

Engineered Wood Flooring Installations

Page 1 Index

Pages 2 - 6

1. Installation Introduction
2. Job Site Conditions
3. Radiant Heat Installation
4. Sub-Floor Requirements

Pages 7 - 9

5. Staple / Nail Down Installation

Page 9 - 10

6. Nail Down / Glue Down Installations
(Adhesive Assist & Full Spread Glue Down & Nail Down Methods)

Pages 10 - 12

7. Adhesive / Glue Down Installation

Pages 13 - 14

8. Herringbone / Chevron Patterns Adhesive Glue Down and Nail Down / Glue Down Installation

Pages 15 - 17

9. Floating Installation

Contact Us:

terra legno

Engineered Wood Flooring

35 Dale

Paterson, N. J. 07050

email: info@terralegno.com

P: 973 357 0600

F: 973 357 1061

1.terra legno Engineered Wood Flooring INSTALLATION INTRODUCTION

terra legno Engineered Wood Flooring is manufactured in state of the art ISO 9001 2000 facilities with raw materials sourced from sustainable resources. Our proprietary manufacturing process has quality control check points to ensure that you are purchasing a wood floor engineered for performance and manufactured with pride to exceed your wood flooring expectations.

The installer and owner are the final quality check point for all wood flooring. Inspect all materials carefully for grade, color, manufacturing and finish defects before installation. Usage constitutes acceptance of goods. Industry standards allows for up to 5% margin of error for natural imperfections and manufacturing defects. terra legno warranties do not cover materials with visible defects once they are installed.

It is the responsibility of the installer/owner to determine if the jobsite conditions are environmentally acceptable as per terra legno Engineered Wood Flooring specifications and NWFA recommendations. The sub-floor system must be in acceptable condition for the installation of wood flooring. terra legno Engineered Wood Flooring has and declares no responsibility for wood floor failures or problems associated with or resulting from sub-floor, sub-surface structural or environmental deficiencies or jobsite damage after the hardwood flooring has been installed.

Grade	Solid	Engineered
Above	Yes	Yes
On-Grade	Yes	Yes
Below	<u>NO</u>	Yes
Radiant Heat	<u>NO</u>	<u>Yes</u>



When nailing down planks down planks 5" and wider terra legno highly recommends a Nail and Glue Assist or Nail and Glue Down Installation methods. The addition of the adhesive has proven significantly a more effective installation to prevent movement and squeaking. All terra legno flooring products that are ¾" thick and thicker or 9" Widths and Wider are specified to be a Nail and Glue Down Installation. Movement and squeaky floors are not a warrantable terra legno claim

terra legno Engineered Flooring Installation Methods Guidelines						
Collections	Dimensions	Pattern	Nail Down	Glue Down	Glue & Nail Down	Glue Assist & Nail Down
Autentico	1/2" x 6 1/2" x RL	Wide Planks	X	X	X	X
Nuevo Classic	9/16" x 6" x RL	Wide Planks	X	X	X	X
Nuevo Classic	9/16" x 7-1/2" x RL	Herringbone & Chevron		X	X	X
Lusso	5/8" x 8 1/2" x RL	Wide Planks		X	X	X
Spectrum Engineered Collection *Custom Made, Made to Order*	5/8" x 5", 7" x RL	Wide Planks	X	X	X	X
Spectrum Engineered Collection *Custom Made, Made to Order*	3/4" x 9"-12" x RL	Wide Planks		X	X	X
Spectrum Engineered Collection *Custom Made, Made to Order*	5/8" x & 3/4" x W x L	Herringbone & Chevron		X	X	X
Spectrum Engineered Collection *Custom Made, Made to Order*	5/8" x 1 1/2" - 4"	Wide Planks	X	X	X	X

terra legno Engineered Wood Flooring's installation instructions as detailed in the following pages are intended to comply with all recommendations as outlined in Installation Guidelines and Methods published by the National Wood Flooring Association (NWFA). For any questions regarding additional application information, please contact NWFA, at www.NWFA.org

2. SITE CONDITIONS

Wood is hygroscopic and will gain or lose moisture until it is in equilibrium with the humidity and temperature of the air. Based on the floorings environmental conditions, gain or loss of moisture corresponds with an increase or decrease in size of the boards, and occasional warping. terra legno Engineered Wood Flooring as constructed has enhanced dimensional stability characteristics. However, terra legno Engineered Wood Floors will react to environmental changes (temperature & humidity).

For the best results we recommend that that terra legno Engineered Wood Flooring is stored in the **controlled environment** in which it will be installed for 5-7 days prior to installation, or until stabilized to install within NWFA guide lines.

- The building should be closed in with all outside doors and windows in place. The wall coverings should be in place and the painting completed except for the final coat on the base molding. If possible, delay installation of base molding until flooring installation is complete. All concrete, masonry, framing members, drywall, paint and other "wet" work should be thoroughly dry. Basements and crawl spaces must be dry and well ventilated.
- Exterior grading should be complete. To direct flow away from the structure grading should offer a minimum drop of 3" in 10'. Do not obstruct the drainage with landscaping materials. All gutters and downspouts should be in place.
- Crawl spaces must be a minimum of 18" from the ground to underside of joists. A ground cover of 6-20 mil black polyethylene film should be installed as a vapor barrier with joints lapped and sealed with moisture resistant tape. The crawl space should have perimeter venting equal to a minimum of 1.5% of the crawl space square footage. These vents should be properly located to foster cross ventilation. NOTE: Unvented crawlspaces are acceptable when following qualified local regulations.
- terra legno Engineered Wood Flooring may be installed below, on or above grade level. Terra legno Flooring is not recommended for applications in areas where excessive humidity is present such as full baths, hot tub enclosures.
- Permanent air conditioning and heating systems should be in place and operational. The installation site should have a consistent room temperature of 60-80°F (16-27°C) and relative humidity of 35-60% for 14 days prior, during and after installation. For best results maintain an RH 40% to 45%.

