



TROPICAL

Forest Products

**Naturally Durable Hardwoods
History, Applications, Available Species,
and Specification Development**

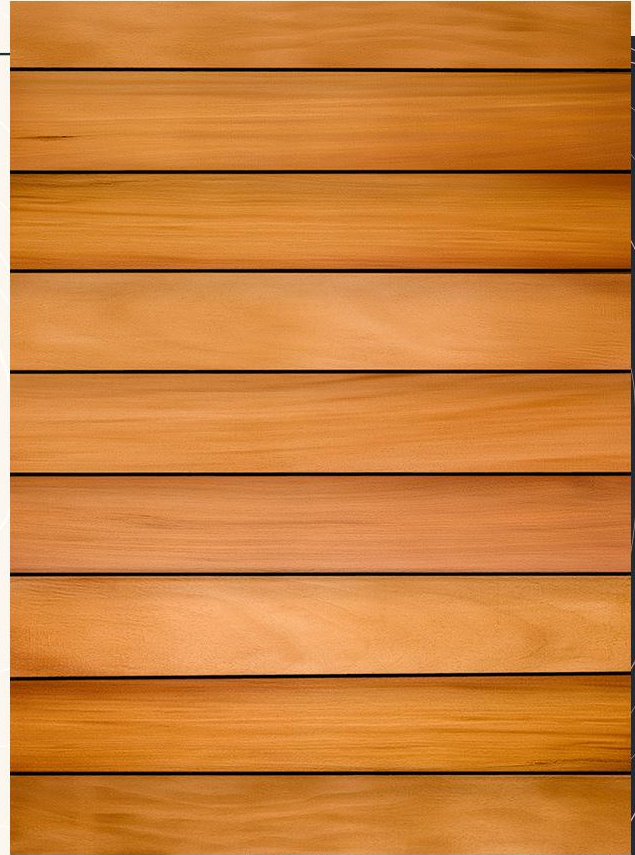


Presenter: _____

BRIAN LOTZ

- Tropical Forest Products
- Product Development
- Business Development
- Environmental Compliance
- Architectural Sales

Tropical Forest Products is the originator of the **Black Label™**, **Legal Lumber™** and related trademarks.



Tropical Forest Products

Tropical Forest Products specializes in the sourcing and supply of naturally durable hardwood products.

Markets / Exterior

- Residential and Commercial Decking & Cladding
- Architectural Millwork & Site Amenities
- Bridge, Boardwalk and Marine Construction
- Trucking, Railroad and Industrial

Course Goals



- promote building materials which enhance aesthetic sensibilities and enhance health, safety and human welfare.
- promote building material which reinforce human connection to the environment
- promote building products which reduce environmental impacts
- reverse trends away from non-sustainable building products

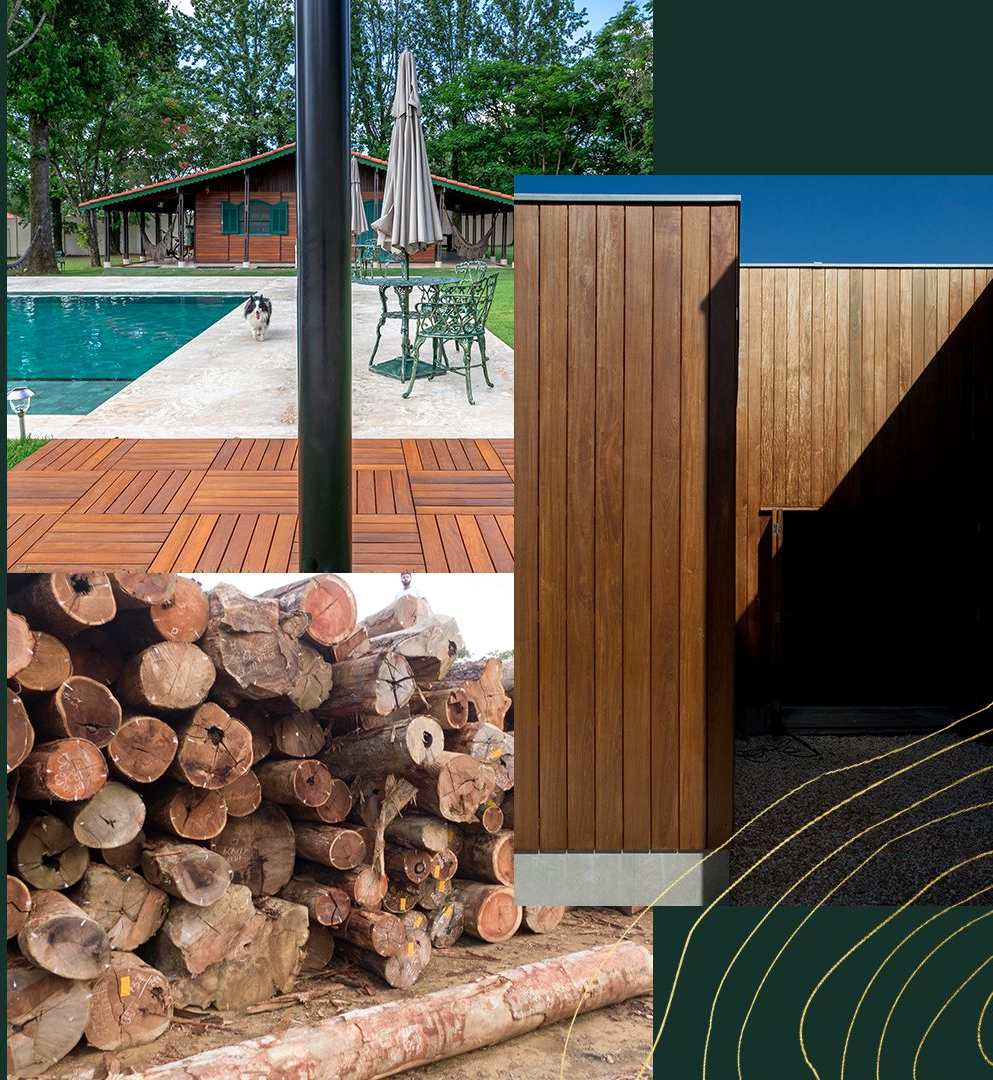
Expectations for today's session;



- A history of naturally durable hardwoods and their applications.
- A knowledge of commercially available naturally durable hardwood species and their applications.
- The importance of specifying renewable resources as a component of forest sustainability.
- An understanding of current environmental compliance strategies designed to support resource sustainability.
- The importance of writing specifications for naturally durable hardwood products based on comprehensive submittal requirements.

WHY WOOD?

