Technical Bulletin – ICC-ES Format Submittal Document

Certificate of Compliance International Building Code/International Residential Code

Division:06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 00 00—Naturally Durable Wood

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SUBJECT:
Iron Woods® Timber, Lumber, Decking, Rail, Cladding and Architectural Millwork Products – Included in Scope. Naturally Durable Wood Species including but not limited to Ipe, Garapa, Cumaru, Red Balau, Itauba, Goncalo Alves, Angelim Pedra and other wood species as produced under Iron Woods Brand.

1.0 SCOPE

1.1 Compliance with the following codes:

2015 International Building Code® (IBC) Naturally Durable Wood
2015 International Residential Code® (IRC) Naturally Durable Wood
2015 International Building Code® (IBC) Fire Resistant Wood
2015 International Residential Code® (IRC) Fire Resistant Wood
2015 International Building Code® (IBC) Slip Resistance of Hard Surface Floor Materials
2015 International Residential Code® (IRC) Slip Resistance of Hard Surface Floor Materials
2015 CalFire Wildlife Urban Interface Compliance

Properties Evaluated:

Structural
Natural Durability
Fire Resistance
Slip Resistance
Grade

Attributes verified:

See Section 3.1

2.0 USES

Iron Woods® Naturally Durable Wood Products meeting minimum performance standards as outlined in this report, are for use as (Exterior) Lumber, Deck Boards, Deck Tiles, Timbers, Guard/Hand Rail, Cladding, Soffit, Rain Screen, Structural Components, Architectural Millwork and Site Amenities. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

2.0 DESCRIPTION

3.1 General:

Iron Woods® are Naturally Durable Hardwood Lumber Products 100% Organic containing no chemical treatments or coatings to enhance technical performance, meeting the (IBC/IRC) definition of Naturally Durable Wood, Naturally Fire Resistant Wood and Slip Resistant Hard Floor Surface.

The attributes of Iron Woods products have been verified as conforming to the provisions of (i) IBC/IRC definition of Naturally Durable Wood (ii) U.S. Forest Products Laboratory definition of Highly Durable/Highly Resistant Class 1. (iii) British Standards definition of Highly Durable/Highly Resistant D70 .

3.2 Grade

When graded in accordance to Iron Woods® Written Grading Rules material shall be inspected and certified as compliant with an industry standard allowable sub grade factor of maximum 5%.

3.3 Condition:

When graded in accordance with Iron Woods® Grading Rules material shall be inspected and certified as being either:

3.3.1 Air Dried having a moisture content between 16% and 30%

3.3.2 Kiln Dried having a moisture content between 12% and 16%

3.4 Durability:

3.4.1. Above Ground - When subjected to weathering, insect attack and other decaying elements, Iron Woods® shall have a durability rating no lower than Class 2 as per U.S. Forest Products Laboratory Technical Data Sheets.

3.4.2. In Ground Contact - When subjected to weathering, insect attack and other decaying elements, Iron Woods® shall have a durability rating no lower than Durable in Ground Contact, 15 years as per U.S. Forest Products Laboratory Technical Data Sheets.

3.4.3. Salt Water Submersion – When subjected to salt water marine environments Iron Woods® shall have a durability rating no lower than Resistant to Marine Borers as per U.S. Forest Products Laboratory Technical Data Sheets.

3.5 Fire Resistance
When tested in accordance with ASTM E84-16 will have a surface burning flame spread index no greater than 25 and a Smoke Developed Index no greater than 200. NFPA Class A / UBC Class 1
Shall meet CalFire Wildlife Urban Interface Brand Burning Test Certification Requirements.

3.6 Mechanical Properties
When Tested in accordance with ASTM D-143 will have minimum design values
3.6.1. Modules of Elasticity no lower than 2,140,000 psi-Dry
3.6.2. Bending Strength no lower than 10,309 psi-Dry
3.6.3. Compression Parallel to Grain no lower than 10,960 psi-Dry
3.6.4. Compression Perpendicular to Grain no lower than 2900 psi-Dry
3.6.5. Shear Parallel to Grain no lower than 1245 psi-Dry

3.7 Slip Resistance
When tested in accordance with ANSI A137.1 Section 9.6 (2017) will be considered High Traction having a Static Coefficient of Friction (SCOF) no lower than .60 and a Dynamic Coefficient of Friction (DCOF) no lower than .42

4.0 DESIGN AND INSTALLATION:

4.1 Design: Allowable Stresses:
Table 1 lists allowable stress values only for Iron Woods® brand products recognized in this report. These values must not be adjusted or used for non-Iron Woods® brand products.

4.2 Installation:
Iron Woods® brand products must be installed in accordance with the manufacturers published Installation and Best Practices Guidelines.

4.2.1 **Deck Boards:** Table 2 lists the maximum allowable spans for deck boards installed perpendicular or at an angle to the supporting construction.

4.2.2 **Stringers:** Table 3 lists the maximum allowable spans for stringers.