INSTALLING OVER EXISTING VINYL FLOORING

- Nail-down applications may be successful over existing sheet vinyl or vinyl tile if fastener penetration is not significantly diminished and the subfloor meets minimum requirements. Fasteners must penetrate a proper subfloor by at least 5/8". Please be cautious with vinyl flooring as some flooring (prior to approximately 1972) contained Asbestos and must be removed by a professional who understands the risk involved. Questions Contact the Environmental Protection Agency (EPA) or your state Department of Health.

ACOUSTIC PERFORMANCE

- There are multiple sound dampening products available, and product choice heavily depends on the required building code specification on the project's installation. Many specifications require a minimum of 50 IIC and 50 STC value. The Higher the STC or the IIC number the better the sound attenuation performance. The STC refers to the evaluation method used to quantify the transmission of airborne sound (voices, music etc.) through building elements (walls, windows doors, floors etc.). The IIC refers to the evaluation method used to quantify the transmission of impact noise (footsteps, dropped articles etc.) through a floor/ceiling system.
- Terra Legno does not recommend a specific sound barrier but recommends that all technical specifications from the sound barrier are reviewed and are approved by the required building/condo code.

- One basic key to peak performance is to avoid hard surface transference points. This would mean that the floor should not come in direct contact with the wall or the molding. A small gap should be left between the molding and the floor as well as the floor and the wall. Leaving a gap would prevent sound from traveling across the floor to the wall or molding and down behind the wall where there is no sound control.
- Nails are also considered a hard surface transference point. When installing a nail down wood floor nails should not penetrate through the floor and into the sound control material and subfloor below. Doing so would greatly diminish the performance of the sound control material.

3. Radiant Heat Installations must meet or exceed all of the requirements in section 2 and the Following:

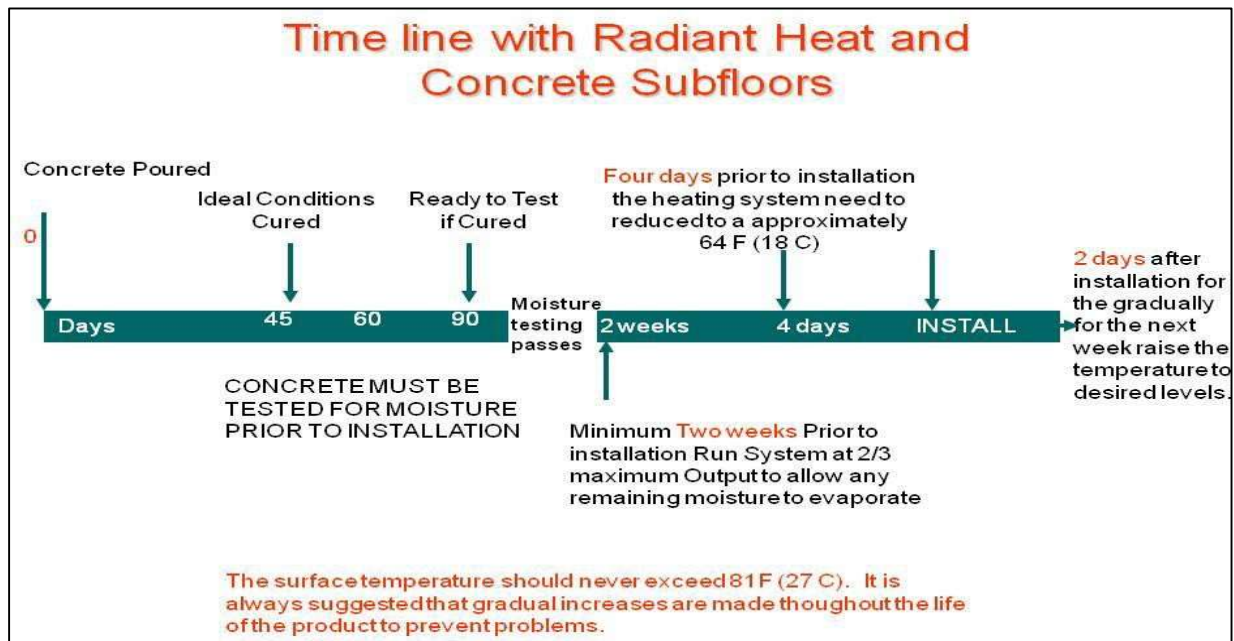
- terra legno Engineered Wood Flooring may be installed over subfloors with only hydronic (water) radiant heat systems. Terra legno does not approve installation over any flooring with an electric radiant heat system.
- Wood flooring installations over radiant heat installations have inherent wood flooring characteristics are: moderate surface checking, cracking (more commonly found at the ends of the planks and around knots) shrinkage, gapping between planks, and slight cupping are all expectations associated with wood flooring installations over radiant heat and do not constitute a (warrantable) product defect.
- terra legno Engineered Wood Flooring does not warranty the installation of exotic species over radiant heat systems e.g.: **Smoked & Fumed Woods, Hickory and EXOTIC Hardwood Species (Brazilian Cherry (Jatoba), Brazilian Walnut (Ipe), Cumaru, etc.**
- **Before installation:**
- The slab must be cured naturally, and pass moisture tests a minimum two weeks prior to installation
- The heating system should then be run at 2/3 of maximum output for a minimum of 2 weeks to allow any remaining moisture to evaporate, attaining its final moisture content without causing damage. Three or four days before installation, the heating system must be reduced to a suitable temperature (about 18°C / 64°F).
- **Caution: For Nail Down Installations, select fastener length wisely so-as to not penetrate the heating element or hydronic pipes. For Glue Down Installations the adhesive's sheer strength should not exceed the psi of the concrete. Light Weight concrete (less than 3,000 psi) is not strong enough for a glue down installation application. For best results a Floating Installation application over light weight concrete.**

