



Exterior Decking Installation Guide



WOOD AS A NATURAL RESOURCE

Hardwood is a naturally abundant resource and when harvested responsibly will allow for more growth than removal. Nova's tropical hardwoods are naturally durable without modification and can last a lifetime when properly maintained.

We are committed to promoting sustainable forest management practices and reducing our environmental impact. Our commitment to sustainability begins with our careful selection of wood suppliers who adhere to responsible forest management practices. All of our tropical hardwood products are sourced under the Lacey Act standards which require Nova to document the legal origin of the timber. We support government agencies and third-party certification organizations like the FSC (Forest Stewardship Council) in their efforts to promote sustainable and responsible logging practices in tropical rainforests.

Thermally modified woods utilize a broad range of timber species focusing on fast growing plantation species or secondary timber species that may otherwise not be as desirable. The thermally modified process takes non-durable species and turns them both incredibly durable and stable.

Nova aims to ensure due diligence is done in regard to proper forest management, as such, Nova is fully FSC certified. All efforts are made to ensure that all of the products brought in under the thermally modified program fall either under FSC or OLB certification.

Both Nova Hardwoods and Nova Thermally Modified Woods are great choices for your decking project that not only will yield stunning results, but they are choices you can feel good about in terms of the environment and sustainability.

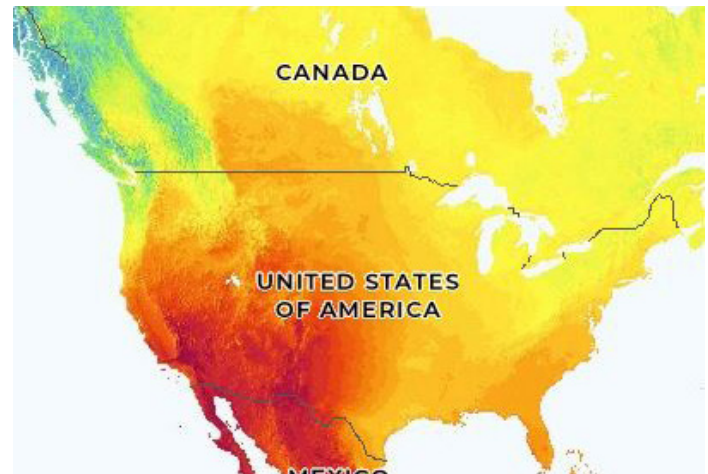
WEATHER AND HOW IT AFFECTS YOUR DECK

Local weather patterns will have a direct impact on your wood project, whether it be siding, decking, hardwood, softwood or thermally modified. Environmental factors like sun exposure, rainfall, snowfall, wind, hail and humidity can all affect how wood behaves and ages.

Exposure to Sunlight: All wood products that are exposed to the sun will naturally turn gray or silver over time. The more sun exposure your deck experiences, the more the graying out process will accelerate.

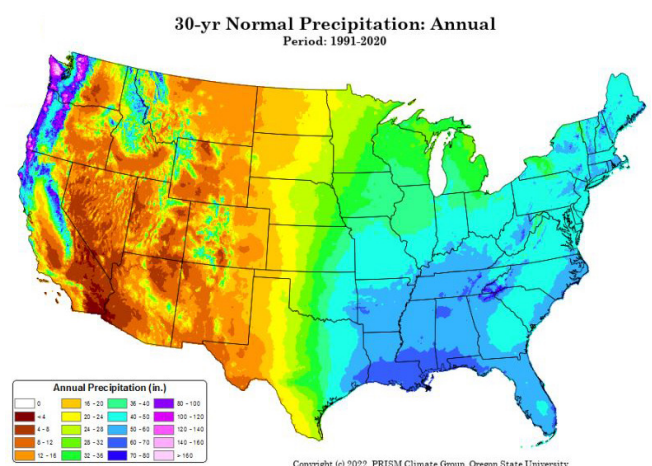
Another factor to consider is west and south facing decks will always experience both more hours and more intense sunlight than north and east facing. Expect to see more accelerated fading or aging on south and west facing surfaces than on north

or east. You may also see more variability in the aging process due to sunlight exposure.



Penetrating exterior wood stains with UV blockers like Nova's ExoShield can protect and maintain your deck's natural color over its lifetime when applied as directed.

