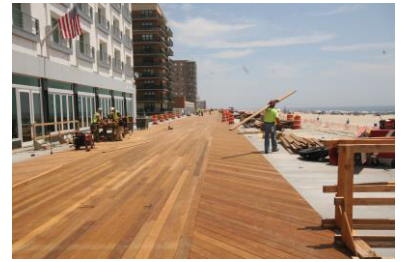
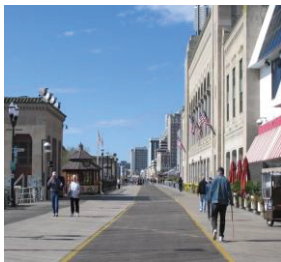


BEST PRACTICES

Installation and maintenance

All TROPICAL FOREST PRODUCTS hardwood decking and cladding products are naturally durable, each having a distinct appearance and performance profile. Naturally durable, wood decking represents the only truly renewable resource available for deck and cladding construction. Whatever TROPICAL FOREST PRODUCTS product you choose, this guide is designed to explore installation, finishing, maintenance options and best practices for naturally durable wood decking and cladding.



Best Practices

To the best of our knowledge, this information is accurate. However, due to the variance of products grown in nature, it is the sole responsibility of the installer to select the appropriate product for any given installation and site condition. Check and follow local building codes, and apply Best Practices in handling and installing TROPICAL FOREST PRODUCTS brand products. Installers should follow the manufacturer's recommended application and maintenance instructions when using the proprietary finish and fastening products. To maximize the performance and beauty of TROPICAL FOREST PRODUCTS products, please read this Best Practices guide before you begin construction. TROPICAL FOREST PRODUCTS provides Installation Section Detail Guides in CAD and PDF formats for specifiers and contractors, which address specific profiles and applications. These guides are available on our website.

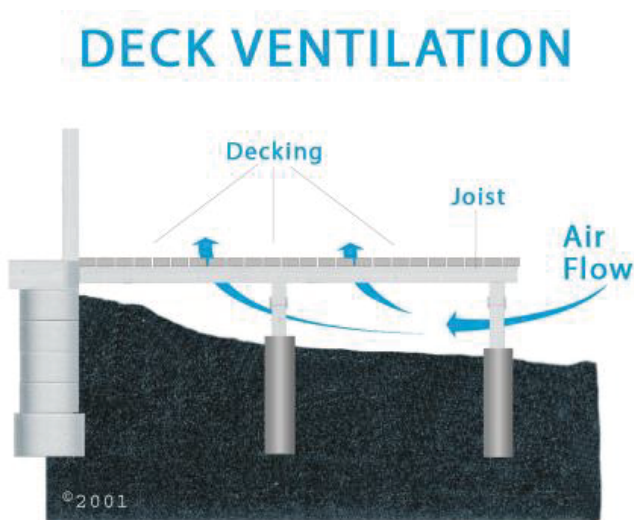
Building Code Compliance

Most municipalities have adopted or included the International Building and International Residential Codes in their own municipal building codes as the benchmark for minimum standards in design and construction. The installer must ensure that the decking design and construction methods adhere to any project-associated local residential or commercial building codes. If required, TROPICAL FOREST PRODUCTS has the technical data and submittal documents needed to facilitate the code compliance process.



Deck Ventilation

The importance of ventilation and air flow under and around wood decking and cladding in improving product stability and performance has been well understood. Adequate ventilation of the deck or cladding system is essential for long-term stability, durability, and minimizing wood movement. Air should always be able to flow freely from outside and under the deck or cladding. Fully enclosed/skirted decks can experience the same kinds of issues as decks built close to grade.



Poor Ventilation Solutions - Decking

High levels of moisture under a deck combined with the impact of the sun and heat on the surface of a deck can cause stress that can result in increased checking, cupping or twisting. Some applications simply can not avoid the reduction of ventilation by design. Decks at grade or on roofs are not that uncommon, so how do we reduce problems in these applications?

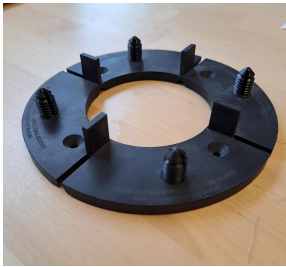
First, it is essential to understand that dimensional stability is directly related to wood thickness and width ratios.

Instability will increase as the board widens related to its thickness. For example, a 1x4 is more stable than a 1x6, and a 1x6 is much more stable than a 1x12. We know from experience that a 5/4x4 deck board, whether air-dried or kiln-dried, grooved for TROPICAL FOREST PRODUCTS deck clips, or face screwed, gives the most stable performance on poorly ventilated residential decks regardless of the fastening method. 5/4x6 face screwed will also work in most applications, but if you want to use hidden fasteners, 5/4x4 is the best choice. You may also wish to consider using TROPICAL FOREST PRODUCTS DECK TILES screwed and plugged to double stringers placed 24" on center as not only a solution to poor ventilation, but a highly cost effective deck solution.

Using shorter-length decking also provides a highly cost-effective and unique deck construction option.

TROPICAL FOREST PRODUCTS DECK TILES are available in 24"x24", 24"x48" and 24"x72". Deck tiles can be installed to on the Elevate pedestal system to create a wide range of designs and patterns.

You may also wish to consider the use of TROPICAL FOREST PRODUCTS DECK TILES on stringers for conventional decks or deck tiles applied to our Elevate™ Pedestal Systems which are specifically designed for less well-ventilated applications. TROPICAL FOREST PRODUCTS DECK TILES were developed specifically for poorly ventilated commercial and residential deck construction. They are prefabricated using wood slats that have a very stable thickness to width ratio using stainless steel fasteners.



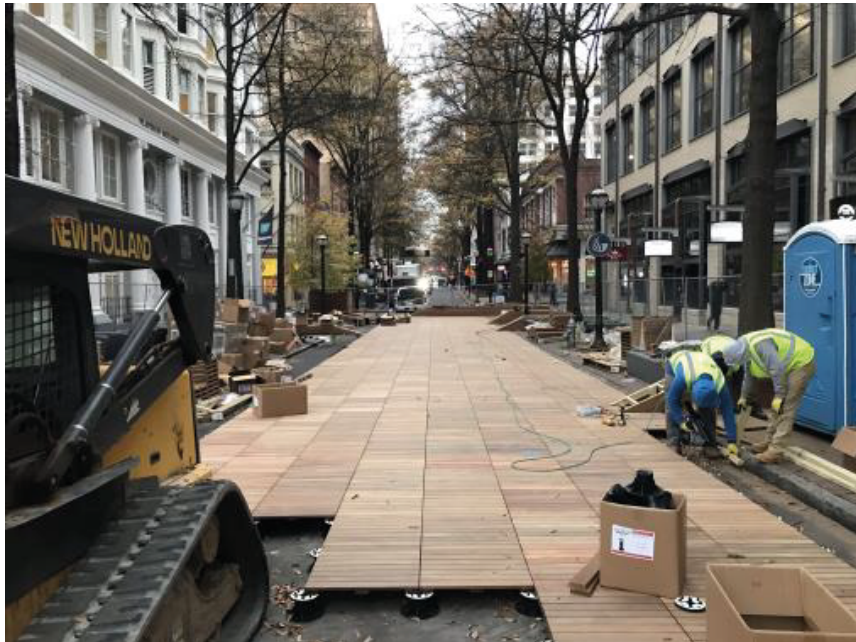
Elevation EPDM Pedestal



Elevate Star Pedestal



Elevate Srew Jack Pedestal - Self Leveling SE and fixed NM options



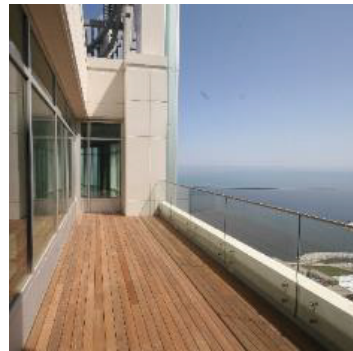
TROPICAL FOREST PRODUCTS ELEVATE™ PEDESTALS are available from 1/4" to 21" in height and can accommodate slopes up to 5 degrees.

At Grade Decks.

