastened floors to make minor occasional noises such as popping, squeaking, or crackling which can change as environmental changes occur. This is not a manufacturing defect. You can help reduce popping, squeaking, or crackling by being sure that the subfloor is secured properly (as explained above) and is structurally sound, that there is no loose joists or decking, and is swept very thoroughly prior to installation.
- **DRY:** Moisture content of sub-floor must not exceed 14% prior to installation of wood flooring. All moisture testing must be done before wood has been acclimated 72 hours and job-site requirements met.

## STEP 5: Installing the Floor

GENERAL TIPS:

- Open 4 to 5 separate cartons at one time and mix the pieces to maximize the color and shade variations.
- Install the product parallel to the longest wall to provide the most appealing visual effect.
- Stagger the ends of the boards at least 6" in adjacent rows for a more appealing overall look.
- Allowing for a 1/2" minimum expansion gap around all vertical obstructions is CRITICAL! Wood expands and contracts with changes in humidity. Wood will buckle and/or cup if an adequate expansion space is not allowed for. ALWAYS allow for expansion space when making cuts around or beside vertical objects (i.e. walls, pipes, etc.).

DOORWAY/WALL PREPARATION:

- Undercut or notch-out door casings 1/16" higher than the thickness of the floor being installed.
- Remove existing base and shoe molding on wall as well as doorway thresholds. These can be reapplied after the installation is complete.

ESTABLISH A STARTING POINT: NAIL/STAPLE-DOWN AND GLUE-DOWN INSTALLATION

An exterior wall is usually the straightest and best reference line to start the installation from. If possible, the direction of the flooring being installed should be at right angles to the floor joists. Establish a starting line by leaving a minimum 1/2" expansion gap around all vertical obstructions. In at LEAST 2 places, measure out equal distances from the starting wall. It is recommended to measure 3-1/8" out from the starting wall and 12" – 18" in from the corners. Mark these points and snap a working chalk line parallel to the starting wall allowing the required expansion space between the starting wall and the edge of the first row of flooring. Plan the floor layout (width-wise) so you don't have to rip the last row **NARROWER** than 1". You may have to rip the **FIRST** row to ensure the **LAST** row is at LEAST 1" wide.

INSTALLING THE VAPOR BARRIER: NAIL/STAPLE-DOWN INSTALLATION ONLY

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- Install 15 lb. Asphalt Saturated Felt Paper on the wood sub-floor prior to installation – roll out the material in the same direction as the flooring will be installed; allowing the Felt Paper to extend 3” – 4” up the walls.
- Position the Felt Paper so that the chalk line can be seen clearly (you may need to cut the Felt Paper back from the wall just enough to see it).
- Staple or tape at the corners to hold the Felt Paper in position.
- Overlap the Felt Paper by 1’ and duct tape the seams.

*NOTE: While 15 lb. Asphalt Saturated Felt Paper is an excellent vapor barrier, it is NOT considered a moisture barrier. If a moisture barrier is needed (if nailing over concrete using the screed/sleeper system), a 6 mil polyethylene film is required – with the edges overlapped 18” and taped.*

## INSTALLING THE FIRST ROWS: NAIL/STAPLE-DOWN INSTALLATION ONLY

- Make sure to use the straightest, longest boards available when installing the first two rows.

*REMINDER: Take boards from multiple boxes while installing. Do not install 2 pieces from the same box in a row – mix the colors and shades while installing to get a more favorable overall look. Also, remember to stagger the end-joints of adjacent rows at least 6” to create a more appealing look for the floor.*

- Line up the tongue of the first row with the starting point chalk line. The groove of the boards should be facing the starting wall.
- Using a pneumatic brad nailer, face-nail the groove side of the boards (first row only) ½” from the edge at 6” intervals and 1” – 2” from each end; then at a 45 degree angle down through the nailing pocket on top of the tongue. Another option is to pre-drill the face-nail holes ½” from the groove edge of the first row, 1” – 2” from each end, and at 6” intervals. Pre-drill at the same intervals at a 45 degree angle down through the nailing pocket on top of the tongue. Face-nail the groove side where it is pre-drilled. When the face-nailing is complete, blind-nail at a 45 degree angle using 4d or 6d nails. Countersink all nails to ensure the next boards install smoothly. Make sure to use a nail set to countersink the nails – failure to do so can damage the surface of the wood. Keep blind-nailing the following rows until the stapler can be used.
- As listed above in General Tips, make sure the end-joints of adjacent rows are staggered at least 6” to have a more appealing overall look (which is called a “stair-step” pattern).

## INSTALLING THE REST OF THE FLOOR: NAIL/STAPLE-DOWN INSTALLATION ONLY

- Make sure you are using the correct staple gun, adapter, fasteners, and PSI setting on the compressor.
- Practice installing on an extra piece of wood. Check for any damage to the board (surface damage, tongue damage, etc.). Make any adjustments and corrections BEFORE you start installing the rest of the floor. Once you have made your adjustments, destroy the “practice” board.

*REMINDER: Take boards from multiple boxes while installing. Do not install 2 pieces from the same box in a row – mix the colors and shades while installing to get a more favorable overall look. Also, remember to stagger the end-joints of adjacent rows at least 6” to create a more appealing look for the floor.*

- Begin installing with several different rows at a time, securing each board with at least two fasteners. To avoid splitting the board, put the fasteners 3” – 4” apart and 1” – 2” from the ends. Make sure you press firmly together before fastening to eliminate gaps between the boards.
- The last one or two rows will need to be installed similar to the first two rows. They will need to be face-nailed where blind-nailing is not possible. Brad-nail or pre-drill and face-nail on the tongue side matching the nailing pattern used in the first row.
- The final row should be ripped to size and face-nailed. If it is less than 1” wide, it should be glued to the previous row BEFORE that row is installed and the two joined pieces should be face-nailed as one board.