3. Radiant Heat Installations

- **Installation Systems Above Radiant Heat**
 1. Plywood with vapor barrier is recommended for all applications: glue down, float, staple / nail down over radiant heat.
 2. If directly over concrete it is possible to have two layers of plywood interlocking covered with a moisture barrier
 3. Direct nail to subfloor joists: The plywood is screwed and glued into place on the floor joist which the radiant heating system is installed. The vapor barrier is between the floor and the subfloor.
 4. Direct Nails to subfloor over sleepers installation, please refer to NWFA Installation Guidelines.
 5. Radiant Heat Glue Down Installation per NWFA Installation Guidelines.
 - a. Do Not glue down any flooring directly to the exposed radiant heat piping
 - b. Do Not directly glue down any wood flooring over light weight concrete
 6. Radiant Heat Floating Installation per NWFA Installation Guidelines
 - a. Ensure the use of recommended glue that is used is approved for floating installations over radiant heat
 - b. Recommended use of a underlayment pad for radiant heat floating installations. Ensure pad is resistant to temperatures above 85 degrees Fahrenheit or 85 degrees Celsius.
- **After Installation:** Approximately 2 days after installation is complete, gradually (over a period of 1 week) raise the temperature of the heating system to its desired operating level.
- Life Cycle: Surface Temperature of flooring should never exceed 80 degrees F/27 degrees C. Exceeding this temperature will void any related

warranty by the flooring manufacturer. Most under-floor heating systems DO NOT have a humidification system. Add humidification systems as necessary to maintain humidity levels between 35% - 60%

- Never let the Heat Change in the Floor be More than 1 Degree Celsius / 1.8 Degrees Fahrenheit



“A B Cs” of Wood Flooring & Radiant Heat

- Wood flooring installations over radiant heat installations have inherent wood flooring characteristics are: moderate surface checking, cracking (more commonly found at the ends of the planks and around knots) shrinkage, gapping between planks, and slight cupping are all expectations associated with wood flooring installations over radiant heat and do not constitute a (warrantable) product defect. terra legno Engineered Wood Flooring does not warranty the installation of exotic species over radiant heat systems e.g.: Smoked & Fumed Woods, Hickory and EXOTIC Hardwood Species (Brazilian Cherry (Jatoba), Brazilian Walnut (Ipe), Brazilian Teak (Cumaru), etc.
- Low Temperature – Keep the subfloor temperature as low as possible while still heating the area.
- Even Heat – The radiant heat system should be designed to spread the heat evenly as possible in the subfloor.
- ACCLIMATE – Ensure the subfloor and the wood flooring are acclimated to the finished room before the wood is installed. The subfloor or slab must be dry.
- Temperature does not harm the wood, temperature does affect the wood's moisture content. As the temperature increases, the moisture content typically decreases. Heating wood too much will cause it to shrink and gaps will occur between the boards. Once the temperature is lowered, moisture returns, and the gaps will close up. This is why a humidification system is recommended to properly maintain wood floors.

4. SUB-FLOOR REQUIREMENTS:

The following minimum NWFA Standards must be met **before** beginning the application of any terra legno products. The subfloor must meet the following minimum requirements. Please refer to NWFA recommendations for additional requirements specific to the installation method.

- **LEVEL/FLAT** - within 3/16" in 10' and/or 1/8" in 6'.
- **CLEAN** – Free of debris, loose materials or materials that may release with age such as paint and dry wall materials.
- **DRY** - Check and document moisture content of the sub-floor using the appropriate moisture test. Concrete sub-floors must be a minimum of 30 days old before testing begins.
 - Calcium Chloride test results should not exceed 3# 24hr/1000 ft². RH Probe such as Wagner Rapid RH, follow manufacturer's instructions
 - Wood sub-floors must not exceed 12% and there must be no more than 4% difference between the terra legno Engineered Wood Flooring and the wood sub-flooring material.
 - A moisture barrier between the wood and the subfloor is a must over concrete or gypsum floors. A moisture barrier is recommended over wood sub-floors too. The moisture barrier helps maintain an even moisture balance in the floor enhancing the wood floors lifelong performance.
 - If the sub-floor has excessive moisture apply a suitable moisture retardant that is compatible with the adhesive being used. Contact the adhesive supplier for their recommendation and warranty
- **STRUCTURAL INTEGRITY** – The attachment methods used for the installation of terra legno Engineered Wood Flooring is not designed to stiffen existing sub-floors. If the sub-floor has excessive deflection before installation of the flooring it is unlikely to improve with the addition of terra legno Engineered Wood Flooring. Excessive deflection may result in a failure, and cause premature finish wear with the floor to becoming increasingly noisy with age and usage of the floor.
- **Wood sub-floors:** Wood panels should have an adequate fastening pattern, glued and screwed or nailed as system specifies using the specified fastener and pattern. Typical: 3" - 6" along bearing edges and 12" along intermediate supports. Flatten any swollen or raised edges as necessary by sanding or scraping. Nail or screw any areas that are loose or squeak. Replace any water damaged swollen or delaminated sub-flooring or underlayment. terra legno Engineered Wood Flooring may be laid over plywood or OSB. For best results the sub-floor has a minimum thickness of 3/4" and APA exterior grade plywood.
- **Concrete sub-floors:** Remove all loose or broken concrete and fill/flatten as necessary using cementitious based leveling materials of 3000 PSI or more. Wood floors cannot be mechanically fastened directly to concrete. Install a wood sub-floor if necessary over concrete of 3000 PSI minimum compressive strength or glue the wood directly to the concrete using the glue-down installation system.

