

TERRAMAI

FLOORING INSTALLATION GUIDELINES

TerraMai.com

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INTRODUCTION

TerraMai Flooring brings unrivaled beauty and long-lasting performance to any space. Multiple patterns, species, and finishes are available to offer exciting new looks. Customization is also available. Please contact your local TerraMai sales representative for more information.

MATERIAL INSPECTION & STORAGE

TerraMai Flooring planks are shipped horizontally on a pallet or in a crate. Inspect all planks for visible manufacturing defects, shipping damage or otherwise unsatisfactory appearance. **Do not install damaged or otherwise unsatisfactory material. Installing a plank constitutes acceptance of the plank.** If any damaged or otherwise unsatisfactory planks are found after completing the inspection, immediately contact TerraMai customer service at customerservice@TerraMai.com.

The planks should be stored on the pallet or in the crate in a clean, dry, temperature- and humidity-controlled environment from 55°F (12°C) to 85°F (29°C) and 35% to 55% RH until ready for installation. Never store the planks outside or expose to water or excessive moisture. Never store planks leaning against a wall as warping will occur.

ACCLIMATION

Flooring may only be installed in spaces with a temperature- and humidity-controlled environment from 55°F (12°C) to 85°F (29°C) and 35% to 55% RH. The planks must be acclimated to site conditions prior to installation. Please follow all directions in the Flooring & Paneling Acclimation Guidelines at TerraMai.com/acclimation.

FACTORS AFFECTING INSTALLATION

The following factors must be considered when determining the appropriate flooring products and method of installation.

- Location (On-, Above-, or Below-Grade)
- Foundation Type (Basement Foundation, Slab On-Grade, Crawl Space, etc.)
- Subfloor Type (Plywood, OSB, Concrete, Existing Floor Coverings)
- Subfloor Prep Materials (Cementitious Patch or Self-Leveler, Gypsum Patch or Self-Leveler, Epoxy Moisture Vapor Barriers, Moisture Vapor Retarders, etc.)
- Structural Elements (Floor Joist Sizing, Spacing, and Orientation, Concrete Expansion Joints)
- Flooring Species
- Flooring Type (Solid or Engineered)
- Flooring Width and Thickness
- Acoustic Requirements

SITE ENVIRONMENTAL CONDITIONS

To help minimize moisture-related expansion and contraction, verify the following conditions prior to installation:

1. All exterior walls, windows, and doors must be in place and the building envelope closed during acclimation and installation.
2. All wet work such as painting, drywall, masonry, and concrete must be completed and dry.
3. Basements and crawl spaces must be dry and well ventilated.
 - a. Crawl spaces must be a minimum of 18" high from the ground to the bottom of the joist.
 - b. Dirt floors in crawl spaces should be covered with a 6-10 mil black plastic to reduce moisture migration, and seams should overlap and be sealed with waterproof tape.
 - c. Perimeter crawl space cross ventilation should equal 1.5% of the square footage.
4. Exterior grading should be complete, and drainage should move away from the building structure with a minimum drop of 3" in 10'.
5. Permanent HVAC should be on and operational and maintained between 55°F (12°C) to 85°F (29°C) and 35% to 55% RH for a minimum of 7 days prior to delivery, as well as during and after installation of the flooring. Vents must remain open year-round.
6. Humidity levels below 35% or above 55% may cause movement in the flooring, gapping between pieces, cupping, cracking and other problems. Humidity controls may be required to maintain proper humidity levels, particularly over radiant heat.

INSTALLATION SUBSTRATES

The flooring substrate must be clean, flat, dry, and structurally sound. Proper surface preparation is key to successful installations. Improper site and subfloor preparation is the leading cause of flooring failure. Never install TerraMai Flooring on surfaces that experience water exposure, excessive moisture conditions, or excessive heat. Protect planks from HVAC ducts, otherwise checking, cracking, warping, or cupping may occur.

CLEAN

Subfloors must be scraped clean and free of debris. Sweep and/or vacuum all debris from the subfloor. Debris on the subfloor may cause uneven surfaces in the finished floor, poor fit between planks, and poor adhesive bond in glue-down installations.

