TECHNICAL BULLETIN
Best Practices

MAXIMO™ hardwood decking and cladding products are renowned for their natural durability, each with unique aesthetics and performance characteristics. These naturally durable wood decking materials are the only truly renewable resource suitable for deck and cladding construction. Regardless of the product you select, this guide aims to cover installation, finishing, maintenance options, and best practices for these naturally durable wood decking and cladding materials.

Best Practices

This information is accurate to the best of our knowledge. However, given the variability of natural products, it is the installer's responsibility to choose the appropriate product for specific installations and site conditions. Ensure compliance with local building codes and follow the best practices for handling and installing **MAXIMO**™ products. When using proprietary finish and fastening products, follow the manufacturer's recommendations for application and maintenance. To enhance the performance and appearance of **MAXIMO**™ products, read this Best Practices guide before starting construction. **MAXIMO**™ offers detailed Installation Section Guides in CAD and PDF formats for specific profiles and applications, available on our website for specifiers and contractors.

Building Code Compliance

Most municipalities have adopted the International Building and International Residential Codes within their own building codes as the minimum standards for design and construction. The installer must ensure the decking design and construction methods comply with local residential or commercial building codes relevant to the project. If necessary, **MAXIMO**™ provides technical data and submittal documents to assist with the code compliance process.

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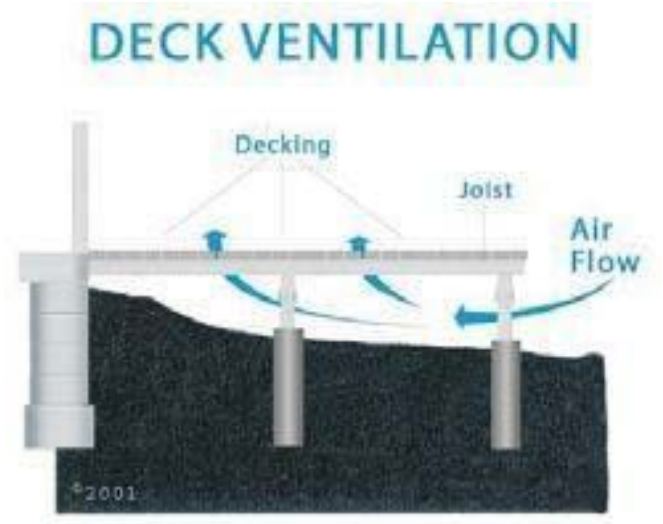
Deck Ventilation

Adequate ventilation and airflow beneath and around wood decking and cladding are crucial for improving product stability and performance. Proper ventilation of the deck or cladding system is essential for long-term stability and durability, minimizing wood movement. Air must flow freely from outside and beneath the deck or cladding. Fully enclosed or skirted decks can experience issues similar to decks built close to grade.



Solutions for Poor Ventilation - Decking

Moisture accumulation under a deck, combined with sun and heat exposure on the deck surface, can cause stress leading to increased checking, cupping, or twisting. Some applications inherently reduce ventilation by design, such as grade-level or rooftop decks. To mitigate problems in these scenarios, consider the following:

Dimensional stability is related to the thickness and width ratios of the wood. Instability increases with the board width relative to its thickness. For example, a 1x4 is more stable than a 1x6, and a 1x6 is much more stable than a 1x12. From experience, a 5/4x4 deck board, whether air-dried or kiln-dried, grooved or face-screwed, offers the most stable performance on poorly ventilated residential decks regardless of the fastening method. While 5/4x6 face-screwed works in most cases, 5/4x4 is the best choice for hidden fasteners. **MAXIMO**™ DECK TILES screwed and plugged to double stringers spaced 24" on center provide a solution to poor ventilation and a cost-effective deck solution.

Using shorter-length decking is a cost-effective and unique deck construction option. **MAXIMO**™ DECK TILES are available in various sizes, such as 24"x24", 24"x48", 24"x72", and 24"x96". Deck tiles can be installed to create diverse designs and patterns. Consider using **MAXIMO**™ DECK TILES on stringers for conventional decks or applying them to the ElevateTM Pedestal Systems designed for less ventilated applications. Developed for poorly ventilated commercial and residential deck construction, **MAXIMO**™ DECK TILES are prefabricated with stable thickness to width ratios using stainless steel fasteners.

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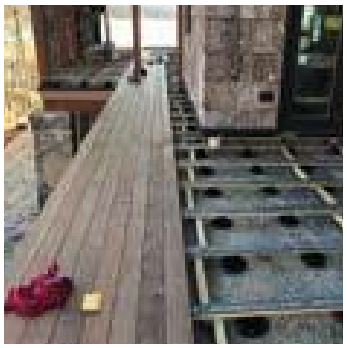
For at-grade decks, pouring a concrete slab and applying **MAXIMO**™ DECK TILES on ElevateTM EPDM or STAR pedestals is a cost-effective solution. Deck tiles can also be applied over existing wood decks to rejuvenate their appearance without a complete rebuild, provided the existing deck is structurally sound.