Rain and Humidity: All climates experience humidity fluctuations and forms of precipitation throughout the year. When wood absorbs the moisture from the environment, it will swell in thickness and width. As it dries it will shrink back down. It is important to design your decking project with space between boards to allow them to expand to avoid any buckling boards. Nova recommends ¼ inch gap between boards regardless of your location or yearly rainfall.



Excessive exposure to moisture can also result in mold or rot if your decking does not allow for proper ventilation and airflow.

Heat and Humidity: Some environments that have both high humidity and heat like the Southeast US, create the perfect environment for fungi that can cause accelerated rot or decay.

Again, it is incredibly important to consider all of these factors when installing your decking and to know your local environment well.

Hidden fasteners like the ExoDek QuickClip for decking and the ExoClad QuickClip for siding have built in spacing and allow for 360 degree airflow to protect your wood against rot and allow for expansion and contraction of the wood. Finishing your wood with a penetrating oil-based stain like ExoShield can also help seal your wood and protect against water damage.

For an in-depth acclimation guide, visit our website.

STORAGE AND HANDLING

For best results, Nova Decking should be kept out of direct sunlight and not exposed to weather before installation. Be sure you know whether you have a kiln dried or air dried product.

Air dried decking must be allowed to acclimate to approximately 18% moisture content on the job site prior to installation. To determine moisture content, be sure to use a moisture meter that is calibrated for the correct species of wood. Kiln dried decking can be installed after a few weeks of acclimation.

Once a decking package is delivered to the job site, keep the material off the ground by placing a few pieces of lumber underneath the decking package. Cover the material with a tarp to protect from sun damage and rain.

Keep your deck boards stacked evenly and flat so they do not warp or twist while acclimating to the local microclimate, and during storage prior to final installation. We recommend stacking boards with separator sticks or lathe every two feet including support at both ends of your deck boards.

MATERIAL APPLICATION

Board Spacing: Be sure you know whether you have a kiln dried or air dried product. For Kiln Dried decking set spacing between boards at 3/16" for 4" nominal and 1/4" for 6" nominal decking. For Air Dried decking, acclimate on the job site until the material is around 18% moisture content, and then set spacing between boards at 3/32" for 4" and 1/8" for 6" decking. This space between boards will allow for air circulation, room for expansion, and provide for the proper spacing as boards become fully seasoned. The maximum movement, shrinkage or swelling, is typically 3/16" on 4" decking and 1/4" on 6" decking. Spacing 4" nominal boards at 1/4" is acceptable and recommended in areas with large fluctuations in humidity and moisture.

Joist Spacing: You must consult local building codes to be

sure you are following local regulations. Generally, 1×4 and 1×6 decking can be installed with joists on 16" centers. 5/4×4 and 5/4×6 decking can be installed with joists on 24" centers. When installing on an angle, joist spacing should be on 12" centers. Final joist spacing should only be determined after consulting local building codes.

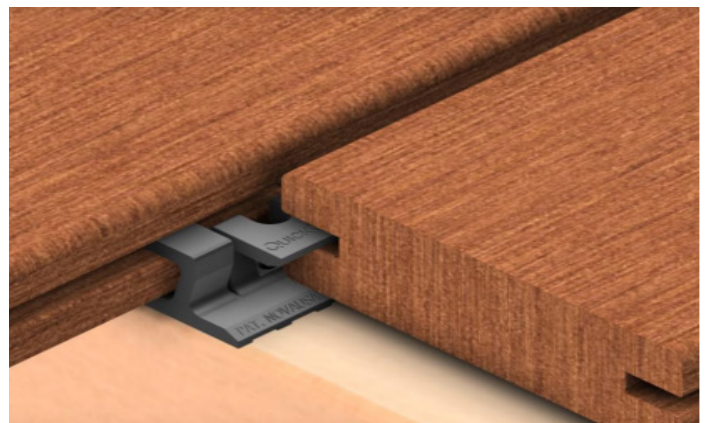
Ground-side Ventilation: Build your deck so that the surface is at least 16" above the ground when using 1×4 or 5/4×4 decking material. When using 1×6 or 5/4×6, the deck must be constructed a minimum of 36" off the ground. There must be adequate air circulation underneath the deck in order to prevent cupping and warping of boards. In wet areas or over water, additional clearance is recommended. In close to ground applications, 60" or less above ground, a vapor barrier is necessary to prevent moisture from absorbing into the underside of the decking boards.