FLAT

Subfloors must be flat to within 3/16" over any 10' radius and 1/8" over any 6' radius. Check the flatness using a straight edge, laser line, or string line. Ensure that all fasteners securing the subfloor are set flush. On concrete subfloors, grind all high areas and fill low areas using a quality cementitious patch or self-leveling compound.

DRY

Check and record all moisture and temperature conditions prior to installation. Visually check the jobsite for potential moisture problems. Look for signs of water intrusion around window and doors. Check for mold or fungus on walls and all other areas. Water intrusion may necessitate structural repairs and/or create conditions unsuitable for flooring installation.

1. Plywood and composite subfloors should be checked using a calibrated moisture meter. Be sure to use the correct moisture meter setting for the species being checked. Carefully follow the moisture meter manufacturer's operation instructions. Moisture readings should not exceed 10% in any location and the moisture variation between the subfloor and the flooring should not exceed 2% at time of installation.
2. Concrete subfloors must be fully cured, at least 30 days old, and should have minimum 6-mil poly film between the concrete and ground. Lightweight concrete can hold more moisture and may take longer to dry out to an acceptable moisture content.
3. Installations over concrete require moisture vapor testing. 3 tests must be performed up to the first 1,000 square feet, with one additional test per each additional 1,000 square feet. Test all areas where wood will be installed. Testing may be performed using either Calcium Chloride tests per ASTM F 1869, or in-situ Relative Humidity tests per ASTM F-2170. The results of the Calcium Chloride tests should not exceed 3 lbs per 24 hours per 1000 square feet, and in-situ test results should not exceed 75% RH. Carefully record all results. If results are above these limits, proper moisture mitigation products must be used, such as:
 - Epoxy moisture vapor barrier coatings
 - Quality urethane or silane-modified polymer moisture vapor retarders
 - Adhesives with moisture control membranes all in one

NOTE: *These tests give a snapshot of moisture conditions at the time of the test, but do not reflect the permanent, year-round condition of the substrate. If gluing down on concrete that is on or below grade, it is highly recommended to use a moisture mitigation product approved by the manufacturer of the adhesive you have chosen, even if you believe the concrete is dry. A concrete slab on- or below-grade that measures dry today may experience high moisture content in the future and cause floor failure. TerraMai is not responsible for site-related moisture issues.*

4. More stringent requirements regarding the dryness of the subfloor apply when installing over radiant heat. Only engineered flooring may be installed over radiant heat systems. Please consult your TerraMai Account Manager for radiant heat installation guidelines.

STRUCTURALLY SOUND

Wood subfloors must be well fastened. Use screws every 6" and replace subfloor panels/boards as necessary to eliminate all movement and squeaking. Concrete subfloors must be sound, cracks up to 1/8" (3mm) must be sealed, and larger cracks, gouges, or otherwise damaged substrates must be repaired with a high quality, cementitious patch or self-leveling compound. Never install over powdery gypsum underlayment, and even if the gypsum underlayment is sound, never install over gypsum underlayments on- or below-grade. See additional information on acceptable subfloor types, locations, and installation methods, below in Table 1.

Table 1: Acceptable Subfloor Type, Location & Installation Method

		Above-Grade	On-Grade	Below Grade	Approved Flooring Installation Method
Flooring Type	Solid	Yes	Yes	No	Nails, Staples, Adhesive
	Engineered	Yes	Yes	Yes	Nails, Staples, Adhesive
Subfloor Type	Plywood, 5/8" minimum	Yes	Yes	Yes*	Nails, Staples, Adhesives, or Nail & Glue Assist
	OSB, 23/32" minimum	Yes	Yes	Yes*	Nails, Staples, Adhesives, or Nail & Glue Assist
	Particleboard or MDF	No	No	No	N/A
	Cork, Rubber, or Acoustic Underlayment**	Yes	Yes	No	Adhesive
	Concrete, >3,000 psi	Yes	Yes	Yes	Adhesive
	Cementitious Patch**, >3,000 psi	Yes	Yes	Yes	Adhesive
	Gypsum Patch**, >3,000 psi	Yes	No	No	Adhesive

* Only when moisture mitigation is in place to prevent excessive moisture migrating through the subfloor

** Only if the underlayment/patch is approved by the manufacturer for the application and moisture conditions present

PREPARING THE PERIMETER

- Undercut door trim, jambs, and casings to the thickness of the flooring plus any adhesives or underlayments you plan to use and remove any base moldings and trim.
- All wood flooring expands and contracts with changes in moisture content. It is essential to install the flooring with an adequate expansion gap of at least 1/2" between ALL sides of the flooring and ALL vertical obstructions, including door trim, jambs, studs, plumbing, cabinets, etc. This space will be covered with base molding. Failure to provide adequate expansion space in any single location can cause damage to the entire floor.