Roof Decks

Roof decks present significant challenges. Applying 5/4x4 hardwood decking to 5/4x4 hardwood or 2x4 treated stringers laid flat on pedestals is an effective solution for poorly ventilated roof decks. Avoid laying stringers directly on roof membranes to ensure free water flow over the roof surface.

Building a Deck over Dry Space

To create a dry space under your deck, build a roof structure with a waterproof membrane and install the deck on top using a roof deck system with conventional decking or deck tiles. This method allows you to apply porch ceiling materials conventionally below your deck, providing a dry space and additional functionality.



Posts, Beams and Stringers

Selecting sub-structure materials that last as long as **MAXIMO**™ decking is crucial. Naturally durable hardwoods or high-grade pressure-treated softwoods with higher treatment retentions like .40 (preferably dried after treatment) rated for "ground contact" are excellent choices. Light gauge galvanized steel and aluminum framing systems are also viable options, though they may complicate decking attachment. The use of naturally durable hardwoods for framing, common in commercial applications, is gaining popularity in residential applications due to their durability and natural fire resistance. Structurally engineered and certified decking stringer and beam span tables are available for those considering naturally durable hardwood framing.

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Stringer Spacing (Distance Between Stringers)

Several factors influence the decision on stringer spacing, beyond the allowed deck span. Ensuring a minimum of 1.5" of support under each board end at butt joints is critical for a proper deck to stringer connection, especially when using decking products without a structural end match (SEM) joining system. Sufficient ledge allows fasteners to sit back "from the butt joint, or in the case of hidden fasteners, allows for the proper use of deck clips secured through the deck boards at the butt joints.

Existing decks likely have stringers spaced 16" on center, the design standard for many years. In these cases, it is recommended to 'sister' a second stringer at locations where decking butt joints will occur.

12" or 16" 'On Center' stringer spacing is advisable when using 1" Nominal (net ") thick **MAXIMO**™ decking in random lengths in 1' multiples, laying decking in a diagonal pattern, or using decking with Structural End Match (SEM) Joints.

Double Stringers Spaced 24" 'On Center' is the best practice for installing 1" Nominal (net ") thick **MAXIMO**™ decking perpendicular to stringers in even length multiples and 5/4" Nominal (Net 1") thick decking perpendicular or diagonal to stringers. For new construction with **MAXIMO**™ PREFABRICATED DECK TILES/PANELS, doubled stringers 24" on center are recommended. This system offers cost-saving benefits through lower sq. ft. material costs, fewer fasteners (1 Pro Plug per square ft.), and reduced labor costs.

Selecting Treated Wood For Use With Naturally Durable Wood Decking

Pressure-treated softwoods like Southern Yellow Pine are commonly used for structural components in deck construction. Given the extended service life of Naturally Durable Hardwoods like Ipe, it is best practice to use softwoods treated for ground contact, such as AWPA U1 UC4A (MCA or C-AC) 0.15 PCF Retention or equivalent.

The structural service life can be further extended by using treatments for Salt Water Application, such as AWPA UC5B .23 PCF MCA Retention or AWPA UC4B CCA 0.60 PCF Retention or equivalent. For proximity to salt water, CCA is recommended for all structural members. Framing and support members regularly submerged in salt water should have UC5B 2.5 PCF CCA treatment.

Additionally, using ground contact or critical structure components for framing and applying joist tape to cap the joist with at least a 3/4" overlap on each side is good practice. Joist tape extends the service life of framing members by delaying rot and water intrusion.

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AWPA Category Use Chart
Including Commercially Available Treatments

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, cross ties, and utility poles	.60 CCA, .23 MCA, .31 CA-C (dissolved), .80 CCA (boards and timber), .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)
UC5A	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

Ledger Joist and Stringer Flashing

When building a wood deck, applying joist tape to Ledgers and Stringers is essential to prevent moisture accumulation at contact points. This tape also helps reduce corrosion between treated wood stringers and galvanized steel joist hangers. Always follow the manufacturer's guidelines for selecting and applying the product.

Attaching Wood Decking to Metal Framing

Metal framing systems require a different method for attaching hardwood decking, as hidden fasteners are not suitable. Pre-drill metal stringers for face screwing. Use stainless screws as required. Given that hardwood decking is significantly heavier than composite decking, ensure that light gauge metal framing systems are designed to support the additional weight.

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Set screws at a slow speed and avoid overtorquing. Do not use impact drivers for screw installation.

Deck Spans

For residential decks, building codes usually require a live load capacity of 50 to 100 pounds per square foot. Based on these standards, **MAXIMO**™ decking provides minimal deflection with stringer centers at these intervals: 16 to 24 inches for nominal 1 inch (net .75 inch) thick decking, 24 to 36 inches for nominal 5/4 inch (net 1 inch) thick decking, 36 to 48 inches for nominal 2 inches (net 1.5 inches) thick decking, 48 to 72 inches for nominal 3 inches (net 2.5 inches) thick decking, and 72 to 96 inches for nominal 4 inches (net 3.5 inches) thick decking. These span calculations are based on a 100 lbs. per sq. ft. residential deck scenario.