4.2.3 Deck Tiles: Table 4 Master Plan Sheet iron Woods Roof Deck, Deck Tile and Pedestal System.

4.2.4 **Cladding/Rain Screen**: Master Plan Sheet Iron Woods Façade, Rain Screen and Cladding System.

5.0 Conditions Of Use:

Iron Woods® products listed in this report comply with, or are suitable alternatives to what is specified in those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation must comply with this report, the manufacturers published instructions and best practices and the applicable code.

5.2 The use of Iron Woods® products as a component of a fire-resistant-rated assembly is outside the scope of this report.

5.3 The compatibility of fasteners with any supporting construction, including chemically treated wood is outside the scope of this report.

5.4 Iron Woods must be mechanically fastened to the supporting construction. Where required by the code official, engineering calculations and construction documents consistent with this report must be submitted for approval. The calculations must verify that the supporting construction complies with the applicable building code requirements and is adequate to resist the loads imparted upon it from the products and systems discussed in this report. The documents must contain details of the attachment to the supporting structure consistent with the requirements of this report. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.5 Iron Woods® products are products of foreign countries and must comply with all international laws pertaining to the legal and fair trade of forest products as defined under the U.S. Lacey Act

6.0 EVIDENCE

6.1. Data in accordance with applicable portions of the ICC-ES Acceptance Criteria for Deck Board Span Ratings and Guardrail System (AC174), dated January 2012 (editorially revised December 2014)

6.2 Test Data in accordance with ASTM D-143 Mechanical Properties

6.4 Test Data in accordance with ASTM E-84-16 Surface Burning Characteristics

6.5 Test Data in accordance with CalFire Wildlife Urban Interface Certification

6.5 Test Data in accordance with ANSI A137.1 Section 9.6 (2017)

6.6 Master Plan Sheets including Minimum Design Properties for Iron Woods® products

6.7 Iron Woods® Grading Rules, Written and Visual

6.8 Technical Data Sheets U.S. Forest Product Laboratory

7.0 IDENTIFICATION

The material described in this report must be identified by a label on the packaging bearing the Iron Woods® brand and product name).

TIMBER HOLDINGS USA
IRON WOODS™

Table 1

Wood Values from test (ASTM D143)

	Wood Name	Extreme Fiber Stress in Bending "FB" Single Member	Modulus of Elasticity	Compression		Shear parallel to Grain
				Parallel to Grain	Perpendicular to Grain	
Inputs	Iron Woods	10,309	2,140,000	10,960	2,900	1,245

Input values from the tests that you have

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 ll	Perpendicular to Grain	
Iron Woods	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" grater than thickness

Wood Name	Grade	Extreme Fiber Stress in Bending "FB" Single Member	Modulus of Elasticity	Compression		Shear parallel to Grain
				Parallel to Grain ll	Perpendicular to Grain	
Iron Woods	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

Additional Grading notes:

Architectural:

1. It is not allow pin knots bigger than 1/2" at any face and/or edge
2. Maximum permitted slope is 1" in 12"

FEQ:

1. It is not allow knots bigger than 3/4" at narrow face or edges
2. It is not allow centerline knots bigger than 1-3/4" at wide face
3. It is not allow edge knots bigger than 3/4" at wide face
4. Maximum permitted slope is 1" in 8"
5. Length of end split and surface split shall be per ASTM D245 (5.4.3)

COM/ SEL / FAS:

1. It is not allow knots bigger than 3/4" at narrow face or edges
2. It is not allow centerline knots bigger than 1-3/4" at wide face
3. It is not allow edge knots bigger than 3/4" at wide face
4. Maximum permitted slope is 1" in 6"
5. Length of end split and surface split shall be per ASTM D245 (5.4.3)

Notes:

1. Grader shall classify, measure and inspect knots, splits, checks and shakes as Standard ASTM D 245 mandates, for dimension lumber and Beams & stringers.
2. Use allowable values in conjunction of adjusted coefficients.
3. Results are for preliminary design only; not valid for construction unless accompanied by a sealed test report by an accredited laboratory.

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IRON WOODS™

Table 2

LIVE LOAD DECKING DESIGN INFORMATION IRON WOODS - IBC

SIMPLE SPAN

MODULUS OF ELASTICITY			2140000	2140000	2140000	2140000	2140000
BENDING - Allowable			2900	2900	2900	2900	2900
SHEAR - Allowable			540	540	540	540	540
SPECIES			**Iron Woods**	**Iron Woods**	**Iron Woods**	**Iron Woods**	**Iron Woods**
WEIGHT PER CUBIC FOOT (lbs.)			75	75	75	75	75
DECKING THICKNESS (inches)			**0.75**	**1**	**1.5**	**2.5**	**3.5**
DECKING SPAN (inches)			**24**	**36**	**48**	**72**	**96**
DEAD LOAD			0.0326	0.0434	0.0651	0.1085	0.1519
LIVE LOAD/PSF		**100**	0.6944	0.6944	0.6944	0.6944	0.6944
TOTAL LOAD	**W**		0.7270	0.7378	0.7595	0.8030	0.8464
SHEAR	**V**		8.7240	13.2813	18.2292	28.9063	40.6250
MAXIMUM MOMENT	**M**		52.3438	119.5313	218.7500	520.3125	975.0000
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		558.3333	717.1875	583.3333	499.5000	477.5510
	Fv		17.4479	19.9219	18.2292	17.3438	17.4107
		Deflection in Inches	0.042	0.090	0.087	0.101	0.122
			Fb OKAY Fv OKAY	***Fb OKAY Fv OKAY***	***Fb OKAY Fv OKAY***	***Fb OKAY Fv OKAY***	***Fb OKAY Fv OKAY***
L/360	**L/360**		0.067	0.100	0.133	0.200	0.267
	Deflection		***OK***	***OK***	***OK***	***OK***	***OK***