## INSTALLING WITH ADHESIVE: GLUE-DOWN INSTALLATION ONLY

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- Use only the proper adhesive. If you are using a Moisture Based Adhesive, Artisan recommends CFS PW0811. Again, refer to the above instructions on the use of a Moisture Based Adhesive and make sure you have the correct conditions to use it.\*
- Make sure to use the appropriate trowel to get the correct coverage rate with the adhesive. It is recommended to use a V-Notch trowel with these dimensions when using a Urethane Adhesive: ¼" D x 3/16" W x ½" SP x 5/16" Foot. This trowel will leave the correct ridges of adhesive on the floor (with very little adhesive between the ridges).
- Do not apply the adhesive if the room temperature or sub-floor is colder than 65 degrees Fahrenheit.

*WARNING: Actual working time with adhesive varies depending on the environmental conditions of the structure. The manufacturer will not be responsible for improper application of adhesives.*

*NOTE: Urethane adhesive can sometimes be difficult to clean off if you do get some on top of the hardwood you are installing. Make sure to have a Urethane Adhesive Remover or Mineral Spirits and a Terry Cloth readily available to remove excess adhesive.*

## INSTALLING THE REST OF THE FLOOR: GLUE-DOWN INSTALLATION ONLY

- Make sure to use the straightest, longest boards available when installing the first two rows.

*REMINDER: Take boards from multiple boxes while installing. Do not install 2 pieces from the same box in a row – mix the colors and shades while installing to get a more favorable overall look. Also, remember to stagger the end-joints of adjacent rows at least 6" to create a more appealing look for the floor.*

- Line up the groove of the first row with the starting point chalk line. The tongue of the boards should be facing the starting wall. Align and securely seat the first row in the adhesive – all additional rows will be pushed back to this row. It must be straight!
- When installing individual pieces, connect the end-joints first as close to the long tongue and groove as possible. Then slide (push) the long tongue and groove together as tightly as possible. Try to avoid sliding the pieces through the adhesive as much as possible – this will help negate memory pull-back (boards pulling apart once they are in position) and adhesive bleed-through (excess adhesive squeezing out vertically through the joints). You may need to use a scrap piece of the same product as a tapping block to help align the product.
- If the first row needs help staying in place, you can nail a board (using 1" concrete nails) on the dry side of your starting chalk line to stabilize it.
- Double check the edges and ends of your installed planks – they should all have a tight fit.
- Remember to stagger the end-joints of adjacent rows at least 6" to create a more appealing look for the floor.
- Be sure not to spread your adhesive too far ahead of your work area! If the adhesive skins over and starts to dry, preventing a proper bond between the floor and the wood, remove the old and spread new adhesive. You must have adequate adhesive transfer to ensure the floor will be installed correctly. You can double check the holding strength of the adhesive by occasionally lifting a board and checking the transfer of the adhesive.
- Once the boards are tightly fitted together, use the 3M 2090 Blue Painter's Tape to hold the planks together while the adhesive dries. Make sure to clean any urethane adhesive off of the surface of the wood with mineral spirits or urethane adhesive remover BEFORE you apply the tape! If the adhesive dries on the surface of the wood it is VERY difficult to remove. After the installation is complete, remove all of the Blue Painter's Tape from the surface of the flooring. Remove the tape within 24 hours.

*NOTE: Do not use Masking Tape! Masking tape leaves a sticky residue on the surface of the wood which is very difficult to remove.*

- Continue with this method while installing the rest of the floor. Rip the final boards (last row) to fit and allow at least ½" of expansion space.

## COMPLETING THE INSTALLATION: NAIL/STAPLE-DOWN AND GLUE-DOWN INSTALLATION

- After all excess adhesive and tape are removed; thoroughly clean the floor using a hardwood cleaner.
- Re-install any moldings, door trim, end caps, etc. to complete the job. Make sure to nail any moldings into the wall – do not nail molding into the floor!

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- To prevent surface damage to the floor avoid rolling heavy appliances and furniture across it. Use cardboard, plywood, or airlifts if possible.
- If further construction is necessary after the hardwood is installed, you can protect the installed floor by laying a quality rosin paper or other paper that allows the floor to breathe, taping it to the baseboards. NEVER use plastic, solid rubber, or polyethylene film to cover the installed floor since they both trap moisture and will damage the installed hardwood (creating cupping or swelling issues).

## GENERAL TIPS: FLOOR REPAIR

If the floor becomes scratched or dinged, it can be repaired with a putty, filler, or touch-up kit. If a board is severely damaged, it may need to be replaced, which can be done by a qualified flooring technician.

## GENERAL TIPS: HARDWOOD AND SEASONS

Once the floor is installed it is critical to keep them well maintained. The manufacturer is not responsible for improper maintenance of the floor. Wood floors will be slightly affected by varying levels of humidity within your building. To make sure the floors are protected for as long as possible, it is VITAL for you to keep the relative humidity levels between 35% - 55%. Below are some recommendations on how to achieve that in the different seasons:

**Wet/Humid (wood expands):** Heaters are not generally used during these months. Therefore the floor holds in the humidity and expands. To maintain a proper humidity level, use a dehumidifier or air conditioner. You can also turn on your heater every once in a while during the summer months – this will help lower the humidity in the building. Make sure the expansion space is not blocked in any way!

**Dry (wood contracts/shrinks):** Wood-burning stoves and electric heating systems are used a lot during winter months – creating very dry conditions indoors. The low humidity causes the wood to contract and shrink – leaving gaps between individual boards. To prevent this, use a humidifier to keep the humidity level between 35% - 55%.