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DECKING STRUCTURAL DESIGN INFORMATION – Simple Plan						
Decking – IPE Species						
MODULUS OF ELASTICITY		2140000	2140000	2140000	2140000	2140000
BENDING – Allowable		2900	2900	2900	2900	2900
SHEAR – Allowable		540	540	540	540	540
SPECIES		BL	BL	BL	BL	BL
WEIGHT PER CUBIC FOOT		72	72	72	72	
DECKING THICKNESS (Net Inches)		0.75	1	1.5	2.5	3.5
Decking SPAN (Net Inches) 100 PSF LIve Load L/360		24	36	48	72	96
DEAD LOAD – Decking		0.0313	0.0417	0.0651	0.1085	0.1519
LIVE LOAD/PSF	100	.6944	.6944	.6944	.6944	.6944
TOTAL LOAD	W	.7257	.7361	.7569	.7986	.6944
SHEAR	V	8.70	13.25	18.16	28.75	40.30
MAXIMUN MOMENT	M	52.25	119.25	218.25	517.50	968.00
AREA	A	0.7500	1.0000	1.5000	2.5000	3.5000
SECTION	S	0.0938	0.1667	0.3750	1.0417	2.0417
INERTIA	I	0.0352	0.0833	0.2813	1.3021	3.5729
	Fb	557.33	715.50	581.33	496.80	474.12
	Fv	17.41	19.87	18.16	17.25	17.28
Deflection (inches)		**0.042**	**0.090**	**0..087**	**0.100**	**0.122**
		Fb OKAY	*Fb OKAY*	*Fb OKAY*	*Fb OKAY*	*Fb OKAY*
		Fv OKAY	*Fv OKAY*	*Fv OKAY*	*Fv OKAY*	*Fv OKAY*
ASHTO Standard	L/360	0..067	.100	0.133	0.200	0.267
DEFLECTION		**OK**	**OK**	**OK**	**OK**	**OK**

This Span calculator is designed to assist in the specifications process only and cares no warranty of fitness os liability.
It is the responsibility of the end user to consult local building codes to verify compliance.

Choosing the Right Wood

Selecting the right wood species and grade is crucial for both appearance and performance. Opt for a wood species that meets the "Naturally Durable" definition under the International Building Code and International Residential Code, such as **MAXIMO**™ Premium Select Architectural Grade Ipe, Garapa, Cumaru, Tigerwood, Bulletwood, Jatoba, Red Balau, Itauba, Angelim Pedra, ThermoWood Ash, Kebony, or High-Density ThermoBamboo.

Color and Grain Variation

Natural materials like wood exhibit color and grain variations, adding to their unique beauty. **MAXIMO**™ wood products feature mixed grain and are not sorted for color. Achieve color consistency by sealing the wood or allowing it to weather naturally over time.

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Grade Selection

The grade of wood significantly affects its appearance and performance. **MAXIMO**™ is known for its high-quality standards, grading rules, and specification language. Without clear grade expectations, you cannot be assured of meeting aesthetic or technical performance requirements. The grade also impacts the price; what seems like a good deal might not perform as expected.

Based on our published grading rules and ASTM D143 physical properties testing, GMX Group has developed certified ASTM D245 Allowable Design Values by grade. **MAXIMO**™ Premium Select Architectural Grade hardwood decking has nearly double the bending strength of generic FAS grade hardwood decking. These definitive grading rules ensure **MAXIMO**™ products perform as designed. We encourage specifiers, consumers, and contractors to use these standards in their decision-making process and reference them in purchase orders for naturally durable wood decking.

Grading Rule Definitions and Grade Selection

Naturally durable wood products are known for their unique "Appearance Characteristics," including color variations and distinctive grain patterns. Additionally, wood grades include "Physical Characteristics," "Sound Defects," "Unsound Defects," and "Milling Defects," which arise naturally or during manufacturing. Here's a breakdown of the common characteristics found in wood grade specifications:

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 porfiling

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

Unsound Defects
1 - Large borer holes
2 - Splits
3 - Unsound knots
4 - Shake
5 - Sapwood

Available Naturally Durable Wood Grades

MAXIMO Premium Select Architectural Grade

MAXIMO 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.

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- For Structural Application – Not Allowed…pin knots bigger than 1/2" 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

MAXIMO™ 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 remedied with standard 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 3/4" at narrow face or edges, centerline knots bigger than 1-3/4" wide face, edge knots bigger than 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 is the standard market export grade from mills and is typically uninspected. It includes a mix of first and seconds ratios, often described in the market with terms like Prime, #1, Select, or First Quality. Without clearly defined grading rules, these terms lack precise meaning.

- Include - Appearance Characteristics.
- Include - Physical Characteristics that can be remedied with standard installation methods, tools, or sanding.
- Include - Sound Defects.
- Include - Unsound Defects.
- Include - Milling Defects.