LAYOUT

On wood subfloors, if the subfloor is fastened to joists/trusses, they must have a maximum span of 16" on center. The flooring should be installed perpendicular or at a 45° angle to the joists. If installing the flooring parallel to the joists is desired, a second layer of underlayment may be installed so the total thickness of subfloor is at least 1-1/4" thick.

On concrete subfloors, expansion joints must be honored: flooring must never bridge over these joints. After flooring is installed, the joint may be filled with a high-quality joint sealant, such as Bostik's 915FS. Flooring may be installed over static control joints.

No contiguous area of installed flooring should exceed 30' across the widths of the planks or 50' along the lengths of the planks. For spaces wider or longer than these dimensions, add expansion space midway through the span and cover with a T-molding or other transition piece.

ACOUSTIC CONSIDERATIONS

For enhanced acoustic performance or achieving specific IIC (Impact Insulation Class) or STC (Sound Transmission Class) requirements, various sound abatement products may be used. Cork underlayment, rubber underlayment, acoustic mats, or various adhesives with sound abatement properties are options, but they must be approved in writing for use under the type of flooring selected (solid or engineered) and must be approved for an adhesive installation method. Nailing through an underlayment allows impact on the floor to transfer to the subfloor through the nails, significantly reducing or eliminating acoustic performance.

Follow all installation instructions from the underlayment and adhesive manufacturers. The structural integrity of the underlayment and its ability to accommodate the natural expansion and contraction of the flooring is the responsibility of the underlayment manufacturer. The acoustic performance of the underlayment is also the responsibility of the underlayment manufacturer. The adhesive bond of the underlayment to the subfloor and the flooring to the underlayment are the responsibility of the adhesive manufacturer. TerraMai accepts no responsibility for bond, structural integrity of the underlayment, or acoustic performance claims made by the underlayment and/or adhesive manufacturers.

Extra care must be taken to ensure there is no contact between the flooring and any pipes, structural elements, or even trim that can transmit vibration through the structure to other rooms or floors. When installing base moldings, place a thin shim between the flooring and base molding to ensure there is no direct contact after installation.

RADIANT HEAT

Please consult your TerraMai Account Manager for radiant heat installation guidance before finalizing product selection or beginning installation. Careful adherence to these guidelines is required for a successful and fully warranted installation. Solid wood flooring, certain wood species, and plank sizes wider than 5" (127mm) are not warranted for installation over any type of radiant heat.

The radiant heating system chosen must be approved in writing for use under the engineered hardwood chosen and must NEVER be set to a temperature higher than 82°F (27°C) after the flooring is installed. Prior to flooring installation, the radiant heat system must be turned on to a minimum of 85°F (29.5°C) for at least 72 hours to drive out excess moisture in the subfloor, then turned off for 24 hours prior to installing the flooring to allow time to cool down.

After the flooring installation is complete, whenever the radiant heat system is turned on for the first time, or the first time of the season, the temperature must be set 2°F (1°C) above its initial temperature, then increased 2°F (1°C) every day until the desired temperature is achieved. Wood flooring installations over radiant heat will move more than a typical wood flooring installation, and moderate surface checking, cracking, shrinkage, gapping between planks, and slight cupping are all to be expected and do not constitute a product defect. Once flooring is installed and the radiant heating system turned on, never place area rugs, cabinets, closed-bottom furniture or other objects that inhibit good air flow over the flooring and trap and retain heat. Excessive heat will damage the wood flooring.

FLOORING CUTTING & FABRICATION

When cutting planks to size, use a sharp, fine cut carbide blade, minimum 60-tooth, or better. It is recommended to use removable 3M #2080 Blue tape along all cut lines on wood to help prevent tear-out or finish chipping. For cutouts in the flooring for outlets, vents, plumbing, etc., the use of a spiral saw is recommended.