This Span Calculator carries no warranty of fitness or liability. It is the responsibility of the end user to consult local building codes and verify compliance.

Table 2 Continued

LIVE LOAD DECKING DESIGN INFORMATION IRONWOODS - IBC

SIMPLE SPAN WITH SNOW LOAD

MODULUS OF ELASTICITY		2140000	2140000	2140000	2140000	2140000
BENDING - Allowable		2900	2900	2900	2900	2900
SHEAR - Allowable		540	540	540	540	540
SPECIES		Iron Woods	Iron Woods	Iron Woods	Iron Woods	Iron Woods
WEIGHT PER CUBIC FOOT		75	75	75	75	75
DECKING THICKNESS (inches)		**0.75**	**1**	**1.5**	**2.5**	**3.5**
Decking SPAN (inches)		**16**	**23**	**35**	**48**	**60**
DEAD LOAD-Decking		0.0326	0.0434	0.0651	0.1085	0.1519
DEAD LOAD- ***Assumes Snow Load 300lb.***		2.0834	2.0834	2.0834	2.0834	2.0834
LIVE LOAD/PSF	**100**	0.6944	0.6944	0.6944	0.6944	0.6944
TOTAL LOAD	**W**	2.8104	2.8212	2.8429	2.8864	2.9298
SHEAR	**V**	22.4832	32.4443	49.7516	69.2724	87.8926
MAXIMUM MOMENT	**M**	89.9327	186.5550	435.3265	831.2692	1318.3894
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	959.2820	1119.3298	1160.8707	798.0184	645.7417
	Fv	44.9663	48.6665	49.7516	41.5635	37.6683
Deflection (inches)		**0.032**	**0.058**	**0.092**	**0.072**	**0.065**
		Fb OKAY	*Fb OKAY*	*Fb OKAY*	*Fb OKAY*	*Fb OKAY*
		Fv OKAY	*Fv OKAY*	*Fv OKAY*	*Fv OKAY*	*Fv OKAY*
ASHTO Standard	L/360	0.044	0.064	0.097	0.133	0.167
DEFLECTION		***OK***	***OK***	***OK***	***OK***	***OK***

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Table 3

This Span Calculator carries no warranty of fitness or liability. It is the responsibility of the end user to consult local building codes and verify compliance.

CALCULATION OF ALLOWABLE SPAN OF IRONWOODS BEAMS

input data							
stringer width	**(inches)**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**
stringer height	**(inches)**	**1.50**	**3.50**	**5.50**	**7.25**	**9.25**	**11.25**
distance between stringers	**(inches)**	**12.00**	**12.00**	**12.00**	**12.00**	**12.00**	**12.00**
thickness of deck	**(inches)**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
life load	**(psf)**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
ASHTO Standard L/360	**x =**	**360.00**	**360.00**	**360.00**	**360.00**	**360.00**	**360.00**
allowable span:	**(inches)**	**32**	**74**	**117**	**154**	**197**	**239**

Table 3 Continued

CALCULATION OF ALLOWABLE SPAN OF IRONWOODS BEAMS

input data					
stringer width	(inches)	2.50	2.50	2.50	2.50
stringer height	(inches)	5.50	7.25	9.25	11.25
distance between stringers	(inches)	12.00	12.00	12.00	12.00
thickness of deck	(inches)	1.00	1.00	1.00	1.00
life load	(psf)	100.00	100.00	100.00	100.00
ASHTO Standard L/360	x =	360.00	360.00	360.00	360.00
allowable span:	(inches)	139	183	233	284

CALCULATION OF ALLOWABLE SPAN OF IRONWOODS BEAMS

input data							
stringer width	(inches)	3.50	3.50	3.50	3.50	3.50	5.50
stringer height	(inches)	3.50	5.50	7.25	9.25	11.25	5.50
distance between stringers	(inches)	12.00	12.00	12.00	12.00	12.00	12.00
thickness of deck	(inches)	1.00	1.00	1.00	1.00	1.00	1.00
life load	(psf)	100.00	100.00	100.00	100.00	100.00	1000.00
ASHTO Standard L/360	x =	360.00	360.00	360.00	360.00	360.00	360.00
allowable span:	(inches)	99	155	205	261	317	84