If you want to build a deck literally at grade, a cost-effective solution is to pour a concrete slab or cover an existing slab by applying TROPICAL FOREST PRODUCTS DECK TILES on Elevate™ EPDM or STAR pedestals directly over the top. Deck tiles can also be applied directly on top of existing wood decks to bring their beauty back without a complete rebuild, as long as the existing deck is structurally sound.

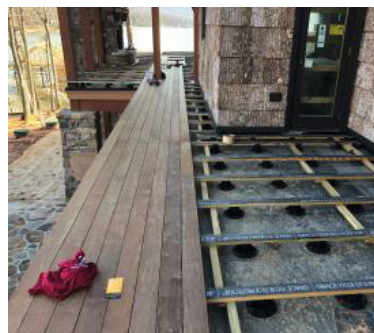
Roof Decks

Roof decks are incredibly challenging. 5/4x4 hardwood decking applied to 5/4x4 hardwood or 2x4 treated stringers laid flat on TROPICAL FOREST PRODUCTS ELEVATE™ pedestals is an excellent solution for poorly ventilated roof decks. Stringers should never be laid directly on roof membranes as they prevent the free flow of water over the roof surface greatly reducing their service life.



Building a Deck over Dry Space

The market is full of products designed to create a dry space under your deck. If you want to build a deck over a dry space, the best practice is to build a roof structure with a waterproof membrane and install your deck on top of it using a roof deck system with conventional decking or deck tiles. The added benefit of building a Dry Space Deck in this manner is that you can apply porch ceiling materials in a conventional manner below your deck.



Posts, Beams and Stringers.

When selecting sub-structure materials, a material that will last as long as TROPICAL FOREST PRODUCTS decking is crucial; naturally durable hardwoods or high grade pressure treated softwoods with higher treatment retentions like .40 (preferably dried after treatment) that are rated for "ground contact" are excellent options. Light gauge galvanized steel and aluminum framing systems are also now in use but may make decking attachment more challenging than wood options.

The use of naturally durable hardwoods for framing, common in commercial applications, has been growing in residential applications, given its durability and natural resistance to fire. As such, structurally engineered and certified decking, stringer, and beam span tables have been developed for those who wish to consider naturally durable hardwood framing as an option.

Stringer Spacing (Distance Between Stringers)

In addition to the allowed deck span, there are other issues to consider when deciding on stringer spacing. A minimum of 1.5" of support under each board end at butt joints is critical for a proper deck to stringer connection when using decking products that do not include a structural end match (SEM) joining system. Providing sufficient ledge allows fasteners to sit back $\frac{3}{4}$ " from the butt joint or, in the case of hidden fasteners, allows for the proper use of BLACK LABEL™ PRO DECK CLIPS properly secured through the deck boards creates a mechanical connection between deck boards which prevents movement (snaking at the butt joint that is a common problem with other deck clip designs).

Existing decks will likely have stringers spaced 16" on center, as this has been the design standard for many years. In these circumstances, it is still recommended to 'sister' on a second stringer at any location where decking butt joints will occur.

12" or 16" 'On Center' stringer spacing is a good design when using 1" Nominal (net $\frac{3}{4}$ ") thick TROPICAL FOREST PRODUCTS decking purchased at random lengths in 1' length multiples, laying decking in a diagonal pattern, or using decking that includes Structural End Match (SEM) Joints, which allow for decking boards to butt with each other at any point mid-span between stringers. You will find SEM Joints in our TROPICAL FOREST PRODUCTS MODULAR DECK SYSTEM, TROPICAL FOREST PRODUCTS THERMAX ASH, and TROPICAL FOREST PRODUCTS THERMAX BAMBOO decking products.

Double Stringers Spaced 24" 'On Center' is the best practice when installing TROPICAL FOREST PRODUCTS decking in 1" Nominal (net $\frac{3}{4}$ ") thick when running decking perpendicular to stringers in even length multiples and 5/4" Nominal (Net 1") thick when running decking perpendicular or diagonal to stringers.

For new construction utilizing TROPICAL FOREST PRODUCTS PREFABRICATED DECK TILES/PANELS, we recommend using doubled stringers 24" on center. This system combines the cost-saving benefits of using TROPICAL FOREST PRODUCTS PREFABRICATED DECK TILES (lower sq. ft. material cost), fewer fasteners (one Pro Plug per square ft.), and reduced labor costs.

Selecting Treated Wood For Use With Naturally Durable Wood Decking

It is a common practice to use pressure treated softwoods like Southern Yellow Pine for the structural components in deck construction. Taking into account the extended service life of Naturally Durable Hardwoods like Ipe it is the best practice to minimally use softwoods which are treated for ground contact such as AWP A U1 UC4A (MCA or C-AC) 0.15 PCF Retention or Equal.

Structural service life can be extended even further by using treatments for Salt Water Application such as AWP A UC5B .23 PCF MCA Retention or with AWP A UC4B CCA 0.60 PCF Retention or Equal. For applications with proximity to salt water CCA is recommended for all structural members. Framing and support members that will regularly be submerged in salt water should be UC5B 2.5 PCF CCA treatment.

In addition to using ground contact or critical structure components for framing it is good practice to use a joist tape to cap the joist with at least a 3/4" overlap on each side of the joist. Adding the joist tape should extend the length of service of framing members by delaying rot and water intrusion.

AWPA Category Use Chart Including Commercially Available Treatments Grade - SYP #1

Use Category	Service Conditions	Use Environment	Common Agents of Deterioration	Typical Applications	Examples of Treatment/Retention Rates(pcf)
UC4A	Ground Contact or Fresh Water, Non-Critical Components	Exposed to all weather cycles, normal exposure conditions	Decay, fungi, insects	Fence, deck, guardrail posts, cross ties, utility posts(low decay areas)	.15 MCA .15 CA-C(dissolved) .40 ACQ
UC4B	Ground Contact or Fresh Water, Critical Components or Difficult Replacement	Exposed to all weather cycles, high decay potential including salt water splash	Decay, fungi, insects with increased potential for biodeterioration	Permanent wood foundations, building poles, horticultural posts, crossties, and utility poles.	.60 CCA .23 MCA .31 CA-C (dissolved) .80 CCA(boards and timbers) .60 ACQ
UC4C	Ground Contact or Fresh Water, Critical Structural Components	Exposed to all weather cycles, severe environments, extreme decay potential	Decay, fungi and insects with extreme potential for biodeterioration	Land and fresh water piling, foundation piling, crossties, and utility poles(severe decay areas)	.80 CCA(piling only)
UC5B	Salt or Brackish Water New Jersey through Georgia on East Coast	Continuous marine exposure (salt water)	Salt water organisms including Limnoria Tripunctata	Piling, bulkheads, bracing	2.5 CCA

Exerpts from AWP A U1-17, Use Category System: User Specification for treated wood, Table 2-1

Ledger Joist and Stringer Flashing

When using wood deck framing, it is important to apply BLACK LABEL™ JOIST TAPE to Ledgers and Stringers to eliminate the harboring of moisture at wood contact points between stringers and decking. Ledger joist and stringer flashing also reduces the corrosive reaction between treated wood stringers and galvanized steel joist hangers. Follow manufacturer's instructions for application.



Attachment of Wood Decking to Metal Framing

The introduction of metal framing systems requires a different approach to fastening. Where hardwood decking is concerned, hidden fasteners are not an option as the angle of the screws through the wood make screw penetration into the steel more difficult. Hidden fasteners can be used with thermally modified decking products which do not require the use of angled screws. Face screwing or face screw will require pre-drilling metal stringers. Use BLACK LABEL™ STAINLESS STEEL SCREWS as required. Hardwood decking is as much as t

Set screws at slow speed. Do Not over torque screws. Do not use impact drivers for screw installation.



DESIGN INFORMATION TROPICAL FOREST PRODUCTS DECKING SPANS

MAXIMUM ALLOWABLE SPANS			
TROPICAL FOREST PRODUCTS DECKING SPECIES - TROPICAL			
ALL GRADES			
Deck		Loading	
Thickness	60 psf	100 psf	500 psf
0.75 in	27 in	24 in	12 in
1.00 in	39 in	33 in	18 in
1.50 in	57 in	48 in	27 in
2.50 in	96 in	81 in	48 in
3.50 in	135 in	114 in	66 in

Wood Selection

Not all wood is created equal. Species selection and grade will have a significant impact on both the appearance and performance of any project. Select a wood species that meets the definition of "Naturally Durable" under the International Building Code and International Residential Code compliance requirements like TROPICAL FOREST PRODUCTS Premium Select Architectural Grade - Ipe, Garapa, Cumaru, Tigerwood, Bulletwood, Jatoba, Red Balau, Itauba, Angelim Pedra, Thermax Ash, Kebony, or High-Density Thermax Bamboo.