Always properly support the planks and wear all appropriate protective equipment, including safety glasses, ear plugs, and approved dust masks.

GLUE DOWN INSTALLATION METHOD

TerraMai Flooring can be glued down to concrete, plywood, most OSB, and many existing floors, such as wood floors (sanded), well-adhered sheet vinyl, ceramic tile, etc., meeting the requirements outlined above under General Conditions/Subfloor Conditions. Some OSB products use resins and/or release agents that may inhibit proper bonding. Bond tests should always be performed on OSB and any existing floor covering materials.

A high quality, moisture curing, permanently flexible adhesive must be used. TerraMai recommends the use of Bostik adhesives, such as GreenForce, Bostik's BEST, Ultra-Set SingleStep2, and Vapor-Lock. GreenForce or Ultra-Set SingleStep2 are recommended for any prefinished flooring because the adhesive is much easier to clean off the face of the flooring, before and after cure. Subfloor moisture must be tested, and the moisture level and application must be approved in writing by the adhesive manufacturer. The performance of the adhesive, including bond of the flooring to the subfloor and any stated moisture protection, is the responsibility of the adhesive manufacturer, not TerraMai, and careful adherence to the adhesive manufacturer's installation instructions for that specific subfloor type is crucial.

GLUING DOWN THE FLOOR

1. It is recommended to start installation along an exterior wall, parallel to the intended plank direction. Place a mark on the subfloor at each end of the wall that is $\frac{1}{2}$ " (13mm) plus the plank face width. Snap a starter chalk line between these two marks. Cut the tongue off the planks of the first row and dry fit with flat edge facing toward the wall and the groove side flush with the chalk line. Installing with the groove out (opposite of a typical nail down installation) prevents "snowplowing" adhesive into the groove.
2. Cut spacers to fit precisely against the wall and the flat edge of the flooring at both ends of every plank and every 16"-24" (406mm - 610mm) in between.
3. Rack out (dry fit) several rows of planks, about 2' (610mm) wide (typically 4 to 5 rows of 5" wide planks - narrow enough to reach the first row after adhesive has been troweled), ensuring design consistency, randomized color, and expansion gaps around fixed objects are maintained. Stagger end joints by at least 18". Avoid creating "H" patterns (where end joints align in any alternating rows). Use cut ends to start the subsequent row, leaving $\frac{1}{2}$ " expansion gap next to all walls and other fixed objects, discarding any pieces shorter than 12".
4. Pull the rows of flooring boards away from the spacers to allow the adhesive to be spread. Place a chalk line at a distance from the starter chalk line equal to the width of the rack (dry fit rows). Trowel spread the adhesive between these chalk lines using the trowel recommended by the adhesive manufacturer.
5. Immediately install the first row of flooring, flat edge against the wall spacers, pressing the flooring firmly into the adhesive. Slide the tongue of the next row of flooring into the groove of the first row, pressing firmly into the adhesive, and continue until all rows of the initial rack have been installed. Some flooring planks may need to be tapped or pulled into place with a tapping block or pull bar. Never use a hammer or mallet directly on the edge of the plank as damage may occur.

6. Immediately clean any adhesives from the face of the flooring, following the adhesive manufacturer's recommendations. If tape is needed to hold boards together, use ONLY 3M Advanced Delicate Surfaces 2080EL Tape, and be sure to remove any tape within 20 minutes of application.
7. Prepare a second rack, repeating steps 3 through 6 (except reference to spacers), and continue the installation in this manner across the room. Trim the last row of flooring to maintain the ½" expansion space at the far wall. Be careful not to move the installed flooring out of position.
8. Once the room is finished, remove the spacers at the starter row.
9. Complete the installation by reinstalling or installing new base moldings. Follow the adhesive manufacturer's requirements for cure time prior to foot traffic and placing furniture.

NAIL DOWN INSTALLATION METHOD

If nailing down planks wider than 7", follow the Nail and Glue Method guidelines below. TerraMai Flooring can be nailed to plywood, OSB and existing wood flooring meeting the requirements outlined above under 'Subfloor Conditions.' Never attempt nailing into particleboard, chipboard, MDF, or gypsum or concrete subfloors.