Fasteners: Several different options are available for fasteners and for fastening techniques. We recommend stainless steel screws through the face of every board, two screws per joist. Self-tapping stainless steel screws are available but may require pre-drilling. Pre-drilling is always required on the ends of the boards. We do not recommend the use of non-stainless fasteners because they will cause discoloration near the fastener. Do not use carbon-steel screws.

Hidden Fasteners: We recommend hidden fastener clips, such as Nova's ExoDek® QuickClip®, shown below, that allow for the natural expansion and contraction of the wood as it takes on seasonal moisture.

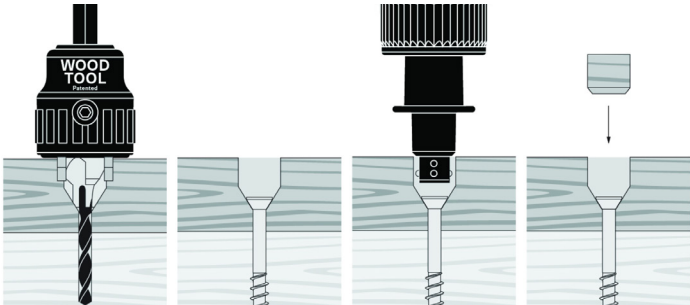
Hidden Fastener Clearance: A minimum of 36" of clearance for 5/4×6 and 1×6 and 24" of clearance for 5/4×4 and 1×4 is required for adequate ventilation - leave a minimum of 50% open area around the edges of the deck. Use netting or lattice to prevent vermin from taking up residence under your deck.

We do not recommend the use of hidden fasteners which do



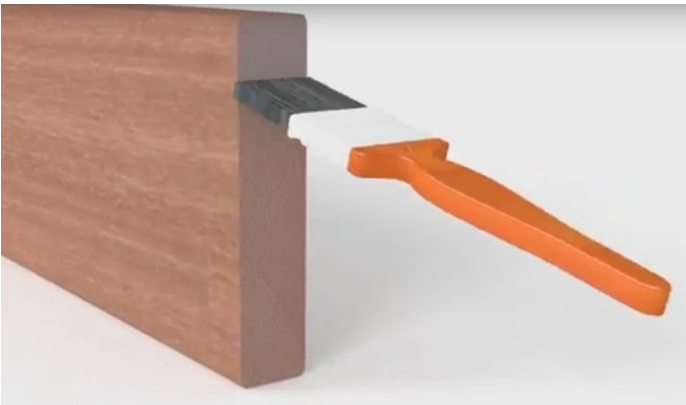
not allow for the boards to move naturally after installation - this includes mechanical fastening systems which fasten from the underside or edges of the boards. Despite manufacturers' claims, we have determined that these products do not provide adequate anchoring of hardwood deck boards to the substructure.

Screw and Plug: The other accepted method for a hidden fastener look is the Starborn ProPlug system, as it still achieves face screwing for maximum hold-down and the use of stainless



steel screws.

End Sealer: Nova Decking is always end-sealed during manufacturing to help prevent splitting and checking on the ends of boards. We require that the boards are end-sealed as soon as possible after making any cuts to the boards. A clear, water-resistant wax should be used. We recommend ExoWax, although several other products are available. If the material is not end sealed the manufacturer will not honor any claims under the warranty.



CLOSE TO GROUND APPLICATIONS

Many people want to build their hardwood deck closer to the ground than we recommend in our installation guidelines. Close to ground applications also include rooftop decks and any type of deck installed directly over a flat structure with less than the minimum recommended 16" of clearance.

We recommend only 1×4, 5/4×4, or narrower boards. Never use 1×6 or 5/4×6 material in close to ground applications.