Color and Grain Variation

Color and grain variation are typical of materials created by nature and are recognized as part of the beauty that sets natural products apart from manufactured ones. This is particularly true where wood products are concerned, though some species have more or less color variation than others. This should always be considered when looking at wood samples, as TROPICAL FOREST PRODUCTS wood products are supplied with a mixed grain and are not sorted for color. You can get some color consistency by sealing the wood or allowing the wood to weather or grey out naturally.



Grade Selection

Grade selection and specification will significantly impact the appearance and performance of wood products in any given application.

The highest quality standards, grading rules, and specification language for architects and other specification professionals have become synonymous with the TROPICAL FOREST PRODUCTS brand.

When naturally durable wood products are specified or purchased without clearly defined grade expectations, there is no assurance that you will receive products that meet aesthetic or technical performance requirements. And since grade affects price and performance, what looks like a good deal on paper might not perform as expected.

Based upon our published grading rules and ASTM D143 physical properties testing, Tropical Forest Products has developed certified ASTM D245 Allowable Design Values by grade. It is important to note that TROPICAL FOREST PRODUCTS Premium Select Architectural Grade hardwood decking has almost twice the bending strength of generic FAS grade hardwood decking. Because of the establishment of definitive grading rules, TROPICAL FOREST PRODUCTS products are engineered to perform as designed.

We strongly encourage specifiers, consumers, and contractors to utilize these standards in their decision making process and to specifically reference these standards in their purchase orders for naturally durable wood decking.

Grade Selection – Grading Rule Definitions

Naturally durable wood products possess natural "Appearance Characteristics" that add to their unique beauty. Those that are appreciated include color variation and distinctive grain patterns. Other characteristics in all types of lumber that develop naturally or through manufacturing are known as "Physical Characteristics," "Sound Defects," "Unsound Defects," and "Milling Defects." The following is a summary of the typical characteristics one might find in a wood grade specification.

Appearance Characteristics

- 1) Color variation
- 2) Mixed grain
- 3) Drying checks
- 4) Reverse Grain (Un-torn)
- 5) Birdseye
- 6) Pin knots
- 7) Water stain
- 8) Discoloration
- 9) Sticker marks
- 10) Molder knife marks

Physical Characteristics

- 1) Bow
- 2) Crook
- 3) Cup
- 4) Twist

Milling Defects

- 1) Skip
- 2) Torn grain
- 3) Non-compliant profiling

Sound Defects

- 1) Pin holes
- 2) Sound knots
- 3) Reverse Grain (Torn)

Unsound Defects

- 1) Large borer holes
- 2) Splits
- 4) Unsound knots
- 5) Shake
- 6) Sapwood

Available Naturally Durable Wood Grades

TROPICAL FOREST PRODUCTS Premium Select Architectural Grade

TROPICAL FOREST PRODUCTS PREMIUM SELECT ARCHITECTURAL GRADE ... Hand Selected Clear Mixed Grain Appearance on 4 Sides and 4 Edges.

- Grading Face, Back Face, and Edges – Free of Open Heart, Free of Sapwood.
- Include - Appearance Characteristics.
- Include - Physical Characteristics which can be removed using normal installation methods, tools, or sanding.
- Exclude - Sound Defects.
- Exclude - Unsound Defects.
- Exclude - Milling Defects.
- For Structural Application – Not Allowed...pin knots bigger than ½" at any face and/or edge, the maximum permitted slope of grain 1" in 10", length of end split, and surface split shall be as per ASTM D245 (5.43).

FEQ Commercial Grade

Tropical Forest Products FEQ (First Export Quality) - Commercial Grade...Free of Heart Center, Free of Sapwood on 1 Face and 2 Edges.

- Include - Appearance Characteristics
- Include - Physical Characteristics that can be removed using normal installation methods, tools, or sanding.
- Include - Sound Defects
- Grading Face – Clear All Heart:
- Exclude - Unsound Defects
- Exclude - Milling Defects
- Back Face and Edges:
- Include – Unsound Defects
- Include – Milling Defects
- For Structural Application – Not Allowed...knots bigger than $\frac{3}{4}$ " at narrow face or edges, centerline knots bigger than $1\frac{3}{4}$ " wide face, edge knots bigger than $\frac{3}{4}$ " at the wide face, the maximum permitted slope of grain 1" in 8", length of end split and surface split shall be as per ASTM D245 (5.4.3)

Mill Run Grade FAS (First and seconds) – Uninspected

FAS represents the standard market export grade produced by the mills and offered by many importers and is typically uninspected. First and seconds ratio is undefined. It is not uncommon to hear FAS qualities described as Prime, #1, Select, First Quality in the open market. Without clearly defined grading rules, these terms have no meaning.

- Include - Appearance Characteristics.
- Include - Physical Characteristics which can be removed using normal installation methods, tools, or sanding.
- Include - Sound Defects.
- Include - Unsound Defects.
- Include - Milling Defects.

For Structural Application – Not Allowed...knots bigger than $\frac{3}{4}$ " at narrow face or edges; centerline knots bigger than $1\frac{3}{4}$ " at the wide face; edge knots bigger than $\frac{3}{4}$ " at the wide face. The maximum permitted slope of grain 1" in 6", length of end split and surface split shall be as per ASTM D245 (5.4.3).

Wood Acclimation

Wood dries by the movement of free water through fiber cavities, fiber walls, and the movement of water vapor through the wood. Because wood is not homogeneous, it shrinks more along the growth rings (radial) than across the rings (tangential). Tangential (width) dimensional change is often nearly twice that of radial (thickness) movement for wood species, and (longitudinal) dimensional change in wood is almost always negligible. Uncontrolled acclimation may cause drying characteristics like movement and checking. Shrinkage and swelling cease as the moisture content of wood approaches equilibrium with its environment.

Species of wood vary in the rate and amount of shrinkage during the drying process. To minimize shrinkage, warping, checking, and splitting in the finished product, lumber must be acclimated to the middle of the range of expected in-use moisture content in a controlled way. This can occur by either air drying or kiln drying the lumber. The drying characteristics depend on the species and the rate at which the lumber dries. For much of the United States, the point of equilibrium in an exterior environment is between 12% and 14%. For the seasonal EMC (equilibrium moisture content) levels in your region, a copy of the US Forest Products Laboratories document titled "Equilibrium Moisture Content of Wood in Outdoor Locations" is available in our Resources Library.

Larger dimensional lumber sizes and timbers may show deeper checks during the acclimation process, which typically reduces once the wood reaches equilibrium. Kiln-dried decking, having been pre-acclimated, tends to be less subject to checking than air-dried decking.

Kiln-Dried or Thermally Modified Decking Versus Air-Dried Decking

Kiln Drying is the method in which most wood species are stabilized by removing the free moisture in the lumber by accelerating the lumber drying process to what would be the natural ambient equilibrium moisture level of the woods service environment. For example, lumber used for flooring and indoor furnishings is typically kiln-dried to a moisture content of between 6% and 8%, as equilibrium is generally controlled through heat and air conditioning to this range. Lumber for outdoor use is typically kiln-dried to a moisture content of between 12% and 14%, as outdoor climates' natural ambient equilibrium levels fall within this range. Therefore virtually all wood decking species require kiln drying to create dimensional stability, with one exception... Ipe. Ipe *Tabebuia* spp. – Lapacho group is unique as a wood species in that it is incredibly stable as it acclimates to ambient equilibrium, which is why Ipe is sold as both air-dried and kiln-dried decking. Ipe is very difficult to kiln dry, so Ipe dimensioned lumber 2" nominal (1.5" net thickness), and thicker is typically only available air-dried.

Air-dried decking is packaged for export with drying sticks between layers, which may leave sticker marks and dirt stains on the decking. These sticker marks are normal in air-dried decking and can be removed by light sanding or by weathering over time.

Some mills saw their own logs and process their own decking. This means that their air-dried decking is, in fact, what we call "Green" and has a moisture content of typically between 30% and 40% when run to decking profile.