- Beauty
- Character
- Contrast
- Connection
- Lowest Environmental Impact
- Lowest Life Cycle Cost



Ship and Boat Building



"The most enduring of woods; it defies decay; time, weather, water, the white rot and the sea worms have no effect on it."

Scientific American: Architects and Builders Edition, 1886 speaking of Jarrah Wood



**Ipe Wooden
Anchor Cross Arm
- Intact after 349
Years of Marine
Borer Exposure**

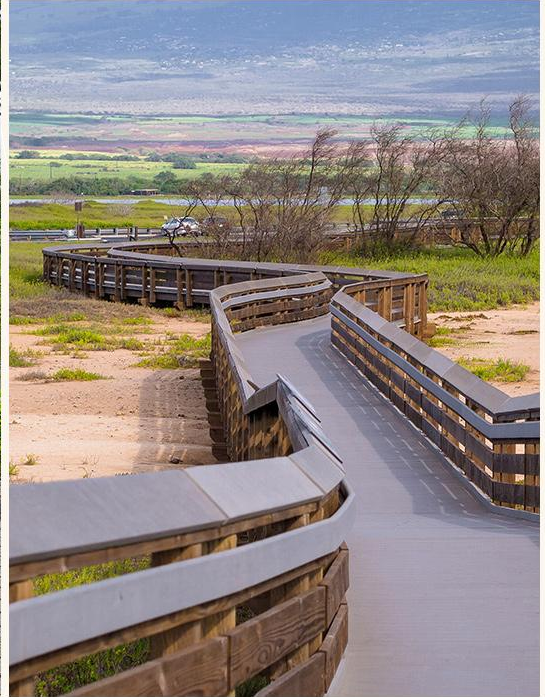
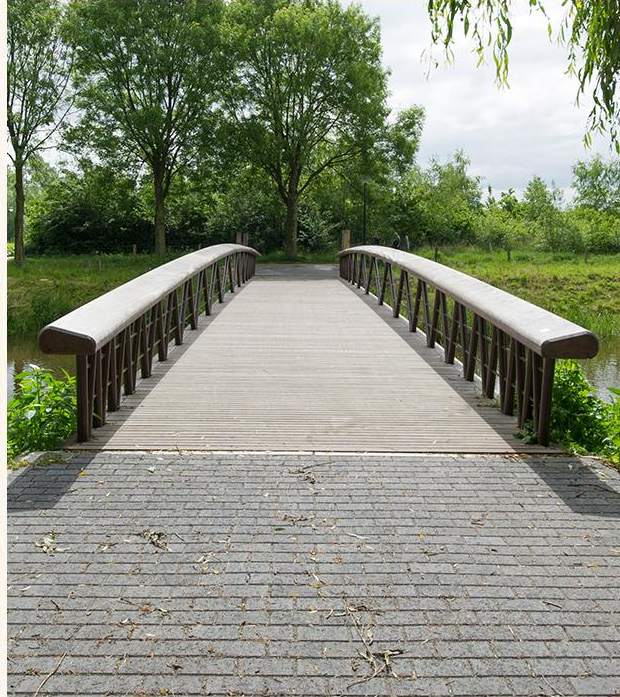


**Genuine
Mahogany
and Teak**



Boardwalks

- Building of wooden boardwalks began in the 18th century and continues today.



Time Tested Performance History

- The benefits of naturally durable hardwoods has been recognized for centuries.
- While wood substitutes and wood treatment and enhancement technologies have improved over time, no material option provides the collective benefits of beauty, durability and structural performance associated with naturally durable hardwoods.



*CCA treated Pine after 5 years
on the Atlantic City Boardwalk*



*Ipe decking after 25 years on the
Atlantic City Boardwalk*



LIFE CYCLE COST ANALYSIS



In 2014, post Hurricane Sandy, the Army Corps of Engineers issued a memo addressing the life cycle financial costs of naturally durable tropical hardwoods verses various alternatives building materials for boardwalk reconstruction.

SUBJECT: *Impracticality of non IPE lumber for Boardwalk Decking*

1. The purpose of this memo is to provide clear evidence and justification for the necessity of specifying IPE/Bethabara/Cumaru/Macaranduba tropical hardwood lumber species for Boardwalk decking.



Waterfront Development



Marinas And Docks



Industrial Applications

- Superior resistance to deterioration from corrosive chemicals like those used in tanning leather. A process which includes high temperature and rapid shifts from acids to alkaloids.