Structural Application Restrictions

For structural applications, certain defects are not allowed: knots larger than 3/4" on narrow faces or edges, centerline knots larger than 1-3/4" on wide faces, and edge knots larger than 3/4" on wide faces. The maximum allowed grain slope is 1" in 6", and the length of end splits and surface splits must comply with ASTM D245 (5.4.3).

Wood Acclimation

Wood dries through the movement of free water via fiber cavities and walls and the movement of water vapor. Wood, being non-homogeneous, shrinks more along growth rings (radial) than across them (tangential). Tangential (width) dimensional change is often nearly twice that of radial (thickness) movement. Uncontrolled acclimation can lead to drying issues such as movement and checking. Shrinkage and swelling stop as the wood reaches equilibrium moisture content with its environment.

Different wood species shrink at different rates during drying. To minimize shrinkage, warping, checking, and splitting, lumber must be acclimated to the expected in-use moisture content. This can be done through air drying or kiln drying, depending on the species and drying rate. In much of the United States, the equilibrium moisture content (EMC) in outdoor environments ranges between 12% and 14%. For specific regional EMC levels, refer to the US **MAXIMO**™ Laboratories document on "Equilibrium Moisture Content of Wood in Outdoor Locations" available in our Resources Library.

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Larger lumber sizes and timbers may show deeper checks during acclimation, typically reducing once equilibrium is reached. Kiln-dried decking, being pre-acclimated, usually experiences less checking than air-dried decking.

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

Kiln drying stabilizes most wood species by removing free moisture, accelerating the drying process to the wood's service environment's natural equilibrium moisture level. For instance, lumber used indoors is typically dried to 6-8% moisture content, while outdoor lumber is dried to 12-14%. Most wood decking species require kiln drying for dimensional stability, except Ipe, which is stable as it acclimates to ambient equilibrium, available as both air-dried and kiln-dried decking. Ipe, difficult to kiln dry, is typically air-dried for dimensioned lumber 2" nominal (1.5" net thickness) and thicker.

A Air-dried decking is exported with drying sticks between layers, which can leave sticker marks and dirt stains, removable by light sanding or weathering. Some mills process their own decking, resulting in "Green" decking with 30-40% moisture content. Finishing mills, buying molding blanks from sawmills, produce partially air-dried decking with 25-35% moisture content.

MAXIMO™ mills offer kiln drying rough sawn decking or pre-stabilizing decking blanks to equilibrium before molding. Kiln- dried decking remains stable in thickness and width, with minimal shrinkage even in low-equilibrium climates. Air-dried decking reaches equilibrium post-installation, potentially shrinking 1/8 to 3/8 inches in width. This shrinkage is usually not problematic for face fastening Ipe but can affect hidden fastening systems, causing decking to shrink off clips and requiring post- installation face screwing for repair. Kiln-dried Ipe is dimensionally stable, reducing warp, twist, and bow issues, with kiln drying providing consistency in width and reduced cupping potential. Other wood species are less stable green to dry, hence **MAXIMO**™ Decking and Cladding species, including Ipe, are kiln-dried.

Thermal modification, an advanced wood technology, super-heats non-durable species like pine, and ash, removing natural sugars and closing cell structures to prevent water absorption. Thermally modified woods are very stable, but may be more expensive.

Pre-Installation Handling and Storage

Store wood products out of direct sunlight, rain, or snow, keeping them clean, dry, and off the ground before installation. Use a moisture barrier under the wood to prevent condensation during storage. Allow the wood to acclimate to equilibrium humidity levels before installation to minimize post-installation movement.

Rainwater reacting with wood tannins and natural oils can stain surfaces. Typically, these stains are removable 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

After years of use, wood products will have reached equilibrium moisture content. Store removed wood with a moisture barrier to prevent condensation. Allow the wood to acclimate to equilibrium humidity levels before reinstallation.

Store removed wood products out of direct sunlight, rain, or snow, keeping them clean, dry, and off the ground. Stack wood in a well-ventilated location with dry stickers/slats not less than 1/2" thick or more than 1.5" wide, placed no more than 24" apart. Avoid dense packing to prevent destabilization, mold growth, and water stains. Expect some movement upon removal as installation tension is released. Reinstall wood products according to the fastener manufacturer's instructions.

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Decking Installation: Cutting and End Sealing

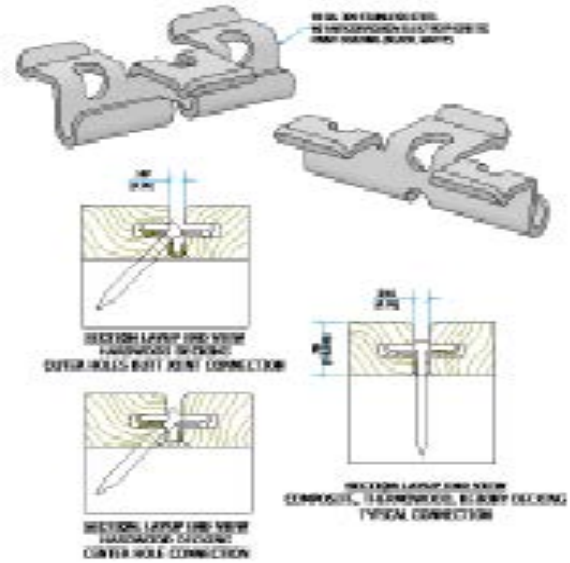
For optimal results when cutting decking, use carbide-tipped finish cut saw blades to minimize tear-out. After cutting, immediately seal all ends to prevent end checking.