Some mills are finishing mills that buy their sawn molding blanks from a sawmill, which means their decking will be run from partially air-dried lumber that could have a moisture content of between 25% and 35%.

TROPICAL FOREST PRODUCTS mills provide the option of kiln drying the rough sawn decking or cladding blanks to 12-14 percent or pre-stabilizing the decking or cladding blank to equilibrium before molding.

For example, two mills have run 1x6 deck board to net .75" inches in thickness and 5.5" in width; one is air-dried, and one is kiln-dried.

Kiln-Dried decking has the benefit of already being pre-stabilized at the higher end of the equilibrium moisture content range for outdoor applications. It will roughly maintain its starting thickness and width before, during, and after installation or experience minor shrinkage in a climate with an extremely low equilibrium.

The air-dried decking will typically reach equilibrium after installation, with the partially air-dried decking shrinking less than the green decking. By experience, this shrinkage runs between 1/8 and 3/8 inches in width on a net 5.5" wide deck board. In most cases, this is not a problem when face fastening Ipe. However, it can become problematic when using hidden fastening systems, as the hidden fasteners will become more visible, and the decking can shrink itself off the deck clip, causing the deck to fail and require post-installation face screwing to repair. This becomes even more problematic in arid climates where equilibrium may be in the 12% range. 40% to 12% is significant, particularly when installed using hidden fasteners, as decking may shrink beyond the clip's ability to hold the decking.

Again, Ipe is dimensionally very stable green to dry, so warp, twist, and bow are not significantly impacted by selecting air-dried vs. kiln-dried Ipe decking. Width consistency and reduced potential for cupping are the benefits of kiln-dried decking. It is important to note that kiln-dried decking can shrink when the equilibrium on site is below 12%. It will, however, shrink much less than air-dried. Kiln-dried, which is dried below the equilibrium of the installation site, will be equally subject to expansion at the time of installation unless the wood has been allowed to acclimate.

Virtually all other wood species in the world are less dimensionally stable green to dry as Ipe. This is why all TROPICAL FOREST PRODUCTS Decking and Cladding species including Ipe are kiln-dried.

Advanced Wood Technology like thermal modification takes non-durable wood species like pine, ash, mahogany, and bamboo and super-heats them in specialized thermal modification kilns. This process cooks the natural sugars out of the wood and closes the cell structure to prevent water absorption. Thermally modified woods are incredibly stable.

Pre-Installation Handling and Storage

Wood products should be stored out of direct sunlight, rain, or snow, kept clean, dry, and off the ground prior to installation. A moisture barrier should be placed on the ground under the wood products to prevent condensation inside the packaging while stored on site. Allow wood products to acclimate and stabilize to equilibrium humidity levels before installation to reduce post-installation movement.

Be aware that wood contains tannins and natural oils that may react to rainwater, causing staining on concrete or other surfaces where decking is stored if exposed to rain. Typically, these stains can be removed with bleach and water, oxalic acid, hydrogen peroxide, or OxyClean. Test cleaning solutions on a small area first and follow the manufacturer's instructions.

Reinstallation Handling and Storage

Wood products removed after years of use for re-installation or re-purposing will likely have reached equilibrium moisture content. A moisture barrier should be placed on the ground under the wood products to prevent water condensation inside the packaging while stored on site. Allow wood products to acclimate and stabilize to equilibrium humidity levels before reinstallation to reduce post-reinstallation movement.

Store removed wood products from direct sunlight, rain, or snow, kept clean, dry, and off the ground before reinstallation. Wood products should be stacked in a well-ventilated location with dry wood stickers/slats not less than ½" in thickness or more than 1.5" in width and placed no more than 24" on center between each row of wood. Do not densely pack wood products after removal as any surface moisture trapped in the unit may result in destabilization, potential mold growth, and/or water stains. The likelihood of sticker marks will increase the longer the wood is stored between removal and reinstallation. It is reasonable to expect some movement of the wood upon removal, as tension, addressed during initial installation, will be released upon removal. Re-install wood products as per the chosen fastener manufacturer's instructions.

Decking Installation

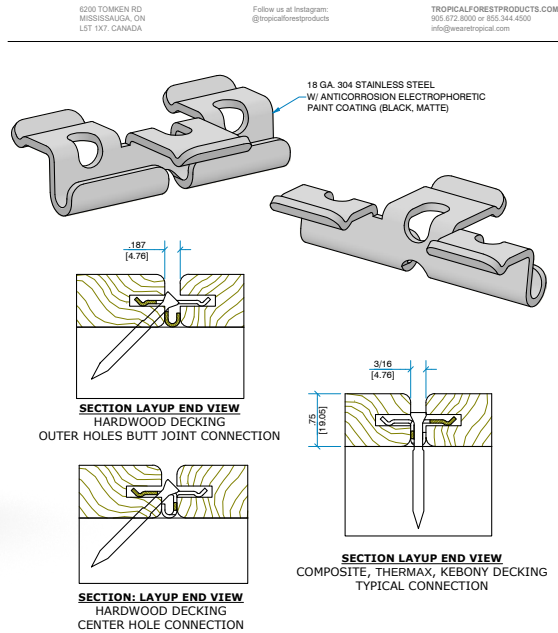
Cutting and End Sealing

Use sharp carbide tipped finish cut saw blades to reduce tear. Seal all ends immediately after cutting with BLACK LABEL™ END SEALER in order to reduce end checking. You can typically expect to seal between 200 and 300 board ends per can.



Deck Board Spacing (Distance/Gap Between Deck Boards)

A /gap between deck boards of 3/16 to 5/32" is ideal for most TROPICAL FOREST PRODUCTS deck installations. This spacing is either achieved through the use of BLACK LABEL™ DECK CLIP hidden fasteners or by use of the BLACK LABEL™ DECK SPACER AND MARKING GUIDE. These guides not only set board spacing they also function as a guide to mark screw placement.



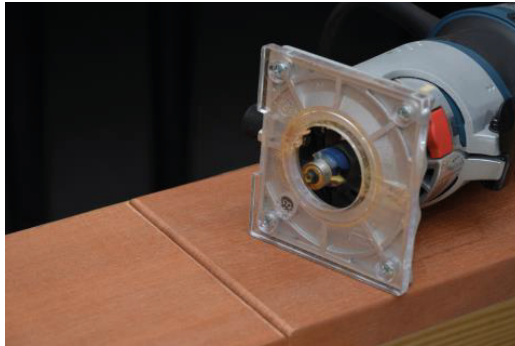
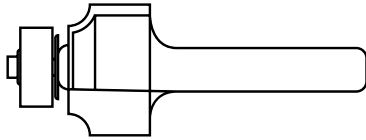
Bow Removal

Bow is a natural characteristic of wood decking and can easily be removed during the decking installation process with the use of a deck wrench.



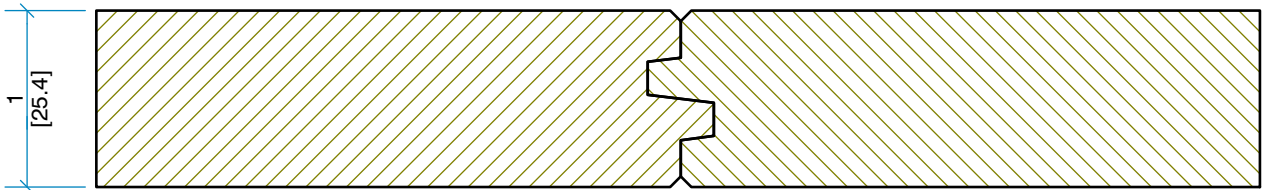
End Matching and Butt Joints

For the best appearance, we recommend routing the board ends with a 1/8" radius using the TROPICAL FOREST PRODUCTS PRO ROUTER BIT, which can be found in the BLACK LABEL™ TOOL KIT. All you need is a small hand router. This process prevents a hard edge from developing where the boards butt together, similar to engineered wood flooring. Taking it one step further, we have also seen contractors use biscuits or dowels to eliminate any potential for movement at the butt joints. BLACK LABEL™ DECK CLIPS provide the same benefit. Butt joints, either face or blind fastened, must be blocked by adding a sister joist or double stringer. This allows for proper fastener placement and avoids the placement of fasteners too close to a butt joint, which occurs when attempting to attach both boards to a single joist.