Railroads and Bridges



Site Amenities



Heavy Timber Construction



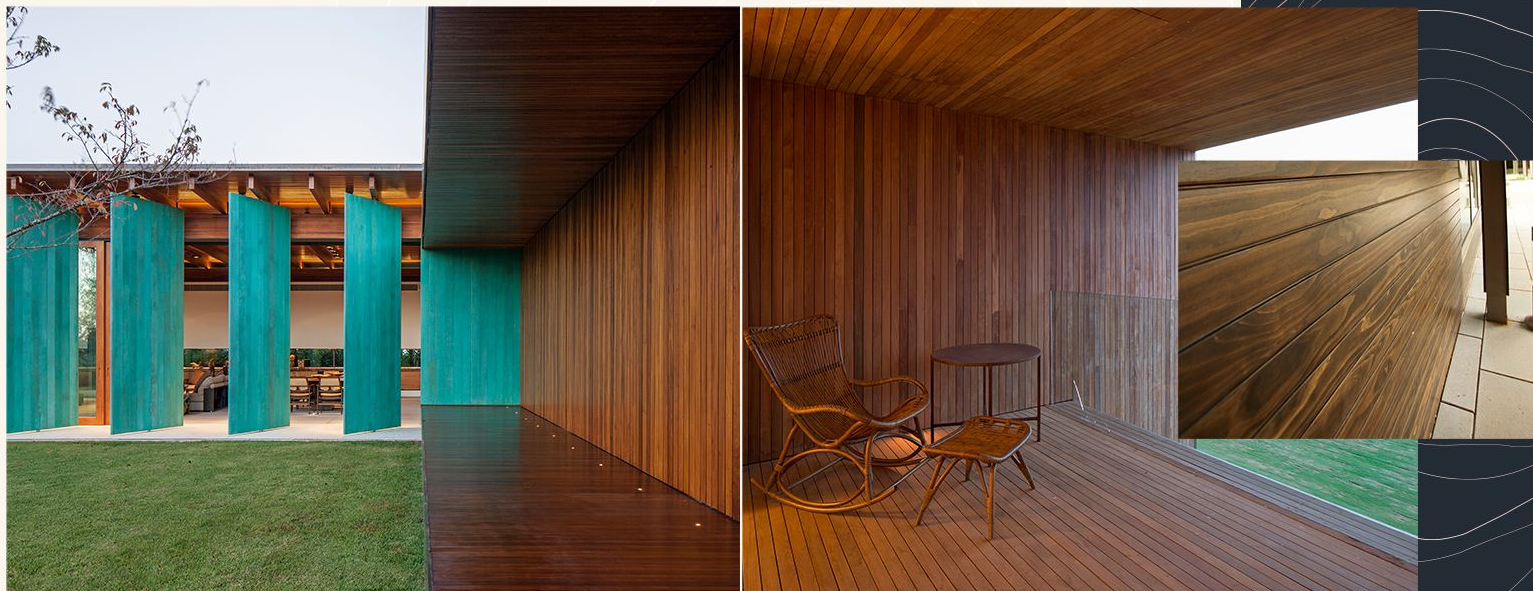
Decks



Architectural Millwork



Cladding / Rain Screen



Black Label Rain Screen and Soffit System

- Rain Screen and Soffit



Roof Decks



Urban Boardwalks Curb Appeal



Deck Tile and Pedestal Options



2'x2' / 2'x4' / 2'x6' Options



All Wood Is Not Created Equal Comprehensive Specification

- Life Cycle Assessment
- Code Compliance
- Species Selection
- Certified Written and Visual Grading Rules and Compliance
- Certified Allowable Design Values
- Certified Product Testing
- Certified Engineered Performance
- Comprehensive Installation and Best Practices
- Certified Environmental Compliance
- Product Source Information

= Comprehensive Specification Language and submittal requirements

CSI Master Specification Language should be available
from any qualified product manufacturer or vendor



BLACK LABEL DECKING, LUMBER AND TIMBERS Guide Specifications in CSI Format

Once established it is incumbent on a company to develop and promote written Specification Language which requires compliance with the policies and procedures they have established in an effort to encourage other companies to follow suit.

SECTION 061500 WOOD DECKING, LUMBER AND TIMBERS

A comprehensive specification should include:



- Product Description
- Grading Rules
- Technical Compliance Data
- Environmental Compliance
- Supply Source Information
- Submittal Document Requirements

Code Compliance Highly Durable Wood

International Building Codes International Residential Codes



- Highly Durable Wood is defined as having greater durability as Redwood or Cedar without the use of Chemical Treatments
- Minimum in ground durability of 25 years +
- Minimum above ground durability of 50 years +
- Class A or better fire rating.



Species Selection

Class	Durability	Years in Ground	Years Above Ground	Species
tl	Highly Durable	25+	50+ untreated	Ipe, Garapa, Cumaru, Greenheart, Purpleheart, Teak, Ekki, Dark Red Balau
II	Durable	15+	30+ untreated	Genuine Mahogany, Western Red Cedar, Redwood
III	Moderately Durable	5+	15+	Douglas Fir, White Oak,





Weathers to
Silver Grey
patina...

Source: Kuiken Brothers Inc.



Rich Walnut Brown Natural color

Ipe

Black Label Ipe is available in all Standard
U.S. Nominal Dimensions from 1x4 up to
4x12 in lengths to 20'.



Garapa



Weathers
to a soft
Silver Grey
patina...



Unique and Warm Honey Golden Teak Natural color

Garapa Characteristics



White spots may appear from silica

Garapa Gold is available in all standard U.S. nominal deck dimensions
1x4, 1x6, 5/4x4, 5/4x6, 2x4, 2x6 and 4x4 in lengths to 20'

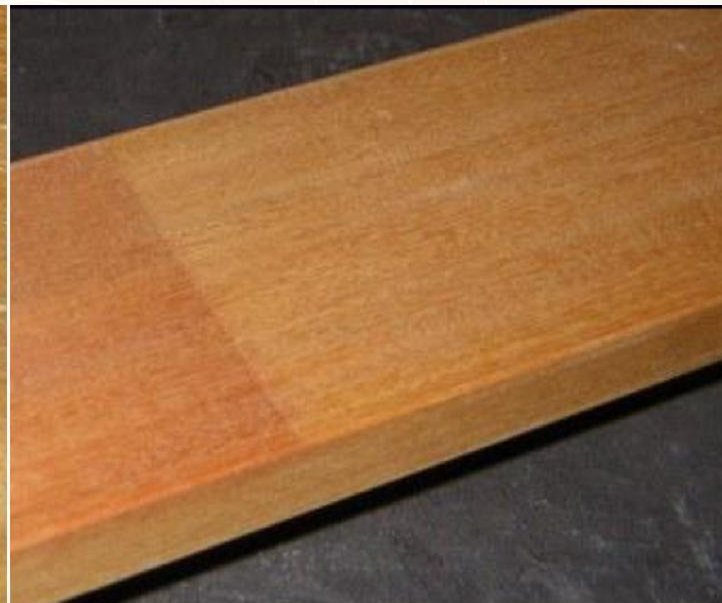
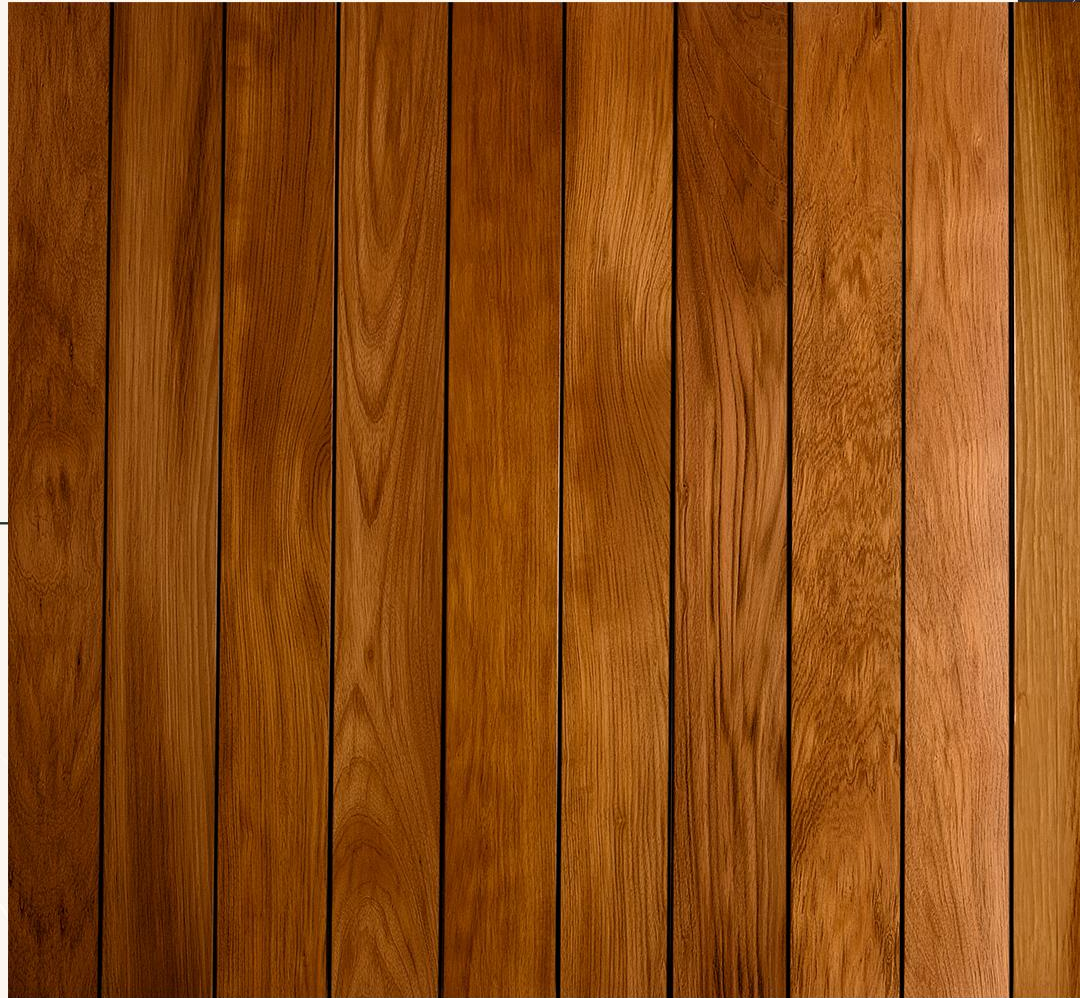