Bow Removal

Bowing is a natural occurrence in wood decking. Use a deck wrench during installation to easily correct bowing.

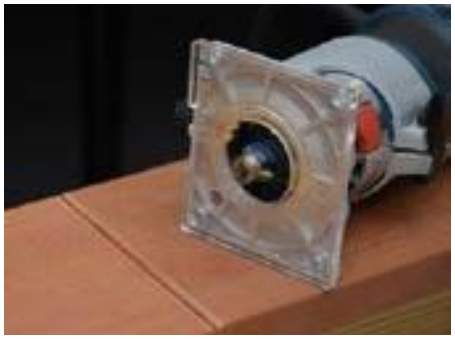
Deck Board Spacing (Distance/Gap Between Deck Boards

The ideal gap between deck boards for most **MAXIMO**™ installations is between 3/16 to 5/32 inches. This spacing can be achieved using hidden fasteners or a marking guide, which also helps mark screw placement.



End Matching and Butt Joints

For a clean appearance, use a router bit to route the ends of the boards with a 1/8" radius. This prevents hard edges at butt joints, similar to engineered wood flooring. Additionally, some contractors use biscuits or dowels to prevent movement at butt joints. Deck clips can also provide this stability. When working with butt joints, whether face or blind fastened, support them with a sister joist or double stringer to ensure proper fastener placement and avoid placing fasteners too close to the joint on a single joist.



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Structural End Match (SEM Joint)

Certain wood decking products, such as ThermoWood Ash, feature an SEM Joint or Structural End Match. This design allows butt joints to be placed anywhere along the board (mid-joist) without compromising structural integrity. Stringer spacing is typically limited to 12" for 1x6 decking and 16" for 5/4x6 decking.

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

Drilling Techniques for Decking

To minimize the risk of end splits caused by screw torque, drill holes as far from the board ends as possible, with a minimum offset of 3/4", some recommend 1". High-speed drills (2500-4000 rpm) are recommended, using fast spiral bits, which efficiently eject wood fibers and reduce heat buildup, extending the bit's service life.

Stainless steel fasteners, while more resistant to corrosion compared to galvanized or coated steel fasteners, are softer and can twist or break. For softwood-to-softwood applications, like **MAXIMO™** Kebony to pressure-treated stringers, though it is still best practice. Pre-drilling reduces tension on the wood fibers, especially at the board ends, minimizing the risk of splits.

For hardwoods, always pre-drill. Although some screws claim to self-drill through hardwood decking, they often cause cracks when the heads are set into the boards. Pre-drilling and countersinking provide superior results. The fastener should drop through the top board without thread penetration into the fibers, especially when fastening hardwood to hardwood. Only drill through the decking, not into the stringer when attaching to pressure-treated stringers. Hardwood stringers require pre-drilling.

Drill Bit Recommendations

Jobber Style Fast Spiral Bits: Ideal for drilling through hardwoods without penetrating the substrate (e.g., pressure-treated or softwood stringers, studs, or sheathing). For softwoods, fasteners will penetrate easily without pre-drilling.

Taper Point Bits: Best for fastening hardwood to hardwood, where pre-drilling the substrate is necessary. After pre-drilling the decking with a Jobber Style Bit, taper bits ensure enough fiber for a good connection while reducing friction that can cause screws to twist off or break.

Countersinks: Used to set the screw head into the board's face, creating a V-shaped cut. This allows the screw head to rest flush or beneath the board's surface, reducing tension and preventing board splits. For hardwoods like **MAXIMO™**, 2-flute countersinks perform better and last longer than 4-flute ones due to stronger steel per flute.

Smart Bit System Smart Bit System

The Smart Bit System combines Fast Spiral Bits, Countersink, and Drill Stop into one convenient tool, streamlining the drilling process.

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High Speed Drill System w/stop

Smart Bit Counter Sink

Bit with Countersink

Jobber Bit

Fast Spiral

Taper Bit

Drilling Posts and Timbers

For heavy timber drilling, use heavy-duty drills (0-1000 rpm) with auger-style bits. Cordless drills can be used, but bit life may diminish at slower speeds.

Auger Bit

Fastening Techniques

Not all fasteners are alike. With a wide array of fastening options and systems available, the choice of fastener can greatly influence the outcome of a deck installation. It's crucial to select a fastener suited to the specific deck material. Remember, once you choose a fastening system, the responsibility for performance shifts to the specifier, fastener company, or contractor, not the decking manufacturer. Therefore, it's vital to carefully consider your options and adhere to both the manufacturer's and fastener company's instructions.