Structural End Match (SEM Joint)

Some wood decking products like Thermax Ash come with what is known as a SEM Joint or Structural End Match. This joint design is engineered to allow butt joints to lay anywhere they fall (mid joist) without diminishing the structural integrity of the decking board. Stringer spacing is typically limited to 12" for 1x6 decking and 16" for 5/4x6 decking.



Drilling

Holes should be drilled as far from the board ends as possible to reduce end splits from over torque of screw heads. ¾" is a good 'minimum' offset. High-speed (2500-4000 rpm) drills that maintain consistent drilling speeds, along with TROPICAL FOREST PRODUCTS FAST SPIRAL BITS, are recommended for drilling holes as they eject the wood fiber more efficiently than conventional spiral bits. This helps reduce the heat buildup, which can shorten the service life of the bit.

Even though stainless steel fasteners are more corrosion resistant than galvanized or coated steel fasteners, they are softer and more likely to twist off or break without proper pre-drilling. When screwing softwood to softwood, like Kebony™ to pressure-treated stringers, the wood fiber does not create enough stress to twist off stainless steel screws, and pre-drilling, while the best practice, may not be necessary. That said, pre-drilling softwoods like Kebony™ reduces the tension on the wood fibers caused by screw penetration and reduce the risk of post-installation wood splits. This is particularly important on the board ends.

Hardwoods, on the other hand, should always be pre-drilled. While there are claims in the market that there are screws that will self-drill through hardwood decking, cracking is often likely to occur when the heads are set into the boards.

Pre-drilling and countersinking will always yield superior results. When pre-drilling hardwoods, it is recommended that the fastener be able to drop through the top board without the threads penetrating the fiber. This eliminates stress to wood fiber caused by oversized fasteners. This is doubly important when fastening hardwood to hardwood. It is important to remember to only drill through the decking and not into the stringer when attaching to pressure-treated stringers. Hardwood stringers will need to be pre-drilled.

The chart below lists the fastener diameter by type number with the appropriate drill bit diameter by wood type.

Fastener Diameter/Type	Bit Diameter/Softwood	Bit Diameter/Hardwood
#7	11/64	3/16
#8	3/16	7/32
#10	7/32	15/64
#12	15/64	17/64
#14	17/64	9/32
0.276"	9/32	19/64

Jobber Style Fast Spiral Bits work well for drilling through hardwoods if you are not going to penetrate the substrate, as in the case with pressure-treated or other softwood stringers, studs, or sheathing. When fastening to softwoods, the fastener will penetrate easily without pre-drilling.

Taper Point Bits are best when fastening hardwood to hardwood where you need to pre-drill the substrate. With a taper bit, after pre-drilling the decking with a Jobber Style Bit, you ensure the fastener has enough fiber to create a good connection while reducing the friction that can cause screws to twist off or break.

Counter sinks are used to set the screw head into the face of the board by creating a V-shaped cut. This not only permits the screw head to rest flush or beneath the face of the board, but it also lowers the tension placed on the wood fiber by sinking a screw into a board without a countersink. Any over-tension from the fastener to the wood fiber can cause boards to split. For hardwoods like TROPICAL FOREST PRODUCTS, we have found that countersinks with 2 flutes perform better and last longer than those with 4 flutes as the steel per flute is larger and stronger.

The Smart Bit System incorporates Fast Spiral Bits, Countersink and Drill Stop into one convenient tool.



Variable Speed Drill



Smart Bit System



Jobber Bit w/stop



Fast Spiral
Taper Bit



Counter
Sink



Bit with
Countersink

BLACK LABEL™ TOOL KIT

When it comes to tools, professional carpenters know that you get what you pay for. Tropical Forest Products takes the guessing game out of the equation. With our Professional Grade BLACK LABEL™ TOOL KIT, you'll have access to all the high-quality bits and tools you need

to achieve the best possible result for any Tropical Forest Products Deck installation. You won't have to travel to the lumber yard to get what you forgot. One Kit provides all the bits and accessories you need for a successful build in a single can.

When paired with BLACK LABEL™ Professional Grade fastener options, you can achieve the professional outcome that homeowners hope for.



Drilling Posts and Timbers

Heavy duty drills (0 -1000 rpm) with auger-style bits are recommended for heavy timber drilling. Cordless drills can be used; however, bit life will diminish at slower speeds.



Fastening

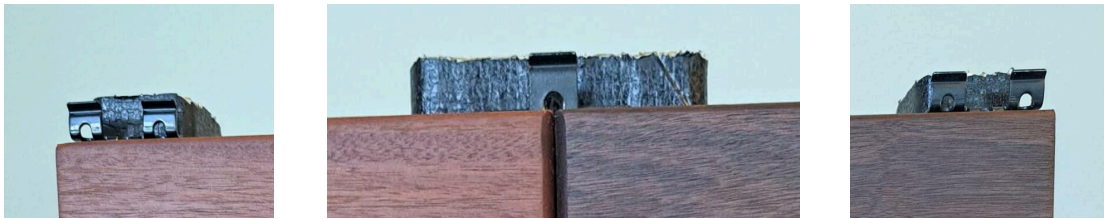
Not all fasteners are created equal. There are many fastening options and systems available on the market today. Fastener selection will significantly impact the outcome of any deck installation. It is critical to ensure that the fastener is appropriate for the deck material that is being installed. Tropical Forest Products fasteners are state of the art and designed to provide superior results and superior performance over time.

Selecting Screw Material

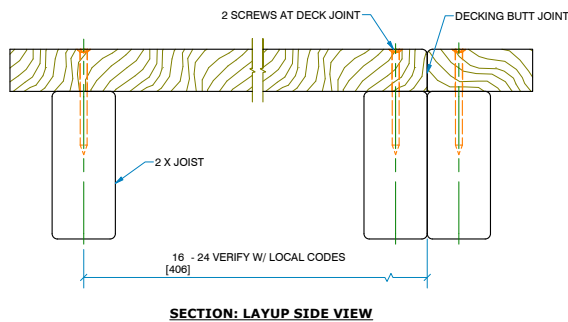
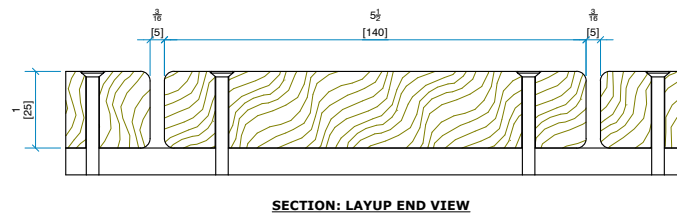
The use of high-quality Tropical Forest Products T305 or T316 stainless steel fasteners is recommended to provide superior service life and avoid potential galvanic reaction issues related to the connection of naturally durable wood products with treated softwood substructures. Staining, which may occur due to the interaction between the natural tannins in the wood, will be reduced by using high-quality T305 or T316 stainless steel. T305 stainless steel is stronger than T316, but T316 stainless steel is slightly more resistant to corrosion caused by salt spray and is therefore recommended for construction in coastal environments. Strength can be increased in both T305 and T316 stainless by increasing the diameter of the screw shank. As an example Black Label™ offers a #7 305 stainless steel screw with our 305 stainless Pro Deck Clips and a #8 316 stainless screw for the pre-drill counter sink and screw method of installation. Regardless of the fastening system selected, performance evaluation and selection are the responsibilities of the specifier or installer.

Pre-Drill, Countersink, and Screw Method

Pre-drill and countersink two holes per deck board intersection with stringer. Install self-drilling trim head or flat head screws. Drilling and screwing through the face of the deck boards provides the strongest mechanical connection. It is always recommended that you pre-drill and pre-countersink the ends of the board when using any type of system, as the ends are the most susceptible to splitting. Be sure not to over torque the screws as the head may cause the board to split. Some tools, like the BLACK LABEL™ SMART BIT SYSTEM, which can be found in our BLACK LABEL™ TOOL KIT, prevent over countersinking or over torque. Typically, commercial decks are constructed using the face screw method. Stainless steel fasteners are now available in both natural stainless steel (for letting the deck weather naturally) and brown head coated (for blending beautifully with wood-finished deck colors).