Photo Sensitive – Garapa will darken on exposure



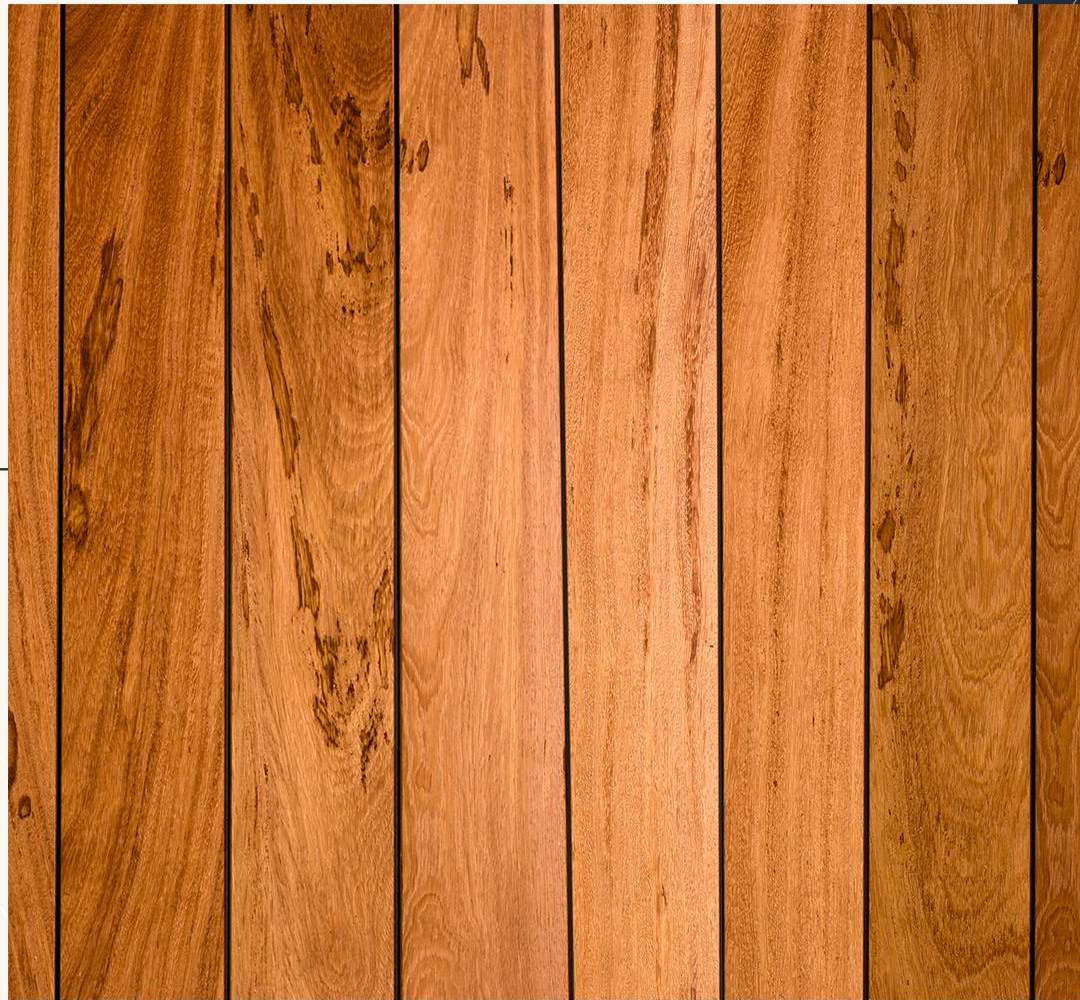
Jatoba



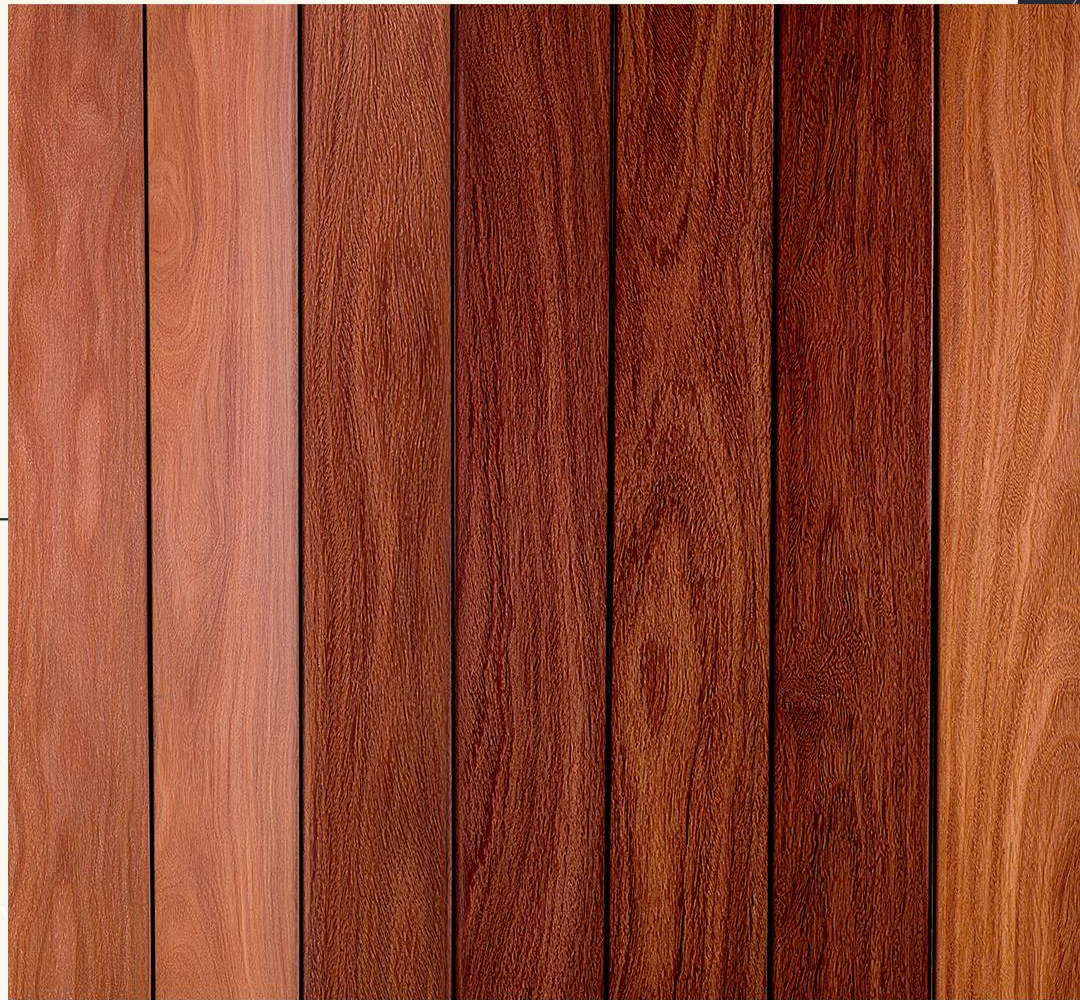
Tigerwood

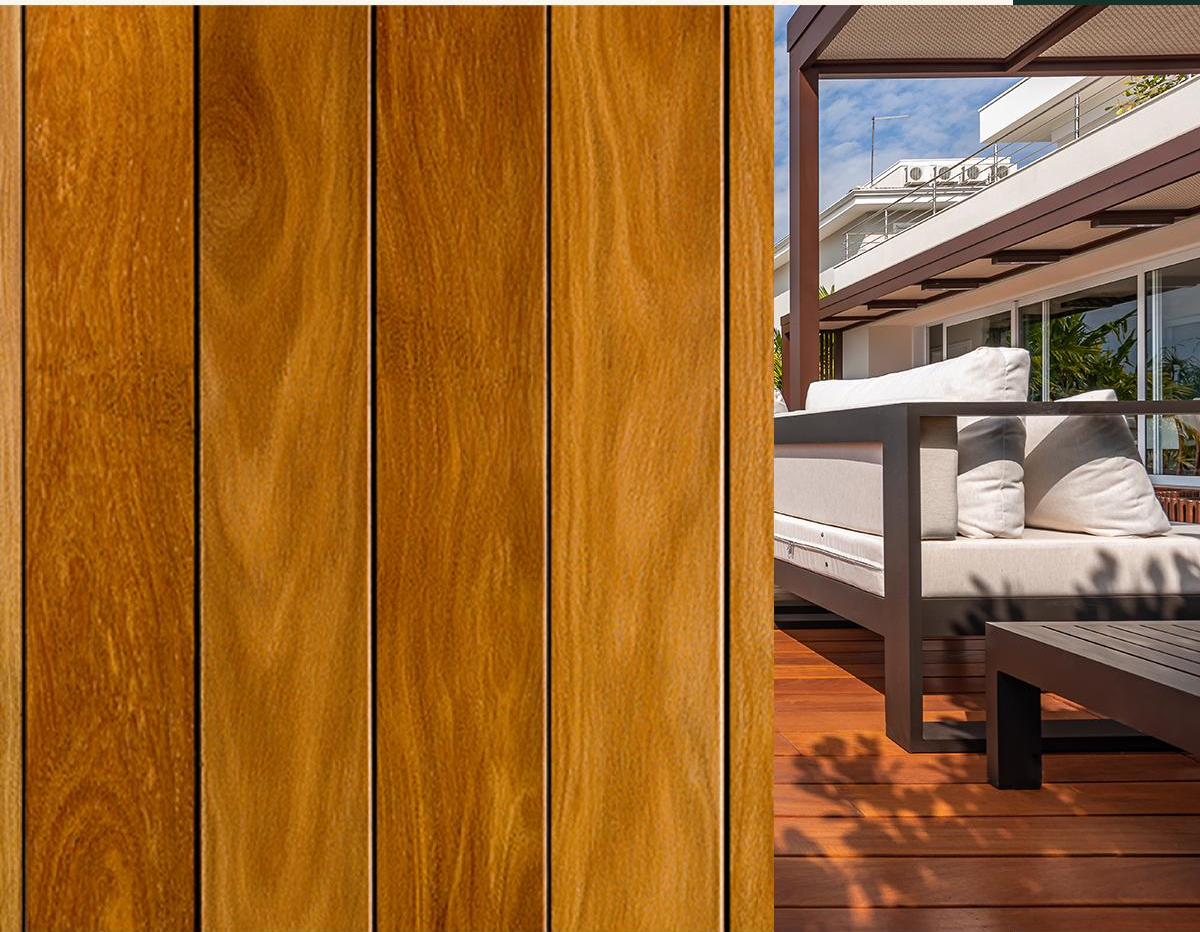


Angelim Pedra



Cumaru





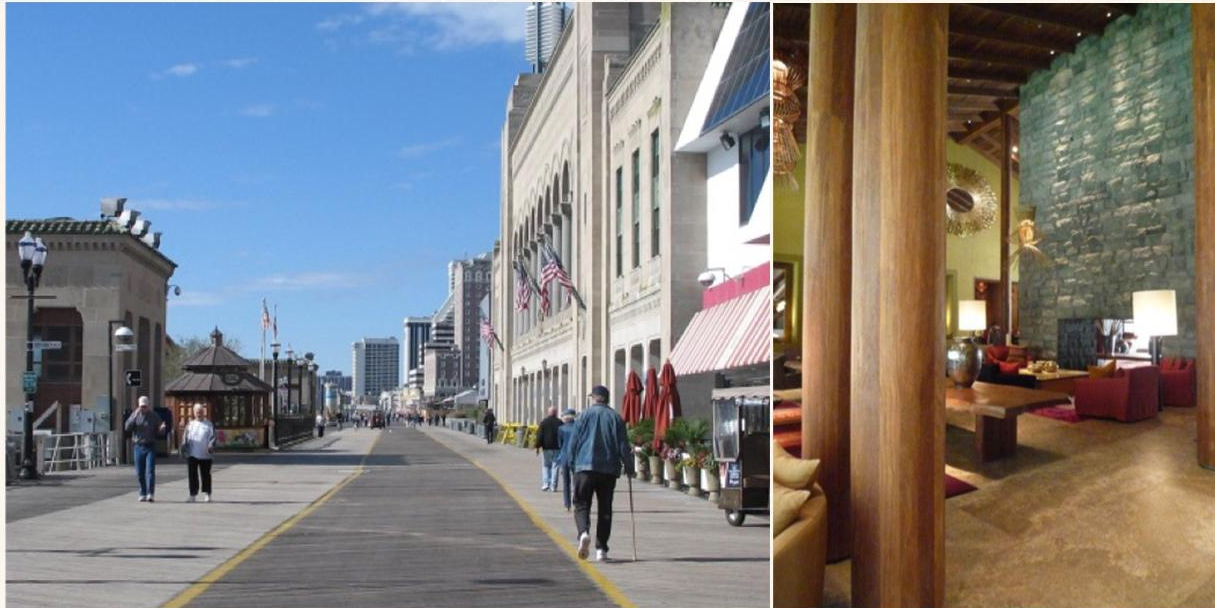
Mahogany
Red to Walnut
Brown Color
Range.

**Coarse
interwoven
grain.**

Large
Dimensions and
Timbers up to
12"x12"x20'

Cumaru - Commercial Solutions

- Considered an “Or Equal” to Ipe by the U.S. Army Core of Engineers,
- Cumaru has the advantage of being able to be ordered in large volumes of single dimension and single length.





Dark Red Balau

Dark Red Balau is available in standard U.S. nominal deck dimensions up 1x4, 1x6, 5/4x4, 5/4x6, 2x2, 2x4, 2x6, 5/4x8 and 4x4 in lengths to 20'

Ekki/Azobe - Heavy Timber Solutions

- Available in any dimensions up to 16"x24" and lengths to 52'



**Chocolate
Brown Color**



OTHER SPECIES

Other naturally durable hardwoods species include...

Purpleheart, Greenheart, Itauba and more.

We have presented what are currently the most commercially available and reliably sourced as primary species.

It is important to evaluate species and availability prior to specification by speaking with an established supplier.



Certified Grade



Wood performance is directly tied to clearly defined written grading rules. If you don't include written grading rules in your specification you will receive the lowest possible grade.