Selecting Screw Material

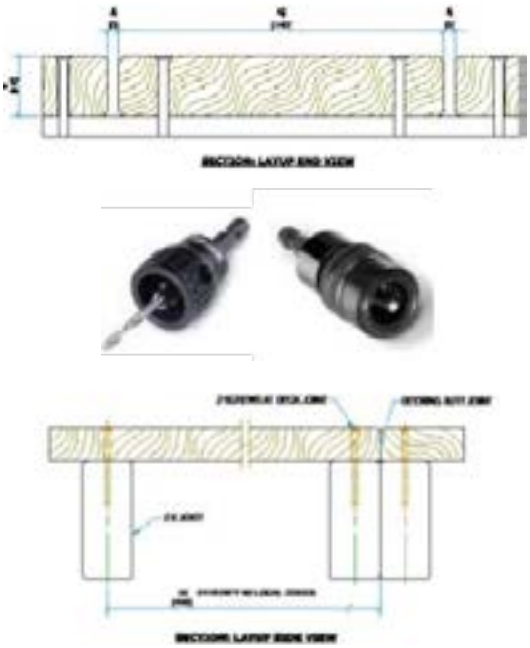
For the best results, use high-quality stainless steel fasteners. They provide a longer service life and help avoid galvanic reactions that can occur when naturally durable wood products connect with treated softwood substructures. Regardless of the fastening system chosen, it's the specifier's or installer's duty to evaluate and select the appropriate fastener.

Pre-Drill, Countersink, and Screw Method

To ensure a strong mechanical connection, pre-drill and countersink two holes per deck board intersection with the stringer.

Install self-drilling trim head or flat head screws. Face screwing provides the most robust attachment. It's essential to pre-drill and countersink the ends of the boards to prevent splitting. Avoid over-torquing the screws to prevent the board from splitting. This face screw method is commonly used in commercial deck construction.

Stainless steel fasteners are available in natural stainless steel for weathering naturally or with a brown head coating to blend with wood-finished deck colors.



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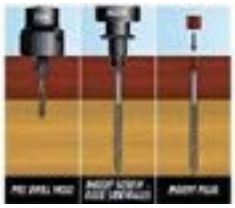
Drill Bit, Countersink, and Drill Stop Tool prevents over drilling. Depth Setter Tool prevents board splitting from the overset of the screw head.

Drill, Screw, and Plug Method
The drill, screw, and plug method combines the mechanical strength of the drill and screw method with the added aesthetic of a wood plug covering the screw head. This technique, often used in wood boat deck construction, involves deeper countersinks to accommodate adhesive and a wood plug.

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



Concealed Fasteners for Tropical Hardwood Decking

It's important to note that concealed fasteners aren't completely hidden; the fastener and screw head are visible between the boards. When using 1x4 or 1x6 decking, clips and screws are more noticeable compared to 5/4x4 and 5/4x6 decking. Avoid using air-dried decking with concealed fasteners, as shrinkage can reduce the contact area between the clip and the deck. We advise against using 1x6 or 1x6+ regardless of being Air or Kiln Dried.

When using 1x6 decking profiles, the use of concealed fasteners is not recommended for certain hardwood species due to the increased potential for movement, cupping, and shrinkage. Face screwing provides the most secure mechanical connection and is considered best practice to improve long-term stability and performance of natural wood decking products. Due to differences in density and dimensional stability between species, hardwood decking products other than Ipe may require supplemental face fastening or side fastening in addition to concealed fasteners to reduce board movement, cupping, and joint separation over time.

Concealed Fasteners

Often called "hidden fasteners," this method involves either cutting a slot at the clip location or grooving a slot along the entire length of the board.

Grooved profiles are not recommended for decking products with a net thickness below 1" due to the reduction of structural material at the clip interface, which may increase the risk of board failure, cracking, or excessive movement.

MAXIMO DECK CLIP SCREWS

MAXIMO DRILLING GUIDE

MAXIMO DECK CLIP

When installing tropical hardwood decking, avoid hidden fastening systems that lack a mechanical connection between decking and stringer, as they can cause the decking to shift, resulting in irregular spacing and mismatched butt joints.

Concealed Fasteners for Thermally Modified Wood

Thermally modified woods like **MAXIMO**™ THERMOWOOD ASH and **MAXIMO**™ KEBONY are more stable than tropical hardwoods but not as strong.

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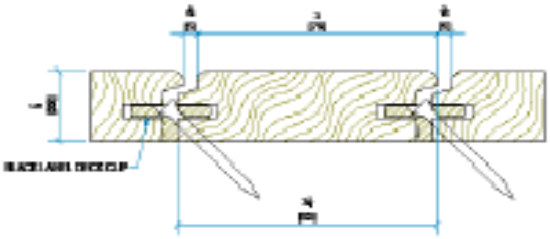
Due to these characteristics, a screw connection through one side of the board, as recommended for tropical hardwood decking, is not necessary. Thermally modified wood decking can be installed using the groove-on-groove profile with a deck clip and a vertical screw application.

Set screws at a slow speed and avoid over-torquing. Do not use impact drivers for screw installation.