5. Staple/Nail-Down Installation Method for terra legno 3-Ply and Multi-ply Engineered Wood Flooring:

3/4" and Greater Products and Widths 9" and greater terra legno installation guide lines specify Nail and Glue Installation or Nail and Glue Assist installation methods.

5. WOOD FLOORING INSTALLATION BASIC TOOLS & ACCESSORIES:

EYE PROTECTION /SAFETY GLASSES	UTILITY KNIFE	VACUM CLEANER
KNEE PADS	CHAULK LINE / LASER	PLASTIC BAGS FOR CLEAN-UP
EAR PLUGS	PRYBAR	WOOD FILLER
FIRST AID KIT	LEVEL / STRAIGHT EDGE	MOLDINGS
MOISTURE METER (WOOD & CONCRETE)	CARPENTER SQUARES	TROWELS
JOB SITE LOG BOOK (RH, MOISTURE READINGS, ENVIRONMENTALS)	SCRAPER, BLADES, & FILE	TAPPING BLOCK
*NAILING MACHINES	PRYBAR	HAMMER
ASSORTED NAILS, CLEATS	DRILLS & BITS	RUMMER MALLET
6 –D FINISH NAILS OR Pneumatic finish nailer and fasteners per Fastener Guidelines	ROUTER & BITS	FANS
"BLIND" FLOORING STAPLER/NAILER	CHISELS	EXTENSION CORDS
AIR COMPRESSOR, HOSES & FITTINGS	NAIL SETS	ELECTRIC PLUG ADAPTERS
JAMB SAW (UNDERCUT SAW)	PLIERS & WRENCHES	STAPLER
JIG SAW	NAIL PULLERS	BROOM
TABLE SAW	SCREWDRIVERS	TAPE MEASURE
CIRCULAR SAW	ELECTRIC TESTER	PENCIL
MITRE SAW (MITER BOX WITH SAW)	BAND SAW	DROP CORDS
	100 – 150 LB ROLLER	NAIL PUNCH

***NOTE:** terra legno recommends that the "Blind" fastening machine be designed for installation of 9/16" thick flooring with 1-1/4" to 1-1/2" fasteners. The machine should include a flooring "foot" to protect the edge of the wood from damage. terra legno is not responsible for damage done to the wood flooring by fastening machines.

5. Staple/Nail-Down Installation Method for terra legno Engineered Wood Flooring:

terra legno Engineered Wood Flooring can be installed over most structurally sound sub-floors or existing permanently bonded flooring materials. Wood, concrete, sheet vinyl, vinyl tile, ceramic, terrazzo are all acceptable sub-floors provided they meet the standards outlined in sections 2, 3, and 4.

Installing floors with nails or staples may lead to slight shifting, resulting in creaking. Minor localized warping near fasteners is also normal.

- A moisture barrier between the wood and the subfloor is a must over concrete or gypsum floors. A moisture barrier is recommended over wood sub-floors too. The moisture barrier helps maintain an even moisture balance in the floor enhancing the wood floors lifelong performance.

PREPARATION AND LAYOUT:

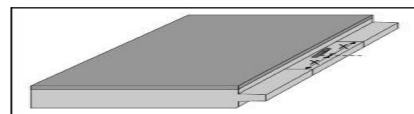
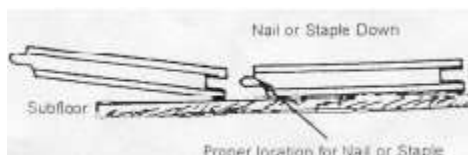
- Wood expands and contracts, therefore it is critical to leave a minimum of 5/8" expansion space between all sides of the flooring and all vertical surfaces including: door trims, jambs, studs, plumbing, cabinets, etc.

- Plan the layout for the best visual appearance of the finished wood floor. Measurements must be made to allow for the width of the flooring plus the thickness of the board as the expansion space and must allow for the width of the tongue.

INSTALLATION:

- Install the first board making certain that the TONGUE side aligns with the WORKING LINE with the groove facing the wall.
- Using 6d finish nails or a pneumatic finish nailer, nail the first board every 6-8" approximately 1/2" from the groove edge parallel to the starting wall. Nail the edge not the ends. Maintain "" expansion space at all times.
- "Blind" nail every 3-4" within the tongue side nail pocket at a 45° angle, and within 2" of each end.
- Insert the end of the next board into the adjoining tongue or groove and force the butt ends tightly together. Fasten as above until all boards in the row are complete.
- Cut to length a board that fits at the end of each row always allowing for expansion space at the wall. For Best Results: Do not cut short boards to finish a row. The leftover materials will be used for future starter boards. Short lengths cannot be used and will become waste. Avoid lining up the joints or creating a pattern.
- Continue adding rows in this manner, blind nailing the tongue side only until enough rows have been installed to make room for the "blind" fastening machine. Avoid close alignment of joints in all
- Working from several cartons "rack" an area of the floor by loosely laying materials side by side in a pleasing pattern avoiding close joints, or creating a pattern, for example a "H" pattern.
- Install the area using cut pieces from the end as starter boards for the next rows to reduce waste. Continue in this manner until the entire floor that can be installed with the "blind" nailing machine is complete.
- Using 6d finish nails or a pneumatic finish nailer blind nail and face nail the final rows.
- Measure the final row. Rip the boards (parallel cut) to fit the final wall allowing for 1/2" expansion.