BLACK LABEL™ (Premium Select) -
Architectural Grade – Inspected to be
free from defect on 4 sides and 4 Edges.
Grading Face, Back Face, and Edges –
Clear All Heart

FEQ (First Export Quality)
- Commercial Grade – Inspected to be
free from defect on 1 face and 2 edges.

FAS (First and Seconds/Mill Run)
Mix of FEQ and Com/Sel.



Certified Design Values - Engineered Performance

Structural Performance is directly tied to grade. Written Grading Rules and associated Allowable Design Values must be included in any comprehensive naturally durable hardwood specification.

Allowable values For Wood (Based on ASTM D245)						
Dimension Lumber		1" to 4" thick by 2" and wider				
Wood name	Grade	Extreme Fiber Stress in Bending "FB" Single Member	Modulus of Elasticity	Compression		Shear parallel to Grain
				Parallel to Grain II	Perpendicular to Grain	
Black Label	Architectural	2,900	2,280,000	3,600	1,735	540
	FEQ	2,150	2,280,000	2,750	1,735	270
	COM/ SEL	1,800	2,280,000	2,100	1,735	270
	FAS	1,800	2,280,000	2,100	1,735	270
Values in PSI						
Beam & Stringers		4" and thicker, width more than 2" greater than thickness				
Wood name	Grade	Extreme Fiber Stress in Bending "FB" Single Member	Modulus of Elasticity	Compression		Shear parallel to Grain