Spacing between boards: You must allow space for your deck boards to expand when they take on moisture, as they will inevitably do when exposed to wet weather, rain or high humidity. The final spacing should be at 1/4" if you have material with a moisture content in the 10-12% range and relative humidity in the 35-45% range. If you are installing during very dry conditions and the boards are measuring in the 6-8% range, then you should add 1/16" additional spacing so that your deck can handle higher humidity and rain. If you are installing high moisture content material, such as Air Dried Ipe in the 16-18% range, then a gap of 3/16" is appropriate so that material does not gap too much in dry weather.



There is a specific science behind the required gap which is a function of the exact wood species, the beginning moisture content of the wood and the dry and wet extremes you want your deck to handle. In most cases, you should plan for 100% humidity levels and expect that the deck boards will expand to their maximum amount at the fiber saturation point of the wood. The dry side of the equation has more variability since many areas of the country have typical minimum humidity levels. You don't need to plan for bone dry conditions in the Southeastern United States, for example; but you certainly do need to plan for

T	Relative Humidity																			
°F	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	
30	1.4	2.6	3.7	4.6	5.5	6.3	7.1	7.8	8.7	9.5	10.4	11.3	12.4	13.5	14.9	16.5	18.5	21.0	24.3	
40	1.4	2.6	3.7	4.6	5.5	6.3	7.1	7.8	8.7	9.5	10.4	11.3	12.4	13.5	14.9	16.5	18.5	21.0	24.3	
50	1.4	2.6	3.6	4.6	5.5	6.3	7.1	7.9	8.7	9.5	10.3	11.2	12.3	13.4	14.8	16.4	18.4	20.9	24.3	
60	1.3	2.5	3.6	4.6	5.4	6.2	7.0	7.8	8.6	9.4	10.2	11.1	12.1	13.3	14.6	16.2	18.2	20.7	24.1	
70	1.3	2.5	3.5	4.5	5.4	6.2	6.9	7.7	8.5	9.2	10.1	11.0	12.0	13.1	14.4	16.0	17.9	20.5	23.9	
80	1.3	2.4	3.5	4.4	5.3	6.1	6.8	7.6	8.3	9.1	9.6	10.8	11.7	12.9	14.2	15.7	17.7	20.2	23.6	
90	1.2	2.3	3.4	4.3	5.1	5.9	6.7	7.4	8.1	8.9	9.7	10.5	11.5	12.6	13.9	15.4	17.3	19.8	23.3	
100	1.2	2.3	3.3	4.2	5.0	5.8	6.5	7.2	7.9	8.7	9.5	10.3	11.2	12.3	13.6	15.1	17.0	19.5	22.9	
110	1.1	2.2	3.2	4.0	4.9	5.6	6.3	7.0	7.7	8.5	9.2	10.0	11.0	12.0	13.2	14.7	16.6	19.1	22.5	
120	1.1	2.1	3.0	3.9	4.7	5.4	6.1	6.8	7.5	8.2	8.9	9.8	10.7	11.7	12.9	14.4	16.2	18.6	22.0	

bone dry conditions in Arizona and Central California.

Shrinkage and Expansion: The amount of expansion from bone dry to fiber saturation is given by tables in references such as The Wood Handbook. The rate of movement is linear with respect to the moisture content from bone dry (0%) to fiber saturation (generally around 25%). Most hardwoods can be expected to move around 8% which is 0.28" for a 3.5" board. This is the maximum movement from bone dry to fiber saturation.

Typical hardwood species such as Batu, Bangkirai, Torem, Cumaru and Angelim Pedra (as well as many others not sold by Nova) have movement up to 8%. The only hardwood species which is significantly more stable is Ipe, which has a total movement in the 5-6% range. Thermally modified woods also have lower movement, generally 3-5% - be sure to follow the manufacturer's recommendations. We generally recommend Ipe or thermally modified as the best options when building close to ground.

Ipe will exhibit less tendency to cup, warp and or check as changes in moisture content occur. However, all hardwood decking species will exhibit some degree of checking, cupping and warping when allowed to fluctuate from very dry to very moist conditions.

The best way to minimize this movement is to slow the flow of moisture into and out of the boards. We recommend waxing the underside with a typical end seal wax product. Wax should be applied on the raw wood - it is not necessary to coat the material with oil finish if wax is being used on the back side. An oil finish should be applied on the face and edges of every board during installation. Oiled boards may still be waxed on the bottom side provided that the oil allows the wax to penetrate and provide a moisture seal. Some sanding or cleaning with solvent may be required in order to get the wax to properly adhere to the previously oiled boards.