Fasteners & Staplers for Multi-ply & 3-Ply Cores



- Fasteners should be driven in at a 45-degree angle
- NOTE: When Stapling installer should staple the middle of the fillet to avoid splitting the void.
- Ensure the fastener is placed in exactly the correct spot. If it's off a few millimeters, the surrounding wood fibers will be subjected to excessive pressure and stress.
- Fasteners should not be driven too deep into the tongue, and positioned not to interfere with board positioning on the next row.
- Tools should be in good working condition to ensure they do not damage the planks.
- Tools should not damage the board sides or tongues.
- Tools should be adjusted for proper positioning to ensure they do not damage the planks.
- Air pressure and, or striking force may need to be adjusted for proper anchoring.

- Terra legno Engineered Wood Flooring will not honor any claims related to the improper use of ,or defective installation tools.

- Stapler & Fasteners for 1/2", 9/16", 5/8" & 3/4" 3-Ply Cores & Multiply Cores**
 - Bostitch EHF 1838K Stapler or Equal
 - Bostitch SX50351-1/2G Staples or Equal
 - Staple Gauge: 18 Gauge
 - Staple Length: 1/2", 9/16" & 5/8" 1-1/2", 3/4" Tri-Layer-Max Core 2"
 - Crown: 7/32"
- Stapler & Fasteners for 1/2", 9/16", 5/8" 3/4" 3-Ply Cores & Multiply Cores**

Engineered Dimensions	Fastener Gauge		Minimum Length	Space Between Fastners	Distance From Ends
	U-Shaped Staples	L or T Shaped Cleats			
1/2" , 9/16" & 5/8"	Min: 19 ga Max: 18 ga	Min: 20 ga Max: 18 ga	1-1/4"	3 to 4"	2"
3/4"	<u>Not Recommended</u>	Min: 18 ga Max: 15 ga	1-1/2"	3 to 4"	2"

Trim, Transitions, Inspection, and Clean-up:

- Inspect the floor for gaps, chips and adhesive residue. Touch up chipped areas and fill with the appropriate filler as necessary. Use colored latex filler for factory finished products and a stainable filler if the floor is to be sanded and finished.
- Install/reinstall all moldings and clean the floor with the appropriate cleaner. Use Manufacturer's formulated UV-Oil Cleaners, or Polyurethane Finish Cleaners accordingly to properly clean terra legno's finishes.

6. Nail Down / Glue Down & Nail Down/ Glue Assist Installations

Nail Down / Glue Down Method

- Procedures and guidelines as detailed above #5 Nail Down Installations
- terra legno Engineered Wood Flooring recommends only a manufacturer's premium grade Polyurethane Adhesive recommended adhesive remover, and applicator.
- Do not use underlayment paper when using adhesives
- Follow all adhesive manufacturer's specifications
- The performance and the warranty of the adhesive is the sole responsibility of the adhesive Manufacturer.
- Do not allow adhesive to dry on the face of the flooring
- Trowel spread the premium grade polyurethane adhesive on the subfloor along the first-row chalk line wide enough to cover the first row of flooring. Be careful as not to cover the chalk line. Follow the adhesive manufacture's recommendations of open times prior to proceeding to the following steps.
- Lay the tongue side of the first row of flooring along the chalk line. Top Nail the first row in place. The fasteners are to be placed approximately 3/4' from the wall side (groove side) of the board every 4" to 6" . Once the face nails are set, use 6-D finish nails, or pneumatic finish nailer to blind nail along the tongue and the end per fastener guidelines. It is important for the success of your installation's

layout the first row is straight along the chalk. Check to make sure the first row is perfectly straight along the chalk line before proceeding.

- With recommend trowel properly spread adhesive to install 2-3 more rows.
- Install the second row sliding the groove side on to the tongue of the first row. Blind nail it into place with the recommended fasteners per fastener guidelines/
- Proceed in the same manner nailing and gluing 2-3 rows at a through-out the room to complete the installation.
- Follow adhesive manufacture's specifications for foot traffic.

Nail Down with Adhesive Assist Method

- Procedures and guidelines as detailed above #5 Nail Down Installations
- terra legno Engineered Wood Flooring recommends only a manufacturer's premium grade Polyurethane Adhesive, recommended adhesive remover, and applicator
In addition to the nail down installations procedures above, apply 1/4" to 3/8" bead of adhesive in a serpentine pattern to the subfloor along the center of each row of flooring, or apply straight bead of adhesive to the subfloor under where the groove side of the board will rest after nailing it down.
- Do not use underlayment paper when using adhesives
- Follow all adhesive manufacturer's specifications
- The performance and the warranty of the adhesive is the sole responsibility of the adhesive Manufacturer.
- Do not allow adhesive to dry on the face of the flooring

7. Adhesive -Glue-Down Installation Method for terra legno Engineered Wood Flooring:

terra legno Engineered Wood Flooring can be installed over most structurally sound sub-floors or existing permanently bonded flooring materials. Wood, concrete, sheet vinyl, vinyl tile, ceramic, terrazzo are all acceptable sub-floors provided they meet the standards outlined in sections 2, 3, and 4.

terra legno Engineered Wood Flooring recommends only a Manufacturer's Premium Grade Polyurethane Adhesive, Adhesive Remover and Applicator.