				Parallel to Grain II	Perpendicular to Grain	
Black Label	Architectural	3,600	2,280,000	3,600	1,735	540
	FEQ	2,400	2,280,000	2,750	1,735	270
	COM/ SEL	1,800	2,280,000	2,100	1,735	270
	FAS	1,800	2,280,000	2,100	1,735	270
Values in PSI						

Tropical Forest Products provides certified design values based on clearly defined Iron Woods grading rules and product testing.



Certified Product Testin Technical Compliance

Comprehensive specification submittals should include a comprehensive Certificate of Technical Compliance including available testing data.

- Brand specific testing
- Structural
- Mechanical
- Screw pullout
- Fire resistance
- Slip Resistance
- CalFire Wildlife Urban Interface



CERTIFIED ENGINEERING

Certified Performance

Comprehensive Specification submittals should include engineered and certified engineering Master Plan Sheets



Best Practices

- Comprehensive Best Practices for the Installation and maintenance of naturally durable hardwoods have been developed from over 30 years experience in the field.
- A comprehensive Best Practices Guide should be part of any comprehensive naturally durable hardwood specification.



Technical - Material Handling - Installation - Finishing - Maintenance - Environmental



WOOD IS GOOD

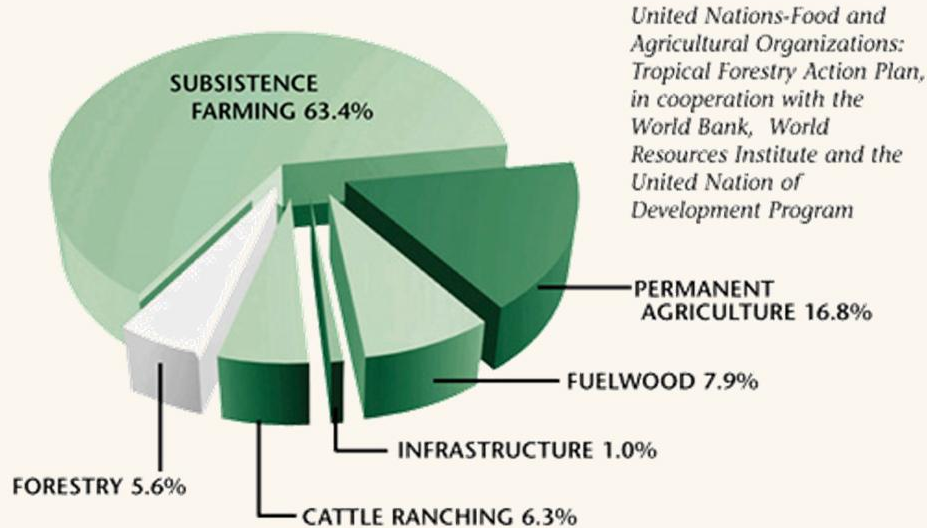
Cradle to Cradle Life Cycle Impact of Wood vs Alternate Materials