Set screws at slow speed. Do Not over torque screws. Do not use impact drivers for screw installation.

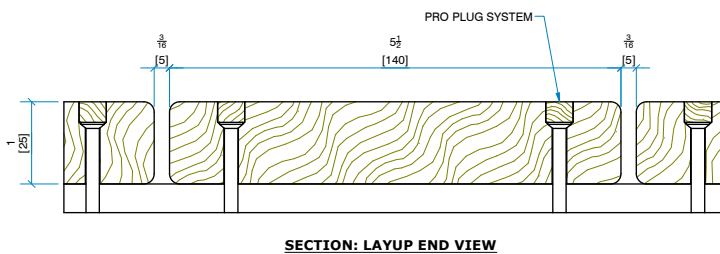
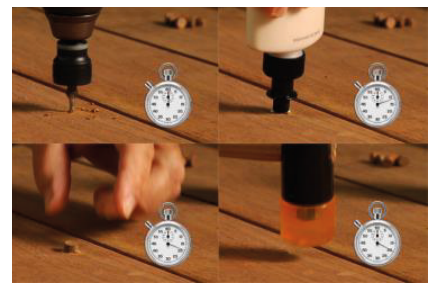
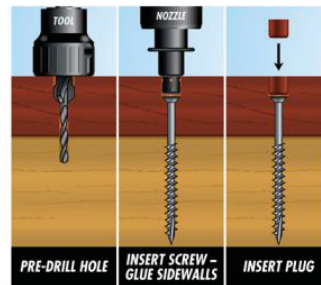


Drill Bit, Countersink, and Drill Stop Tool prevents over drilling.
Depth Setter Tool prevents board splitting from the overset of the screw head.

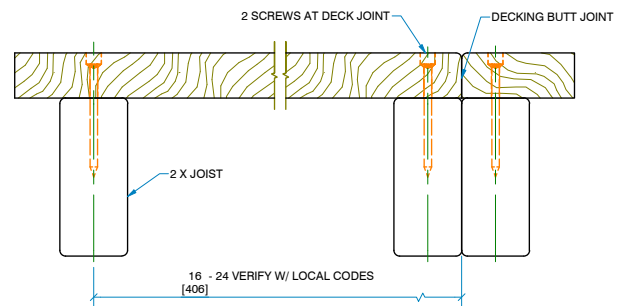
Drill, Screw, and Plug Method

The drill, screw, and plug method has all the mechanical benefits of the drill and screw method. However, the countersinks are deeper to allow the application of adhesive and a wood plug to cover the screw head. Typically used in wood boat deck construction, this method offers a unique appearance. BLACK LABEL™ screws and plugs come in a variety of packs and our BLACK LABEL™ PRO-PLUG tools are available in our BLACK LABEL™ TOOL KIT making the drill screw and plug method a breeze to use. Drilling and plugging are recommended for all deck thicknesses and dimensions.

Set screws at slow speed. Do Not over torque screws. Do not use impact drivers for screw installation.



SECTION: LAYUP END VIEW



SECTION: LAYUP SIDE VIEW



Hidden Fasteners Tropical Hardwood Decking

It is essential to understand that hidden fasteners are not entirely hidden. You will see the fastener and screw head between the boards. Clips and screws are more visible when using 1x4 or 1x6 decking than on 5/4x4 and 5/4x6 decking. Using air-dried decking with hidden fasteners is not recommended, as shrinkage may reduce the contact surface between the clip and the deck. We do not recommend the use of 1x6 (net .75"x5.5") or what is marketed as 1x6+ (net 21mmx5.5") air-dried decking as these dimensions have a greater potential for cupping than 5/5x4 or 5/4x6 or 1x6 kiln-dried decking.

Hidden Fasteners

Typically referred to as "hidden fasteners," this method requires either biscuit cutting at the clip location or grooving a slot down the entire length of the board.



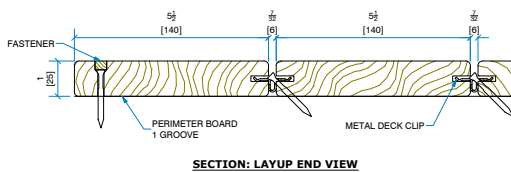
BLACK LABEL™ DECK CLIP
SCREWS



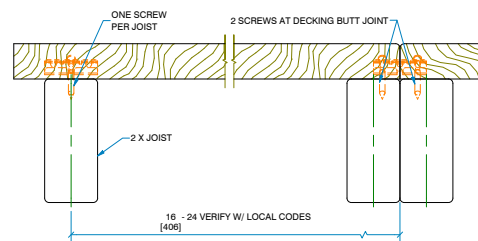
BLACK LABEL™
DRILLING GUIDE



BLACK LABEL™
DECK CLIP



SECTION: LAYUP END VIEW



SECTION: LAYUP SIDE VIEW

The BLACK LABEL™ DECK CLIP is made of 305 stain less steel. When paired with Black Label™ 305 STAIN LESS STEEL TRIM HEAD SCREWS, they produce a winning combination that prevents galvanic reaction and corrosion of screws and fasteners in all conditions and when attaching to treated wood. The BLACK LABEL™ PRO DECK CLIP has a unique 3/16" spacing, 3-hole design that creates a mechanical connection at butt joints and eliminates the risk of board snake. Because a mechanical connection is made between board and stringer, deck spacing remains consistent throughout the deck's life.



BLACK LABEL™ Pro Deck Clips unique state of the art design provide the only deck clip to installers that creates a mechanical connection that prevents board shift at the butt joints and a smooth board to board transition. When used with the Black Label™ Pro Deck Clip Tool Kit and Drilling Guide ease of installation is assured.

BLACK LABEL™ DECK CLIPS create a mechanical connection between the deck board and stringer on one side by applying a screw through the clip and a pre-drilled hole through the deck board at a 45-degree angle. The TROPICAL FOREST PRODUCTS DRILLING GUIDE is the ideal tool for pre-drilling the boards properly for installing BLACK LABEL™ DECK CLIPS. Pre-drilling the deck board is required. The TROPICAL FOREST PRODUCTS FAST SPIRAL BITS AND DRILL STOP will set the drill bit depth so that you will not drill into treated softwood, and screws will seat properly. **Set screws at slow speed. Do Not over torque screws. Do not use impact drivers for screw installation.**

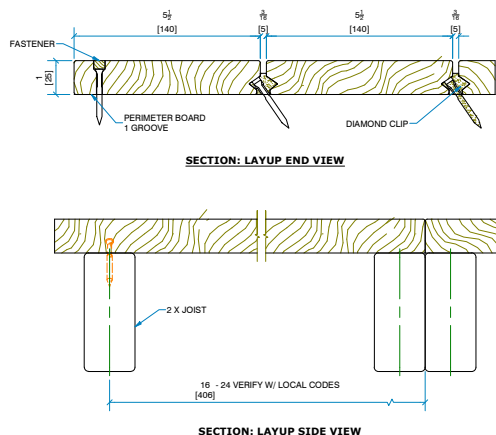
When using tropical hardwood decking, avoid hidden fastening systems that do not require some kind of mechanical connection between decking and stringer, as such systems allow the decking to shift, creating irregular and inconsistent deck spacing and butt joint matching. BLACK LABEL™ DECK CLIPS with 2 screws must be used at all butt joints so that both boards have a mechanical connection.

Hidden Fasteners Thermally Modified Wood

Thermally modified woods like TROPICAL FOREST PRODUCTS THERMAX ASH and TROPICAL FOREST PRODUCTS KEBONY are somewhat more stable than tropical hardwoods though not quite as strong.

Due to these unique characteristics screw connection through one side of the board as recommended for tropical hardwood decking is not required. Thermally modified wood decking can be installed using the groove on groove profile with the BLACK LABEL™ DECK CLIP with a vertical screw application or the TROPICAL FOREST PRODUCTS DIAMOND PROFILE AND CLIP.