WOOD FLOORING GLUE-DOWN INSTALLATION BASIC TOOLS & ACCESSORIES:

EYE PROTECTION /SAFETY GLASSES	UTILITY KNIFE	VACUM CLEANER
KNEE PADS	CHAULK LINE / LASER	PLASTIC BAGS FOR CLEAN-UP
EAR PLUGS	PRYBAR	WOOD FILLER
FIRST AID KIT	LEVEL / STRAIGHT EDGE	MOLDINGS
MOISTURE METER (WOOD & CONCRETE)	CARPENTER SQUARES	TROWELS
JOB SITE LOG BOOK (RH, MOISTURE READINGS, ENVIRONMENTALS)	SCRAPER, BLADES, & FILE	TAPPING BLOCK
*NAILING MACHINES	PRYBAR	HAMMER
ASSORTED NAILS, CLEATS	DRILLS & BITS	RUMMER MALLET
6 -D FINISH NAILS OR Pneumatic finish nailer with 1-1/4" or 1-1/2" fasteners	ROUTER & BITS	FANS
"BLIND" FLOORING STAPLER/NAILER	CHISELS	EXTENSION CORDS
AIR COMPRESSOR, HOSES & FITTINGS	NAIL SETS	ELECTRIC PLUG ADAPTERS
JAMB SAW (UNDERCUT SAW)	PLIERS & WRENCHES	STAPLER
JIG SAW	NAIL PULLERS	BROOM
TABLE SAW	SCREWDRIVERS	TAPE MEASURE
CIRCULAR SAW	ELECTRIC TESTER	PENCIL
MITRE SAW (MITER BOX WITH SAW)	BAND SAW	DROP CORDS
Premium Polyurethane Adhesive	100 – 150 LB ROLLER	NAIL PUNCH

PREPARATION AND LAYOUT:

- Wood expands and contracts, therefore it is critical to leave a minimum of 5/8" expansion space between all sides of the flooring and all vertical surfaces including: door trims, jambs, studs, plumbing, cabinets, etc.
- Plan the layout for the best visual appearance of the finished wood floor. Measurements must be made to allow for the width of the flooring plus 9/16" expansion space and must allow for the width of the tongue

INSTALLATION

- Measure the distance between the WORKING LINE and the wall the full length of the starting wall. If the wall is badly out of square (crooked) it may be necessary to rip boards to follow the irregularities of the existing walls.
- Using no adhesive install a sacrificial row on the INSIDE edge (closest to the wall) of the chalk line. This row may be of any straight wood material or the narrowest width of flooring. terra legno Engineered Wood Flooring should be installed with the groove side facing the line (tongue towards wall). Make certain each of the sacrificial boards is in perfect alignment with the WORKING LINE. When satisfied, attach the board to the sub-floor using finish nails or concrete nails. This sacrificial row is to minimize movement of the flooring during installation and will be removed once the floor is complete.
- Read the label on the adhesive container. Using the trowel recommended by the adhesive manufacturer spread an area that can be covered with wood within the working time of the adhesive (as specified by the manufacturer).
- Install the first board making certain that the TONGUE side is tight against the sacrificial board. Installation can be from the left or right. Best speed is usually accomplished by installing from the left if right-handed and from right if left-handed.
- Insert the end of the next board into the adjoining tongue or groove and force the board tightly against the sacrificial board and the end of the adjoining first board.
- After three or more boards have been installed in the first row installation of the second row can begin.
- Select a board for the second row that will allow at least 6" of difference between it and the length of the board in the first row. Continue installing in this manner until three or more boards have been installed. Continue adding rows, extending each as necessary until all of the adhesive has been covered. Avoid close alignment of joints in all rows throughout the installation, always attempting to get the maximum spacing available with a minimum of 6". Avoid alignment of joints in opposite rows, which may create an "H" pattern in the floor.
- Cut to length a board that fits at the end of each row always allowing for 9/16" expansion space at the wall. For Best Results Do not cut short boards to finish a row. The leftover materials will be used for future starter boards. Short lengths cannot be used and will become waste
- Once the first section has been completed inspect it closely, tightening all end and side gaps as necessary. Clean all adhesive from the surface immediately. DO NOT wait to clean the surface until completion of the job, as the adhesive may not be removable.
- Spread a new working area and proceed as above. Use the cut ends of the boards from the previous section as starter boards when possible. Avoid lengths shorter than 4" as they are hard to keep in alignment and are easily displaced. Continue in this manner until all rows are complete.
- Measure the final row. Rip the boards (parallel cut) to fit the final wall allowing for 9/16" expansion.
- Remove the sacrificial row being careful to not damage the adjoining boards. If 9/16" expansion is not available because of a bow in the wall cut rip the boards to allow the required spacing. Apply adhesive to the back of each board and gently press in place. Pull the boards tightly to the previously installed row.

Trim, Transitions, Inspection, and Clean-up:

- Inspect for gaps, chips and adhesive residue. Remove all adhesive residue, touch up chipped areas and fill with the appropriate filler as necessary.
- Install/reinstall all moldings
- clean the floor with the appropriate cleaner. Use Manufacturer's formulated UV-Oil Cleaners, or Polyurethane Finish Cleaners accordingly to properly clean terra legno's finishes.
- First use of the floor varies from one adhesive manufacturer to another. Generally, the floor can have light foot traffic after the adhesive has cured for 18-24 hours with furniture being LIFTED into place after 24 hours.
- Inspect the floor for gaps, chips and adhesive residue while removing the tape. Touch up chipped areas and fill with the appropriate filler as necessary. Use colored latex filler for factory finished products

**8. Herringbone & Chevron Pattern Adhesive Glue-Down and Nail / Glue Down Installation Method
for terra legno Engineered Wood Flooring:**

- Procedures and guidelines as detailed above #6 Nail Down / Glue Down, Nail Down / Glue Assist Installations or #7 Adhesive Glue Down Installation
- Herringbone and chevron patterns are highly detailed installations. For best results herringbone and chevron installations should be installed by professionals equal to an NWFA Certified Installer.
- The key elements to a successful herringbone and chevron pattern installation is detailed floor preparation and an accurate pattern layout.

Step 1. Determine the direction the pattern will run. Generally, for best results the pattern looks best with points running in the longest direction of the room or directed to a focal point. When the direction has been determined snap a line down the center of the room.