- natural and renewable resource
- carbon sequestering
- production waste creates energy
- natural durability/no modification
- reclaim...reuse...recycle
- organic/ biodegradable
- safe
- timber reduces the use of non-renewable resources



Life Cycle Assessment Common Misconceptions

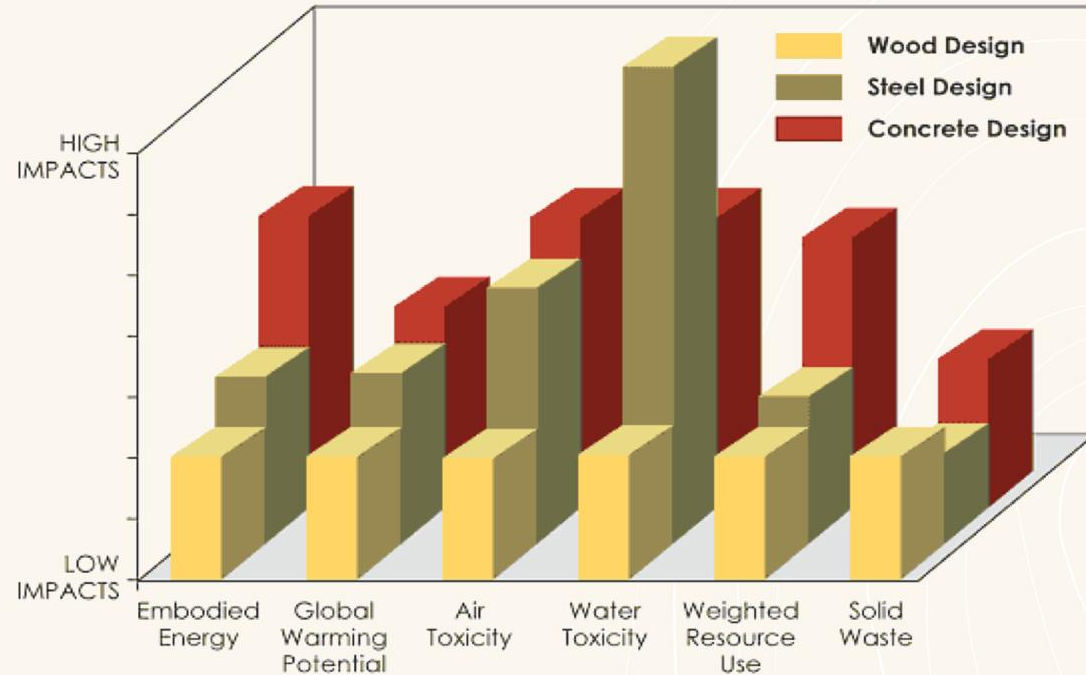
Main causes of rainforest degradation



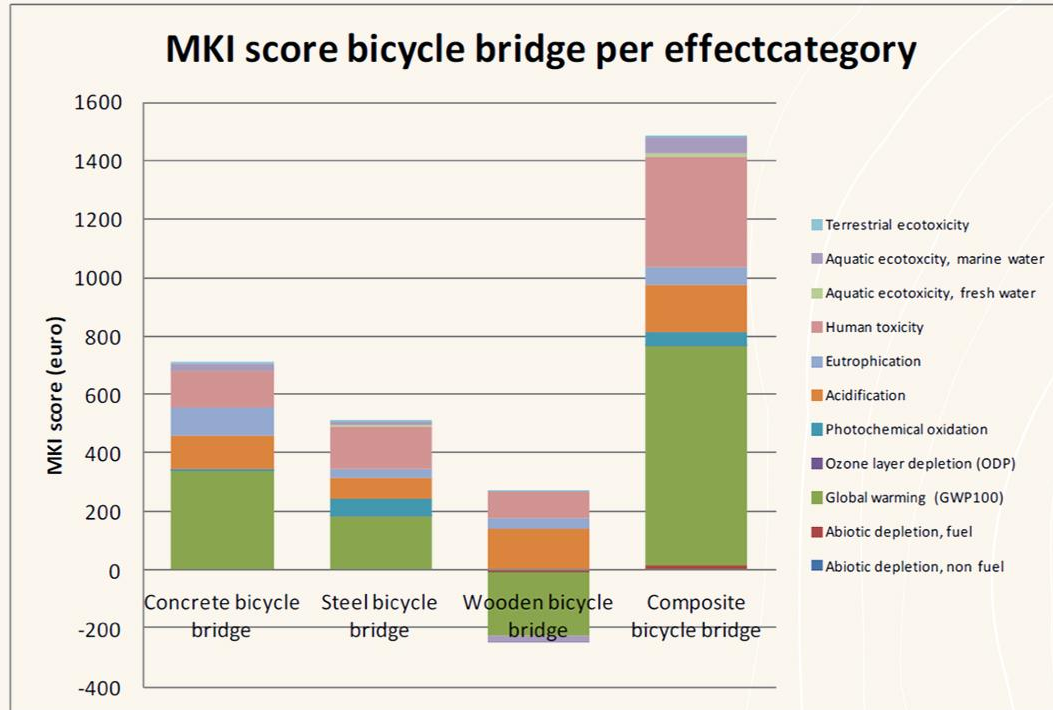
Tropical Forests can be sustained only if the value of sustainably managed tropical forest products exceed the value converting tropical forests to non forest use.



Life-Cycle Assessment Wood vs Non Wood



LCA - MKI (Environmental Cost Indicator)



Certified Environmental Compliance

To preserve forests, you must preserve their value as a sustainable resource to protect the land resource against conversion to non forest uses.

The importance of specifying forest products cannot be over stressed.

Designers and specifiers play the single most important role in forest preservation by providing value to the worlds most renewable resource.

Inclusion of comprehensive environmental specification language in written project specifications supports those products and companies committed to forest sustainability.

Submittal Documents should include Certificates of Environmental Compliance verifying compliance with International 'Due Care' environmental compliance standards.

U.S. LACEY ACT

IT'S THE LAW



ENVIRONMENTAL COMPLIANCE

laws and initiatives

The U.S. Lacey Act is a federal law established in 2008 prohibiting the import, trade and possession of illegally harvested forest products.

The U.S. Lacey Act incorporates the U.S Foreign Corrupt Practices Act, U.S Forced Labor Laws and U.S. Buy American Act.

The Lacey Act is enforced by the U.S. Department of Agriculture and U.S. Department of Justice.

The Lacey Act requires that importers apply "**Due Care**" in the specification, sourcing, trade, manufacture and distribution of forest products imported to the USA.

Penalties for violation of 'Due Care' standards include fines of up to \$500,000 and up to 5 years in prison.

The U.S. Lacey act removes all corporate veils of protection.