NAILING DOWN THE FLOOR

1. Install 15-30 lb. roofing felt or Aquabar B underlayment per the manufacturer's instructions. Red rosin, craft paper, and foam pads are not acceptable underlayments. Failure to use a proper underlayment exposes the flooring to greater fluctuation in moisture and will lead to cupping, crowning, buckling, or other movement and will void the warranty.
2. It is recommended to start installation along an exterior wall, parallel to the intended plank direction. Place a mark on the subfloor at each end of the wall that is ½" (13mm) plus the plank face width. Snap a starter chalk line between these two marks.
3. Lay the tongue side of the first row of flooring along the chalk line, aligning the bottom edge of the flooring with the chalk line, NOT the outside edge of the tongue. Press the plank down against the subfloor and face nail (top nail) the first row of flooring in place approximately ¾" from the wall side (groove side) of the flooring board using 18-gauge nails, then blind nail through the base of the tongue at a 45° angle. Place the fasteners between 2"-3" (50mm-76mm) of each plank end, and every 4" to 6" (101mm to 152mm) in between. Face nails may be covered by the base molding and quarter round. Because the starter row and several subsequent rows may not be accessible to flooring nailers, finish nailers may be required. Ensure that each nail is set properly into the base of the tongue.
4. Rack out (dry fit) several rows of planks, ensuring design consistency, randomized color, and expansion gaps around fixed objects are maintained. Stagger end joints by at least 18". Avoid creating "H" patterns (where end joints align in any alternating rows). Use cut ends to start the subsequent row, discarding any pieces shorter than 12".
5. Move the rack back from the starter row. Begin the second row pressing the groove side of the plank over the tongue of the starter row, ensure gapping is eliminated, press down on the plank, and blind nail as described above, within 2"-3" (50mm-76mm) of each plank end and every 4" to 6" (101mm to 152mm) in between. Some flooring planks may need to be tapped or pulled into place with a tapping block or pull bar. Never use a hammer or mallet directly on the edge of the plank as damage may occur.
6. Continue the installation across the room. As soon as enough rows of planks are installed that a flooring nailer may be used, stand on each plank being nailed so that it is firmly seated against the subfloor. Any gaps between the plank and the subfloor may result in squeaking floors. After every few rows have been installed, check straightness of the last row using a laser line, level, or taught string. Even minor deviation can become augmented and cause significant gaps in subsequent rows.

7. Trim the last row of flooring to maintain the minimum expansion space at the far wall. It may be necessary to glue or face-nail the last 2-3 rows due to the angle of the flooring nailer.
8. Complete the installation by reinstalling or installing new base moldings.

NAIL & GLUE INSTALLATION METHOD

Recommended for Engineered Flooring Over 7" wide. TerraMai Engineered Wood Flooring can be nailed & glued to plywood, OSB, and existing wood flooring meeting the requirements outlined above under 'Subfloor Conditions.' Never attempt nailing into particleboard, chipboard, MDF, or gypsum or concrete subfloors.

Because the adhesive must bond to a structural subfloor, installing 15-30 lb. roofing felt or Aquabar B underlayment is not possible. Two options are available:

1. Using roll-on moisture vapor retarders, such as Bostik's Roll-Cote, then using a cartridge or sausage gun to apply adhesive, such as Bostik's BEST, Pro-MSP, or GreenForce, onto the back of the plank.
2. Full-trowel adhesive with moisture vapor retarder properties, such as Bostik's BEST or EFA+.

Failure to use a proper moisture vapor retarder exposes the flooring to greater fluctuation in moisture and will lead to cupping, crowning, buckling, or other movement and will void the warranty.

NAILING & GLUING DOWN THE FLOOR

For Roll-on moisture vapor retarders:

1. Apply the roll-on moisture vapor retarder per the manufacturer's instructions.
2. After it has dried per the manufacturer's requirements, install the flooring using the Nail Down Installation Method, but apply adhesive from a cartridge or sausage gun onto the back of each plank in an "S" pattern within 1" (25mm) of long edges and repeating every 6" to 8" (150mm to 200mm).