Porch Flooring and Decking

Installing wooden porch flooring follows a similar process to interior solid wood flooring. You can use a flooring stapler with stainless steel staples or countersunk stainless steel trim head screws.

Porch flooring needs to be dried to an exterior moisture level of at least 12%, unlike interior flooring. Snow should never be allowed to remain on a porch floor, as excess moisture can cause the flooring to swell and buckle. Pre-sealing the porch flooring on all sides with **MAXIMO**™ IPE + MARINE OIL is a good practice. This helps protect against ground moisture even if you want the floor to weather naturally. Traditional tongue and groove flooring should not be used on fully exposed decks; it's best suited for covered porches.

For projects that include both covered and uncovered areas, consider using our Shiplap Grooved Decking with hidden fasteners. This design provides the appearance of flooring while allowing drainage between boards and hiding the fasteners. This unique profile combines the benefits of flooring and decking. Install screws slowly and do not over-torque them. Avoid using impact drivers for screw installation.

Natural Weathering

Wood left unfinished or not maintained will naturally weather to a silver-grey color over time.

Applying an oil-based finish to all faces before installation is recommended, even if you plan to let the deck weather. A single coat of **MAXIMO**™ IPE + MARINE OIL helps control moisture absorption and release during seasonal changes, reduces surface checking, and improves stability during the initial adjustment period. This is especially useful for air-dried decking in dry, arid conditions and direct sunlight. Note that water-based finishes can be applied over oil-based finishes, but not the other way around, so choose your finishes accordingly.

Preparation, Finishing, Maintenance, Cleaning, and Restoration

When choosing wood products for outdoor use, it's important to have realistic expectations about their appearance. Wood used outdoors will not look the same as it does indoors in furniture or flooring. Without regular cleaning and reapplication of finishes, wood will not retain its original color. Wood is a natural material and will react unpredictably to different environmental conditions.

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Preparing a New Deck

To start, clean your deck thoroughly with a cleaner to eliminate dirt and debris. Follow up with brightner to tackle any stains or discoloration from weather exposure. Oxalic-acid- based brighteners not only remove stains but also enhance finish penetration. Ensure the wood is completely dry before and between applications of cleaner, brightener, or finish. Always review the safety and storage instructions for any chemical or oil-based products, and refer to the MSDS sheets on the manufacturer's website.

Sanding

To remove natural imperfections like reverse, raised, or torn grain, scratches, sticker stains, water spots, finishes, or other discolorations, use an orbital or belt sander with 80 to 100 grit sandpaper. You may need to experiment with different grits to find the one that works best for your wood type.

Finishing

Although not essential, applying oil to all faces before installation is highly recommended. This slows the wood's acclimation process and offers protection against moisture absorption on the back side of the wood without UV degradation. To preserve the natural color, use oil, which includes a UV inhibitor, fungicide, and pigmented tint. Always test the finishes on a small section of decking to ensure compatibility and desired appearance.

Before applying any finish, brush and clean the decking surface to remove dust, dirt, and other airborne particles. Since **MAXIMO**™ wood decking and cladding are dense, apply thin coats of finish and wipe off any excess oil, allowing each coat to dry thoroughly to avoid a sticky surface. Availability of pre-finished decking options may vary; check with your local dealer. Factors like grain, density, and moisture content can influence how the finish is absorbed. Each piece of wood will accept finish differently, even from the same tree, so sampling finishes before full application is always advised. Note that TFP does not guarantee the performance of finishes.

Maintaining and Weathering a Finished Deck

Regular cleaning with cleaner and reapplying oil will keep your deck looking its best. The easiest way to maintain a finished deck is to treat it like indoor furniture: clean it when it's dirty and apply a fresh coat of finish before UV exposure causes it to deteriorate or discolor. A good maintenance schedule is to do this every spring and fall.

Handling Spots, Stains, and Discoloration

Black spots can sometimes appear on wood decking due to mold or a reaction between iron and the wood's natural tannic acid.

Mold and mildew can grow on any surface with accumulated organic matter, including plastic and glass. They can be cleaned off with cleaner, available in powder or concentrated solution form, mixed with water.

If the black stains remain after cleaning, they are likely caused by an iron reaction. These iron spots can appear as black rings around galvanized steel or lower-grade stainless fasteners, or as small black dots from iron particles like railings, shingle granules, or fertilizers on the deck surface.

Iron-induced black stains can usually be removed with brightner, also available in powder or concentrated solution form and mixed with water. Multiple applications might be needed. To prevent recurrence, replace the offending fastener with a higher-grade stainless steel one.

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If the finish deteriorates beyond what cleaners and brighteners can fix, you can strip the old finish and start over with a cleaner, wood brightener, and oil-based finish. Wood's beauty lies in its ability to be restored to its original appearance. Unlike PVC or composite decking, a hardwood deck can always be sanded and prepped like new.

Exercise caution with these chemicals and wear protective clothing and eyewear. Do not mix these cleaners with ammonia or household products. Test in small areas before full application and always follow the manufacturer's guidelines.