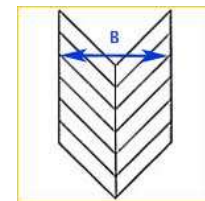
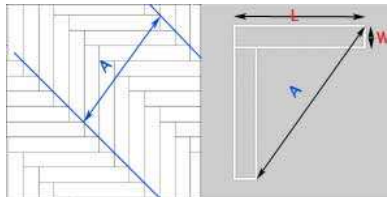
Step 2-a. In order to establish working lines, determine the distance will be between the corners of the slats when they are laid out. Dry-fit several boards together and snap lines through the corners. Then measure the distance between the lines.



Step 2-b. An alternate method to establish the working lines is to use a framing square to mark 45- degree angles off each corner from the same end of the board. Measure the distance from one corner to the intersection of the lines



Step 4. With Either method in Step 2 or 3, divide that distance in half and mark that distance on either side of the center line. Use two different chalks to mark the room. For example, a RED Chalk line is the Center of the room. A Blue Chalk line are the working lines to be used as guides to line up the points of the herringbone slats. Now is the best time to transfer all the parallel lines to confirm the layout of the pattern repeat and if acceptable to be used as reference lines in the installation.



Herringbone & Chevron Pattern Repeat		
Board Size	Herringbone	Chevron
2-1/4" x 11-1/4"	16.22	15.91
3" x 18"	25.81	25.46
4" x 20"	28.84	28.28
4" x 24"	34.41	33.94
5" x 20"	29.15	28.28
6" x 24"	34.99	33.94

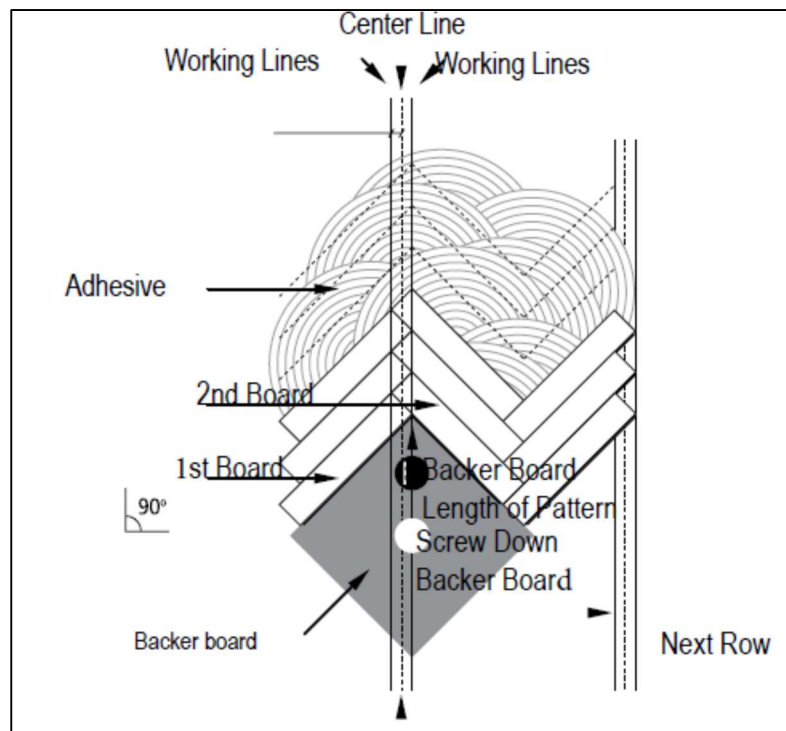
Step 5. The use of a plywood backer board is a tried and true method to start the first row. The board should be a perfectly square piece the same dimension as the length of the pattern to be installed.



Step 6. Screw down the backer board. Then dry-fit the first pieces to ensure the pattern is lining up perfectly. Upon confirming the boards / pattern is lining with your working lines proceed with your Adhesive Glue Down or Nail Down / Glue Down Installation.



Step 7. Check the installation alignment every three to four rows to ensure a square installation. Just a few millimeters of error can become a compounding and catastrophic failure.



9. Floating Installation

9. WOOD FLOORING INSTALLATION BASIC TOOLS & ACCESSORIES:

EYE PROTECTION /SAFETY GLASSES	UTILITY KNIFE	VACUM CLEANER
KNEE PADS	CHAULK LINE / LASER	PLASTIC BAGS FOR CLEAN-UP
EAR PLUGS	PRYBAR	WOOD FILLER
FIRST AID KIT	LEVEL / STRAIGHT EDGE	MOLDINGS
MOISTURE METER (WOOD & CONCRETE)	CARPENTER SQUARES	TROWELS
JOB SITE LOG BOOK (RH, MOISTURE READINGS, ENVIRONMENTALS)	SCRAPER, BLADES, & FILE	TAPPING BLOCK
*NAILING MACHINES	PRYBAR	HAMMER
Glue (PVA- Poly Vinyl Acetate)	DRILLS & BITS	RUMMER MALLET
6 –D FINISH NAILS OR Pneumatic finish nailer with 1-1/4" or 1-1/2" fasteners	ROUTER & BITS	FANS
Strap Sets	CHISELS	EXTENSION CORDS
AIR COMPRESSOR, HOSES & FITTINGS	NAIL SETS	ELECTRIC PLUG ADAPTERS
JAMB SAW (UNDERCUT SAW)	PLIERS & WRENCHES	STAPLER
JIG SAW	NAIL PULLERS	BROOM
TABLE SAW	SCREWDRIVERS	TAPE MEASURE
CIRCULAR SAW	ELECTRIC TESTER	PENCIL
MITRE SAW (MITER BOX WITH SAW)	BAND SAW	DROP CORDS
SOFT CLOTH / TOWELS	100 – 150 LB ROLLER	NAIL PUNCH