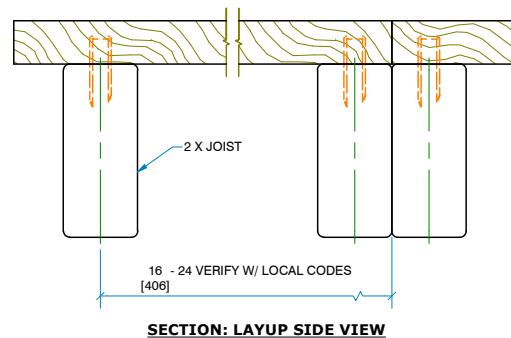
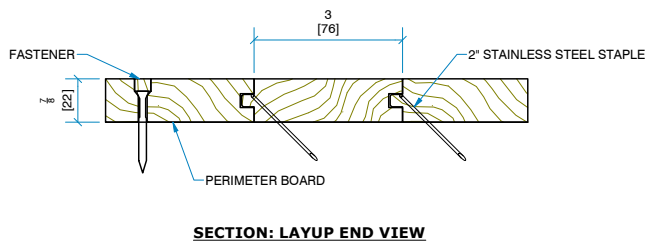
Set screws at slow speed. Do Not over torque screws. Do not use impact drivers for screw installation.



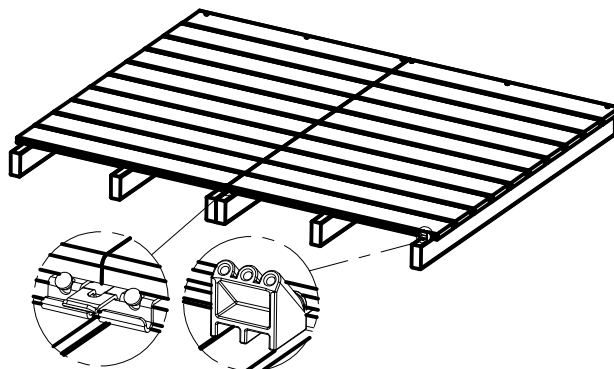
Porch Flooring and Decking

Wooden Porch Flooring is installed much like interior solid wood flooring. Porch Flooring can be installed using a Flooring Stapler using Stainless Steel Staples or by using countersunk stainless steel trim head screws.

Unlike interior solid wood flooring, porch flooring should be dried to an exterior moisture equilibrium not below 12%. Snow should never be allowed to sit on a porch floor as the increased moisture load, beyond normal water spray, may cause the flooring to pick up moisture beyond the point of equilibrium causing the flooring to swell and buckle. It is also a best practice to pre-seal porch flooring on all sides with BLACK LABEL™ IPE + MARINE OIL. Even if you intend to let your porch floor weather naturally, the penetrating oil sealer will help prevent the impact of ground moisture on the flooring. Traditional tongue and groove porch floor should never be used on a fully exposed deck. Covered porches are the rule.

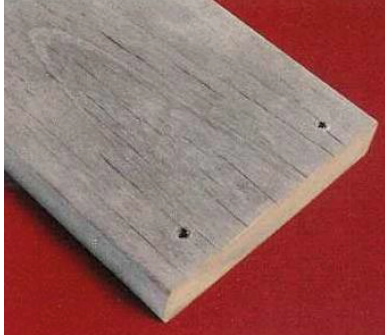


For projects that transition from covered to uncovered, you may want to consider our Shiplap Grooved Decking with TROPICAL FOREST PRODUCTS HIDDEN FASTENERS. (image 3 forth attachment) This products unique design provides a flooring appearance while allowing the floor/deck to drain between boards while at the same time hiding the fasteners completely. This unique profile provides the best of both flooring and decking. **Set screws at slow speed. Do Not over torque screws. Do not use impact drivers for screw installation.**



Natural Weathering

Left unfinished or over time without cleaning and refinishing, wood products will weather naturally to a silver-grey patina.



A coating on all faces before installation with an oil-based finish is not necessary but recommended even if you intend to let the deck weather. Application of a single coat of BLACK LABEL™ IPE + MARINE OIL slows moisture absorption and release during seasonal moisture transitions, reduces surface checking, and improves stability during the initial acclimation process. This can significantly improve project outcomes when installing air dried decking in dry, arid conditions and direct sunlight. It is important to remember that you can apply water-based finishes over oil-based finishes; however, you cannot apply oil-based finishes over water-based finishes, so make sure you consider this when selecting finishes.

Preparation, Finishing, Maintenance, Cleaning, and Restoration

When specifying wood products for exterior construction, it is important to have realistic appearance expectations. When used outdoors, wood products will not retain the appearance associated with their use in interior applications like furniture or flooring. Wood will not maintain its original color over time without cleaning and reapplication of finishes. Wood, by its nature, will be subject to some limited amount of natural reaction as it cannot be predicted how a natural product like wood will behave in any given environment or conditions.

New Deck Preparation

Always clean your deck using BLACK LABEL™ WOOD DECK AND CLADDING CLEANER to remove dirt and debris from the wood surface. After cleaning, apply BLACK LABEL™ WOOD BRIGHTENER to remove any stains or discolorations caused by weathering. Oxalic-acid-based wood brighteners also improve finish penetration. Make sure you allow the wood to dry thoroughly before and between any cleaner, brightener, or finish applications. Review any safety and storage information on all chemical or oil-based products before using them. MSDS sheets should be available on the manufacturer's website.



Caution should be exercised when using Wood Brighteners containing oxalic acid and only be used if the deck will be refinished after brightening. Oxalic acid converts lignin in natural wood species to sugar and can accelerate mold growth if left raw after cleaning.

Sanding

Removing natural characteristics like reverse, raised, or torn grain, scratches, sticker stains, water spots, finishes, or other discolorations can typically be easily removed using an orbital or belt sander with 80 to 100 grit sandpaper. You may have to try a few different grits to determine what will work best for the wood species you are sanding.

Finishing

A coating with BLACK LABEL™ IPE+ MARINE OIL on all faces before installation is not necessary but highly recommended as it slows the wood acclimation process and provides protection against moisture absorption on the back side of the wood without degradation from UV. To maintain the natural color, use BLACK LABEL™ IPE+ MARINE OIL finish with its UV inhibitor, fungicide, and pigmented tint. Test the finishes on the decking to determine their compatibility and appearance.

Before application, brush and clean the decking surface to remove dirt, dust, and other airborne contaminants. TROPICAL FOREST PRODUCTS wood decking and cladding are dense, so apply thin coats and wipe off excess oil, allowing each coat to dry thoroughly, or a sticky surface may result. Decking with a pre-finish option may or may not be available in your market. Check with your local dealer for the availability of this service. Grain, density, and moisture content can all affect finishing. Every piece of wood will accept finish differently, even pieces from the same tree. Sampling finishes are always recommended before completing the full application. TFP does not warrant the performance of finishes.



Finished Deck Maintenance and Weathering

Periodic cleaning with BLACK LABEL™ DECK AND CLADDING CLEANER and reapplication of BLACK LABEL™ IPE+ MARINE OIL will enhance the appearance of your deck. The lowest maintenance approach we have found for maintaining finished decks is to treat them like you would a piece of furniture in your home. Simply clean your deck when it is dirty and wipe-on wipe-off a fresh coat of finish before the finish deteriorates from UV exposure and the greying out or other forms of discoloration begin to take place. Every spring and fall is a good schedule.

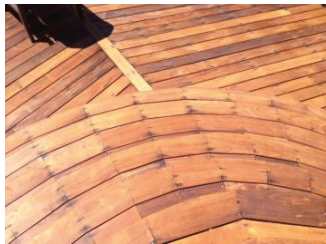
Spotting, Staining, and Discoloration

From time to time, we get calls asking about black spots that appear on wood decking. Usually, these spots appear on wood surfaces due to mold or a reaction between iron and natural tannic acid found in all woods.

Mold and mildew will grow on any surface where a food source has accumulated. This includes plastic and glass surfaces. Mold or mildew can be removed with BLACK LABEL™ DECK AND CLADDING CLEANER, which is supplied in a powder or a concentrated solution and mixed with water.

If deck cleaners do not remove the black stains, your spots are likely caused by an iron reaction. Iron spots often appear as black rings around galvanized steel or low-grade stainless fasteners. Small black dots on the deck may also be caused by filings from iron railings, shingle granules, fertilizers, or any particle containing iron that rests on the deck surface.

This type of black staining on the deck can typically be removed with TROPICAL FOREST PRODUCTS WOOD BRIGHTENER. It is supplied in a powder or a concentrated solution form and is mixed with water. Multiple applications may be necessary to remove the stain. The fastener may have to be removed and replaced with a higher-grade stainless steel fastener to prevent the problem from returning.