For full-trowel adhesives with moisture vapor retarder properties:

1. It is recommended to start installation along an exterior wall, parallel to the intended plank direction. Place a mark on the subfloor at each end of the wall that is ½" (13mm) plus the plank face width. Snap a starter chalk line between these two marks.
2. Rack out (dry fit) the starter row, positioning the planks with the tongue side of flooring along the chalk line, aligning the bottom edge of the flooring with the chalk line, NOT the outside edge of the tongue.
3. Cut spacers to fit precisely against the wall and the grooved edge of the flooring at both ends of every plank and every 16"-24" (406mm - 610mm) in between.
4. Rack out (dry fit) several more rows of planks, about 2' (610mm) wide (typically 4 to 5 rows of 5" wide planks - narrow enough to reach the first row after adhesive has been troweled), ensuring design consistency, randomized color, and expansion gaps around fixed objects are maintained. Stagger end joints by at least 18". Avoid creating "H" patterns (where end joints align in any alternating rows). Use cut ends to start the subsequent row, leaving ½" expansion gap next to all walls and other fixed objects, discarding any pieces shorter than 12".
5. Pull the rows of flooring boards away from the spacers to allow the adhesive to be spread. Place a chalk line at a distance from the starter chalk line equal to the width of the rack (all dry fit rows). Trowel spread the adhesive between these chalk lines using the trowel recommended by the adhesive manufacturer.
6. Immediately install the first row of flooring, grooved edge against the wall spacers, pressing the flooring firmly into the adhesive. Face nail (top nail) the first row of flooring in place approximately ¾" from the wall side (groove side) of the flooring board using 18-gauge nails, then blind nail through the base of the

tongue at a 45° angle. Place the fasteners within 2" (50mm) of each plank end, and every 4" to 6" (101mm to 152mm) in between. Face nails may be covered by the base molding and quarter round. Because the starter row and several subsequent rows may not be accessible to flooring nailers, finish nailers may be required. Ensure that each nail is set properly into the base of the tongue.

7. Slide the groove of the next row of flooring into the tongue of the first row. Because pushing the flooring toward the groove side may "snowplow" adhesive up into the groove, take care to begin engaging the tongue and groove before the plank contacts the adhesive. Rotating the plank down while pushing the planks together will minimize the potential for issues. Once the tongue and groove are fully seated, press the plank down firmly into the adhesive and blind nail per the nailing schedule above. Continue until all rows of the initial rack have been installed. Some flooring planks may need to be tapped or pulled into place with a tapping block or pull bar. Never use a hammer or mallet directly on the edge of the plank as damage may occur.
8. Immediately clean any adhesives from the face of the flooring, following the adhesive manufacturer's recommendations. If tape is needed to hold boards together, use ONLY 3M Advanced Delicate Surfaces 2080EL Tape, and be sure to remove any tape within 20 minutes of application.
9. Prepare a second rack, repeating steps 4 through 8, and continue the installation in this manner across the room. As soon as enough rows of planks are installed that a flooring nailer may be used, stand on each plank being nailed so that it is firmly seated against the subfloor. Any gaps between the plank and the subfloor may result in squeaking floors. After every few rows have been installed, check straightness of the last row using a laser line, level, or taught string. Even minor deviation can become augmented and cause significant gaps in subsequent rows.
10. Trim the last row of flooring to maintain the ½" expansion space at the far wall. Be careful not to move the installed flooring out of position.
11. Once the room is finished, remove the spacers at the starter row.
12. Complete the installation by reinstalling or installing new base moldings. Follow the adhesive manufacturer's requirements for cure time prior to foot traffic and placing furniture.

CARE & MAINTENANCE

After installation is complete, the flooring must be maintained properly. Permanent HVAC should be maintained between 55°F (12°C) to 85°F (29°C) and 35% to 55% RH after installation of the flooring. Vents must remain open year-round.

Any liquid spills or food should be cleaned immediately with a clean, soft cloth. Never wet mop hardwood flooring. Excessive water will damage wood flooring. Sweep, dust mop, vacuum, or wipe flooring with a slightly dampened soft cloth as needed. Please follow all requirements in the Care & Maintenance section of the TerraMai website at <https://TerraMai.com/care-maintenance>.

Factory applied polyurethane finishes and oil finishes have different requirements for proper maintenance. Please follow all guidelines in the [TerraMai Care & Maintenance of Reclaimed Wood Flooring](#).