ENVIRONMENTAL COMPLIANCE

laws and initiatives



- The importance of supporting products and brands that take environmental “Due Care” compliance seriously is the cornerstone of sustainable design.
- For any company trading in wood products both tropical or temperate, imported or domestic this process starts with the development of clearly defined written, implemented and enforced **Controlled Wood Policies and Procedures** that verify compliance with all international and domestic laws and regulations pertaining to the environmental, legal and ethical harvest, processing and trade of wood products.
- Submittal requirements should include a copy of a suppliers written environmental ‘Due Care’ policies and procedures.

STEP

1

Verify if your product vendor has written environmental compliance systems and procedures.

ENVIRONMENTAL COMPLIANCE laws and initiatives

- The importance of supporting products and brands that take environmental “Due Care” compliance seriously is the cornerstone of sustainable design.

It is also the responsibility of an environmentally conscious company to

- develop programs like our Legal Lumber™ ‘Due Care’ Environmental Compliance program to promote the life cycle environmental benefits associated with naturally renewable forest products over non-renewable resource based alternatives and compliance with all international laws pertaining to sustainability and the legal trade of forest products.



STEP 2

Check if the foreign or domestic wood species you are specifying are listed in the CITES Appendixes.

ENVIRONMENTAL COMPLIANCE laws and initiatives

- **CITES** (The Convention on the International Trade of Endangered Species) was established to clearly identify any plant or animal species which fall into one of three appendixes or categories.

Appendix I – Species threatened with extinction.

Appendix II – Species which may become threatened with extinction if not closely monitored.

Appendix III – Species that are already being voluntarily being regulated by a specific country of origin irrespective of Appendixes I or II.



STEP 3

Verify that the foreign or domestic wood product you are specifying comes from a country that has signed the ITTA (International Tropical Timber Agreement).

ENVIRONMENTAL COMPLIANCE laws and initiatives

- **ITTO** (International Tropical Timber Organization) and the ITTA (International Tropical Timber Agreement) The ITTO as an organizational body made up inside of and overseen by the United Nations is made up of member countries who have signed an agreement to adopt and support CITES regulations.



ITTO

INTERNATIONAL TROPICAL
TIMBER ORGANIZATION

STEP 4

Verify that the foreign or domestic wood product you are specifying that the wood product you are specifying is U.S. Lacey Act Compliant

ENVIRONMENTAL COMPLIANCE laws and initiatives

- **Lacey Act** (U.S. Federal Ban on the Trade of Illegally Harvest Plant and Forest Products). Enforced by the U.S. Department of Agriculture with harsh financial and criminal penalties modeled after U.S. drug trafficking laws, the Lacey Act is a good example of individual ITTO member countries enacting and enforcing domestic laws in support of International laws.



ENVIRONMENTAL COMPLIANCE

laws and initiatives

- **U.S. Buy American Act** The U.S Buy American Act requires that government agencies preference products sourced and or produced in the United States unless there is no products with equivalent qualities available domestically or if that product is required for historic preservation. Iron Woods fall into this category as there are no species of wood grown domestically which provide the performance characteristics associated with naturally durable tropical hardwoods.



Environmental Leadership

- These International and Domestic Laws and Regulations backed by implemented and audited systems and procedures and independent environmental initiatives represent the Minimum standard of accountability under which Tropical Forest brand products are sourced, processed, distributed and sold under a comprehensive “Due Care” Program.



Environmental 'Due Care' Compliance



- Tropical Forest and Black Label™ brand products are sourced using documented comprehensive 'Due Care' standards, policies and procedures.

- Tropical Forest and Black Label™ brand products are third party chain of custody audited and verified legal.





Environmental Leadership

As a component of our commitment to 'Due Care', Tropical Forest Products worked integrally with Unifloresta to develop their third party legal verification program and was the first company to engage legal verification on 100% of our **Tropical Forest and Black Label™** products originating from Brazil under our **Legal Lumber™** Due Care Compliance Program..

Comprehensive Legal Lumber™ Certification

“All **Legal Lumber™** certified products have been third party chain of custody verified of legal origin and verified of legal 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 ITTA (International Tropical Timber Trade Agreement), CITES (Convention On The International Trade of Endangered Species) U.S. Department of Agriculture Lacey Act, U.S. Foreign Corrupt Practices Act, U.S. Forced Labor Laws and U.S. Buy American Act.”



Comprehensive Legal Lumber™ Certification language

“All **Legal Lumber™** certified products are derived from forests which are naturally occurring, renewable and sustainable and are not harvested from forests or forest plantations where traditional, civil or intellectual property rights have been violated, forests having high conservation values which are threatened, forests that have been genetically modified or forests which have been converted to non-forest use.”

“All **Legal Lumber™** certified products are sourced with a preference to those forestry operations implementing LIL (Low Impact Logging) techniques and sustainable forest management practices.”



Comprehensive Legal Lumber™ Certification language

All Legal Lumber™ certified products are 100% organic and grown without the use of chemical fertilization and are regenerated naturally or by seeding and replanting.

All Legal Lumber™ certified products are either kiln dried or fumigated and are free from invasive insect, plant or animal species.

The natural service life of Iron Woods®, exceed their natural growth cycle, trap and store carbon and are able to be reclaimed, reused or down-cycled.

All Legal Lumber™ certified products are 100% bio-degradable and do not require for service any petroleum based or inorganic chemical treatments adhesives or coatings.

All Legal Lumber™ certified products do not require for service any specialized handling storage or disposal procedures and generate zero post-industrial or post-consumer non-biodegradable waste.

All Legal Lumber™ certified products are also safe for human and animal contact, meet Low VOC emission standards and meet International Building, International Residential and Cal Fire Wildlife Urban Interface Code requirements for naturally durable wood.

Environmental Compliance Initiatives Voluntary

- USGBC (U.S. Green Building Council) and LEED (Leadership in Environmental Design) Programs like the USGBC and LEED provide financial incentives in the form of tax relief for designing buildings which meet minimum environmental criteria in support of sustainability efforts.



Environmental Compliance Initiatives Voluntary

- **FSC** (Forest Stewardship Council) The FSC developed Principles and Criteria for sustainable forest management. The adoption of which and participation in by forest products producers and distributors is completely voluntary. These Principles and Criteria have been created for both temperate and tropical, domestic and foreign forest management and if adopted should not be adopted selectively in favor of any country or species over any other.



Currently the only approved certification scheme approved by USGBC for LEED compliance is FSC certification.

Source Information

- Comprehensive Specification Language should always include manufacturer or supplier contact information to facilitate the bidding process.
- Source information should include
 - Vendor Name**
 - Vendor Address**
 - Vendor Phone Number**
 - Vendor Email Address**





TROPICAL



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