The only reason a wood deck fails when close to the ground is **INCORRECT INSTALLATION**.

Nova's warranty is against rot and decay - it does not cover shrinkage and expansion.

FINISHING OPTIONS

In order to help prevent surface checking, cupping and discoloration, we require that Nova Decking be finished on all four sides with an appropriate and sufficiently-pigmented oil-based product, prior to installation. Especially in dry, sunny conditions, finishing must be done prior to exposure to weather. Deck boards should be oiled on top, bottom and edges. Finishing

Nova Decking on the underside of your deck will reduce potential cupping by inhibiting moisture from absorbing into the wood.

Nova's ExoShield® is a Tung oil based wood stain available in 7 different colors which includes UV blockers and a fungicide, in a low-VOC formula which can cover up to 800 SF per gallon on hardwood.



If a natural silver color is desired, we still require finishing with a Clear or Gray oil-based finish and then letting the material age naturally which will take 2 to 3 years. We do not recommend water based finishes because they do not adequately seal the wood fiber and are prone to excess checking over time.

For best results, apply the treatment according to the manufacturer's directions. To maintain the natural color, a high quality penetrating oil finish with UV inhibitors should be used.

Nova Decking can also be pressure washed, but you must be careful not to damage the surface wood fibers by setting the pressure too high. Pressure washing may be necessary between oil treatments in order to remove surface discoloration.

Porch Flooring: It is recommended that all T&G exterior applications be in a covered environment and be installed with a pitch to allow for proper drainage. Please refer to your local building codes on pitch requirements. Material should be finished on all six sides before application to prevent moisture from collecting on the underside of the deck. T&G products do not allow spacing for ventilation, which is why only covered installations and adequate ventilation underneath the deck are required. Fastening should be done with stainless steel fasteners.

REQUIRED EQUIPMENT

Nova Decking can be easily crosscut with a good quality chop saw using a carbide-tipped blade. Ripping can be done on a standard table saw, using a well-aligned high quality fence and a

carbide-tipped blade. A combination tooth blade works well for both cross cutting and ripping.

When drilling, always use the highest quality drill bits available. If screwing through the face, a countersink bit with a positive stop, such as the Starborn Smart-Bit, should be used to ensure all screw heads end up at a consistent depth. Fasteners should be pre-lubricated for easiest assembly.

Routing or planing can be done with both high speed steel or carbide cutters. Feed speed should be fairly slow. When routing be sure that the cutter head is spinning with the cutting face into the material. Sanding may be necessary before a final coat of finish is applied.

Hidden fasteners can be used with pre-grooved decking. Cutting grooves can also be done with a biscuit joiner - just be sure you test fit the clip to your boards to confirm you have the tool height set correctly. Start with a 3/16" height groove, centered in a nominal 5/4×4 or 5/4×6 deck board, and adjust so you get a tight fit without forcing the clip into the wood.

PRODUCT RESOURCE INFORMATION

Starborn Industries
Headcote Screws, Smart Bit,
ProPlug Fastening System
www.starbornindustries.com
800-596-7477

Nova USA Wood Products
ExoDek QuickClips
ExoWax End Sealer
ExoShield Wood Stain
www.novausawood.com
503-419-6407

SAFETY CONCERNS

Safety glasses and a dust mask should always be worn when working with hardwood lumber. We recommend an active carbon filter dust mask. Some people may have an allergic reaction to hardwood dust. Remove wood splinters immediately to prevent infection.

WARNING

Drilling, sawing, sanding or machining wood products generates wood dust, a substance known to the State of California to cause cancer. Avoid inhaling wood dust or use a dust mask or other safeguards for personal protection.

DISCLAIMER

Our tropical decking products are carefully manufactured and inspected to ensure quality. However, these products are natural wood products and are subject to variations in weight, density, color, grain and performance. Wood decking is subject to dimensional changes as the moisture content in the wood fluctuates with humidity in the air. Swelling, shrinkage, checking, and other movement of individual pieces are normal occurrences in wood decking.

Local building codes must be consulted when building an exterior deck. Most counties require building permits.

Call the experts at Nova if you have any questions.
(503) 419-6407

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