Pressure Washing

Wood decks can be pressure washed, but with caution. Different wood fibers and grains, even within the same species, react differently to pressure washing.

Do not exceed a pressure setting of 1200 psi and maintain the correct distance between the nozzle and the deck to avoid damaging the wood grain. Start washing in a corner to find the right combination of pressure and distance.

If hiring a pressure washing service, ensure they have experience with wood decks, ask for references, and supervise the process to inspect your deck throughout.

Painting

Painting some naturally durable hardwoods can be challenging. Paint is "film-forming," which traps moisture and often leads to peeling and poor performance. Therefore, painting naturally durable hardwoods like Ipe is not recommended.

Stains, on the other hand, are "vapor permeable," allowing for natural moisture equalization and are less affected by seasonal temperature and moisture changes. If you choose to paint hardwoods like Ipe, the best results come from applying a high-quality oil-based primer followed by a high-quality exterior latex paint.

Gluing

Gluing naturally durable hardwoods like Ipe can also be difficult. However, marine-grade epoxy, polyurethane, PVA type III, and two-part resorcinol glues have shown some success in non-structural applications. Before gluing, ensure the wood is dry and clean the surface with a solvent like alcohol or acetone to remove oils and dirt that could 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 with natural variations that can affect adhesion. It's important for architects, engineers, and designers to consider the impact of the acclimation process on glue connections and the final appearance of the application. TFP does not provide specific recommendations or warranties for painting or gluing wood products. It is advisable to test samples from different boards before proceeding with any glue application. Always follow the manufacturer's guidelines when using proprietary products.

Cladding and Soffit

The same best practices used for decking apply to cladding and soffit. Always install cladding and soffit with sufficient air space for moisture to evaporate from behind. A minimum of 10mm or 3/8" air gap should be maintained between the vapor barrier and the cladding. For closed cladding systems like tongue and groove or shiplap, it is essential to allow air circulation at both the bottom and top of the wall. This is usually achieved with wood or plastic battens that enable vertical air movement behind the wall. Back Ventilated Rain Screen systems provide the added benefit of allowing air to move vertically, horizontally, and through the wall cladding itself. Additionally, it eliminates fastener penetration through the cladding, reducing potential moisture

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penetration points. Rain Screen systems are now considered state-of-the-art, promoting rapid moisture evaporation from behind wall cladding. Pre-finishing wood cladding on all sides is recommended to minimize moisture absorption.

Battens and clips are typically spaced 16" on center. Avoid using aluminum clips on galvanized steel wall framing or pressure- treated wood, as this can cause a galvanic reaction, leading to corrosion of clips and fasteners.

Never place cladding in direct contact with a house wrap or vapor barrier. Effective water management is crucial. Direct roof water away from decks and cladding, and ensure water is shed out from beneath the deck or behind the cladding to prevent accumulation. Address drainage issues before installing the deck or cladding. Whether you plan to let your decking or cladding weather naturally or maintain its original color, applying one coat of marine oil to all board faces before installation is recommended. This helps mitigate acclimation issues and reduces moisture absorption on the back of the boards. Since there is no UV exposure to the back side of the boards, the coating will protect against long-term moisture absorption.

Environmental Compliance

Products bearing the 'Timber Trust' Certificate of Compliance offer an environmentally superior alternative to non-wood products. These products meet specific Controlled Wood, Chain of Custody, Life Cycle Impact, and Due Diligence Standards, Policies, and Procedures that support environmental sustainability initiatives.

MAXIMO Product Compliance and Sustainability

All **MAXIMO**™ products have undergone third-party NGO verification to ensure they are legally sourced. This verification covers harvesting, transportation, exportation, importation, and documentation, ensuring compliance with all relevant national and international laws, rules, regulations, and treaties. These include, but are not limited to, the U.S. Department of Agriculture Lacey Act, the International Tropical Timber Trade Agreement (ITTA), the Convention on International Trade in Endangered Species (CITES), and the U.S. Buy American Act.

TIMBER TRUST COMPLIANCE

MAXIMO™ products come from naturally occurring, renewable, and sustainable forests. They are not sourced from areas where traditional or civil rights are violated, nor from forests with threatened high conservation values, genetically modified forests, or forests converted to non-forest uses.

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MAXIMO™ products are 100% organic, grown without chemical fertilizers, and regenerated naturally or through seeding and replanting. The longevity of **MAXIMO**™ Wood Products surpasses their natural growth cycle, sequesters carbon, and allows for reclamation, reuse, or recycling. These wood products do not require petroleum-based or inorganic chemical treatments, adhesives, or coatings for their service life. They also do not need specialized handling, storage, or disposal procedures and produce zero non-biodegradable waste post-industrially or post-consumption. **MAXIMO**™ Wood Products are safe for human and animal contact, adhere to low VOC emission standards, and meet International Building Code and International Residential Code requirements for naturally durable wood.

MAXIMO™ assumes no liability beyond the product warranties provided. The act of finishing, cutting, drilling, or installing the product constitutes the installer's acceptance of the material's quality at the time of installation.

Be sure to explore the full range of MAXIMO™ 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

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