***NOTE:** terra legno recommends Franklin Tongue and Groove Glue, Franklin Titebond III, Roberts 1406 Tongue and Groove adhesive PVA Adhesive or equal cross linking polyaliphactic emulsion glue or PVA adhesive for gluing terra legno Engineered Wood Flooring planks together in a floating installation method

9. Floating Installation

terra legno Engineered Wood flooring can be installed over most structurally sound sub-floors or existing flooring materials. Wood, concrete, sheet vinyl, vinyl tile, ceramic, terrazzo, and natural stone floors are all acceptable sub-floors provided they meet the standards outlined in section II.

terra legno Engineered Flooring recommends floating installations Only for Residential Installations

PREPARATION AND LAYOUT:

- Wood expands and contracts, therefore it is critical to leave a minimum of 5/8" expansion space between all sides of the flooring and all vertical surfaces including: door trims, jambs, studs, plumbing, cabinets, etc.
- Additional expansion space is required for Floating Installations that cover a span of greater than 40 feet. Use a T-Molding or other trim piece to provide the required additional 5/8" expansion space.
- If the sub-floor is concrete install a 6-mil poly vapor barrier. All joints should be lapped 6" and taped with a moisture resistant tape. DO NOT install this vapor barrier over wood sub-floors.

- Install the underlayment parallel to the starting wall and in the same direction that the flooring will be installed. Do not overlap joints. Underlayment should be cut flush with the walls.
- Tape all joints using a water resistant tape such as packing tape or duct tape; allow no wrinkles. Tape the starting row to the floor to prevent movement. Doing so will maintain accuracy in the next step.
- Plan the layout for the best visual appearance of the finished wood floor. Measurements must be made to allow for the width of the flooring plus 1/2" expansion space, and must allow for the width of the tongue.

9. Floating Installation

INSTALLATION: Option to install a sacrificial board the full length of the floor on the inside edge of the WORKING LINE to form a support for the balance of the flooring installation. Proceed to step 1 using wedges to hold the flooring in place on the ENDS.



- Select the longest boards available. Work from several cartons to maintain color uniformity. Lay the boards out the length of the room. Make certain that the last and final board in the row will be at least 12" in length. The last UNCUT board must allow at least 12" between the board end and the wall. If the board in the row will need to be cut less than 12" in length to complete the row adjust the board selection accordingly.
- Begin installation from the RIGHT corner with the tongue facing you and the long GROOVE facing the starting wall or sacrificial row. The short end GROOVE should be facing the end wall. Align the first board with the WORKING LINE.
- Select the second board. Place a 1/8" continuous bead of glue in the *inside bottom edge* of the END groove. DO NOT apply glue to the long side groove at this time. Interlock the joint with the first board always maintaining alignment with the WORKING LINE. Remove any excess glue from the surface with a towel dampened in warm soapy water. Use strap sets to temporarily hold the end joints together. Use wedges or waste material in the expansion gap on the side and end walls (ends only if sacrificial board was used) to maintain alignment with the WORKING LINE.
- Continue installing in this manner until the first row is complete. Measure and cut to length the final board in the row allowing 1/2" expansion between the end of the board and the end wall. Select a longer board for this cut, as the material left over will be used as a starter board later. Do not use short boards that would allow waste of 3" or less as this cannot be used later. Apply glue in the groove and install as above. Set the waste end aside for later use.
- Select a new set of materials just as in step 4. If the cut-off waste from the first row was 18" or longer it can be used as the first board in the row. Maintain 6" spacing between the end joints of all rows.
- Place a continuous bead of glue along the *inside bottom edge* of the END groove and the same location on the Side groove. Carefully align the tongue and grooves together and tighten the plank until all joints are snug. Remove any excess glue as before and temporarily hold the joints together using strap sets. Cut and install the final board in the row as in step 7.
- Continue in this manner until the first four rows are completed. This four-row area is the base for the balance of the floor installation. Perfect alignment is essential, as any variance will worsen as the flooring proceeds further into the room. Carefully inspect for proper alignment before the glue sets. Adjust as necessary.
- Continue with the installation as above. Best appearance occurs with 6" spacing between joints in adjacent rows and avoiding a pattern in the floor. Try to avoid aligning joints closer than four rows apart as this may eventually create a pattern. On Aluminum Oxide and Polyurethane continue using tape to hold the joints together and wedges to hold the end joints in place. **DO NOT USE TAPE ON UV -**

OIL FINISH FLOORS. DO NOT walk on the finished floor during installation, as this will break the uncured glue joint. DO NOT roll the floor for the same reason.

- Finish the final row by cutting the boards to fit, always allowing 1/2" expansion space.
- If a sacrificial row was used remove it and replace with a row of materials that is properly edge glued as above

9. Floating Installation

Trim, Transitions, Inspection, and Clean-up:

- Inspect for gaps, chips and adhesive. Remove all adhesive residue, touch up chipped areas and fill with the appropriate filler as necessary. Use colored latex filler for factory finished products.
- Install/reinstall all moldings and clean the floor with the floors finish formulated cleaner.
- DO NOT ROLL THE FLOOR, as this will break all glue joints.
- First use of the floor varies from one adhesive manufacturer to another. Generally, the floor can have light foot traffic after the adhesive has cured for 8-24 hours with furniture being LIFTED into place after 24 hours.

MOLDING TYPES AND USE:

- Reducer Strip: a wedge shaped molding. Used as a transition to thinner floor covering materials.
- Baby threshold: a molding undercut to transition to thicker materials or for use against vertical objects where expansion is required. Use against sliding door tracks, fireplaces, carpet, ceramic tile, existing thresholds r floor to ceiling glass.
- Stair Nosing: a molding undercut for use as a stair landing trim, elevated floor perimeters, and stair steps.
- Quarter Round: a molding used to cover expansion space next to baseboards.
- T-Molding: a molding used as a transition piece from one flooring to another of similar height.