If you wait for the finish to deteriorate beyond the capabilities of deck cleaner and wood brighteners, all is not lost. Simply remove the old finish using a finish stripper followed by BLACK LABEL™ cleaner, wood brightener, and oil-based finish, just like you did when you first installed the deck. That's the beauty of wood. It can always be restored to its original appearance. Unlike PVC or composite decking, even in the worst possible condition, a hardwood deck can simply be sanded like a solid wood floor and restored to a like-new condition by prepping it like you would a new deck.

Use extreme caution when handling these chemicals and wear protective clothing and eyewear. Do not mix these cleaners with ammonia or household cleaners. We recommend that tests in small areas on a few different boards be conducted before overall use on the project. Always consult and follow the manufacturer's recommendations when using proprietary products.

Pressure Washing

Wood decks can be pressure washed but take great care. It is important to remember that all wood, due to fiber density and grain, even within the species, may react differently to pressure washing.

If you intend to pressure wash your deck, we do not recommend a pressure setting above 1200 psi. It is also important to set the proper distance between the nozzle and the deck surface so as not to tear the wood grain. Begin your washing in a corner to establish the right combination of pressure and distance.

If you are using a contracted pressure washing service, make sure you verify that they have wood deck experience, ask for references and make sure you are there to inspect your deck throughout the process.

Painting

Some naturally durable hardwoods can be extremely difficult to paint. Paint is defined as "Film Forming" and locks in trapped moisture, resulting in peeling and poor performance. Painting naturally durable hardwoods like Ipe is not recommended.

Stains are defined as "Vapor Permeable," which allows for natural equalization and are less affected by seasonal changes in temperature and moisture. If you do decide to paint hardwoods like Ipe, the best outcome will be the application of a high quality oil based primer followed by a high quality exterior latex paint.

Gluing

Some naturally durable hardwoods like Ipe are extremely difficult to glue. It has been reported that marine-grade epoxy, Polyurethane, PVA type III, and two-part resorcinol glues have been used with some success in non-structural applications. When gluing naturally durable hardwoods, the wood should be dry and wiped with a solvent such as alcohol or acetone to remove surface oils, dirt, or other conditions that may interfere with adhesion.

- Epoxy Types: similar to "West System Epoxy" or "G-2" Epoxy."
- Polyurethane Types: similar to "Gorilla Glue."
- PVA Type III; similar to "Titebond III."

Wood is an organic material, not manufactured, with variations from board to board that may impact adhesion. When working with wood products, it is incumbent on the architect/engineer/designer to evaluate the potential impact of the acclimation process on glue connections and the appearance of the completed application. TFP makes no specific recommendations or warranties associated with painting or gluing wood products. It is recommended that samples from different boards be made and tested before using any glue in an application. Always consult and follow the manufacturer's recommendations when using proprietary products.

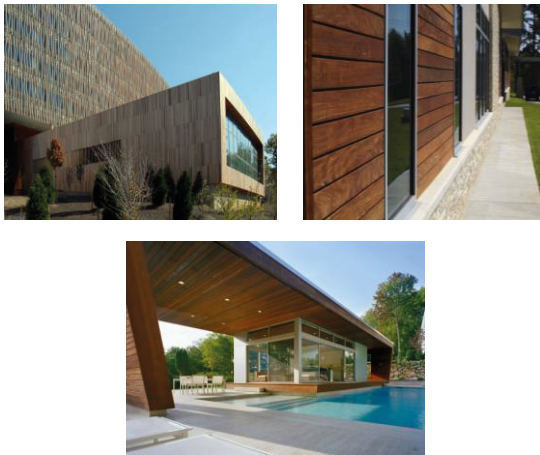
Cladding and Soffit

The same best practices for Decking apply to cladding and soffit. Cladding and soffit should always be applied so that moisture can evaporate from behind the cladding. This requires a minimum of 10mm or 3/8" air space between the vapor barrier and the cladding. In closed cladding systems like tongue and groove or shiplap, air must be allowed to enter and leave the cavity at both the bottom and top of the wall. This is typically achieved using wood or plastic battens that will enable air to move vertically behind the wall. Back Ventilated Rain Screen systems like the BLACK LABEL™ CLAD CLIP™ SYSTEM provide the additional benefits of allowing air to move vertically, horizontally, and through the wall cladding itself. The BLACK LABEL™ CLAD CLIP™ SYSTEM also eliminates the penetration of fasteners through the cladding, eliminating those potential points of moisture penetration into the cladding material itself. Rain Screen systems are now considered state of the art, providing the rapid evaporation of moisture from behind wall cladding. Pre-finishing wood cladding on all sides reduces the risk of moisture absorption and is recommended.

Clad Clips are the ideal solution for mounting interior wood claddings available in a wide range of wood species and profiles. Make sure to take a look at our Tropical Forest Products Cladding Profiles Guide.



Battens and clips are typically spaced 16" on center. Do not use aluminum clips on galvanized steel wall framing or pressure-treated wood as a galvanic reaction can occur, which will corrode the clips and fasteners. The BLACK LABEL™ CLAD CLIP SYSTEM utilizes VO-1 Fire Rated Glass-Filled Nylon clips and Stainless Steel fasteners to eliminate the risk of system failure in all environments.



Cladding should never be placed in direct contact with a house wrap or vapor barrier. The importance of managing water cannot be overlooked. Roof water should be directed away from decks and cladding, and water should be shed out from underneath the deck or behind the cladding and not be allowed to accumulate. Drainage should be addressed before deck or cladding installation. It is also recommended, whether you intend to let your decking or cladding weather naturally or maintain the original color, that one coat of BLACK LABEL™ IPE+ MARINE OIL be applied to all board faces before installation. This is to slow any potential acclimation issues and reduce the potential for any moisture absorption on the back face of the boards. As there is no UV exposure to the back side of the boards, the coating will protect against moisture absorption over time.

Environmental Compliance

An environmentally superior alternative to non-wood products... products carrying the 'LEGAL LUMBER™ Due Care' Certificate of Compliance meet a specific set of Controlled Wood, Chain of Custody, Life Cycle Impact, and Due Diligence Standards, Policies, and Procedures that support environmental sustainability initiatives as follows...

ALL TROPICAL FOREST PRODUCTS products have been third-party NGO verified of legal origin and compliance as being legally harvested, transported, exported, imported, and documented in compliance with all country of origin, international and domestic laws, rules, regulations, and treaties pertaining to the fair and legal trade of forest products including but not limited to the U.S.

Department

of Agriculture Lacey Act, ITTA (International Tropical Timber Trade Agreement), CITES (Convention On The International Trade of Endangered Species), and U.S. Buy American Act.



ALL TROPICAL FOREST PRODUCTS products are derived from forests that are naturally occurring, renewable and sustainable and are not harvested from forests or forest plantations where traditional or civil rights have been violated, forests having high conservation values that are threatened, forests that have been genetically modified or forests that have been converted to a non-forest use.

ALL TROPICAL FOREST PRODUCTS products are 100% organic, grown without chemical fertilization, and regenerated naturally or by seeding and replanting. The natural service life of TROPICAL FOREST PRODUCTS Wood Products exceeds their natural growth cycle, traps and stores carbon, and can be reclaimed, reused, or recycled. TROPICAL FOREST PRODUCTS Wood Products do not require for service any petroleum-based or inorganic chemical treatments, adhesives, or coatings. TROPICAL FOREST PRODUCTS Wood Products do not require for service any specialized handling storage or disposal procedures and generate zero post-industrial or post-consumer non-biodegradable waste. TROPICAL FOREST PRODUCTS Wood Products are also safe for human and animal contact, meet low VOC emission standards and meet International Building Code and International Residential Code requirements for naturally durable wood.

TROPICAL FOREST PRODUCTS does not assume any liability other than those outlined in TROPICAL FOREST PRODUCTS product warranties. Finishing, cutting, drilling, or installing the product always validates the installer's acceptance of material quality at the time of installation.

Don't forget to check out the entire TROPICAL FOREST PRODUCTS family of products.

Decking Systems • Rain Screen™ • Siding • Cladding • Paneling Systems
Porch Flooring • Deck Tiles • Roof Deck Systems • Hand Rail • Architectural
Millwork • Bridge Decking • Posts • Heavy Timbers • Custom Milling