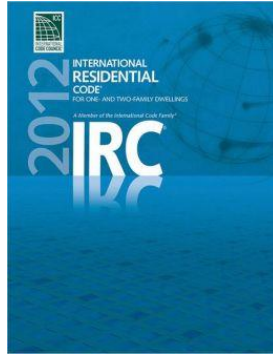


Technical Bulletin –

Understanding International Building Code /International Residential Code Compliance - Definition of ‘Naturally Durable Wood’, Fire Resistant Wood, and Structural Wood Decking Lumber and Timbers.



Natural Durability

Not all wood is created equal. Species selection will have a significant impact on both the appearance and performance of any exterior building project. To meet code a wood species must be selected that meets the definition of “Naturally Durable” under International Building Code and International Residential Code compliance requirements.

The International Building Code (IBC) and International Residential Code (IRC) require the use of Treated or Naturally Durable Wood having the durability of Redwood or Cedar as a minimum standard for deck constructions or other above ground applications.

Both Redwood and Cedar have a durability class rating of Class 2 (moderate) or higher in above ground applications. It is important to note that the durability rating of wood is associated with heartwood. As such untreated sapwood of Redwood, Cedar or any other species must always be considered as non-durable.

While it is not mandatory some designers and building inspectors will request an ICC-ES number for products used in construction. The ICC-ES number correlates to an ICC-ES report which verifies code compliance without having to demonstrate through other forms of documentation that the products used meet minimum standards. Not having an ICC-ES number does not disqualify a product from use. The building inspector may simply require product documentation that demonstrates compliance with minimum standards.

These lists has been prepared to assist the building inspection professional whose state or municipality has adopted IBC and IRC codes as the minimum standards basis for commercial and residential construction as those standards relate to the use of naturally durable wood products.

Commonly Used Wood Decking Species – Natural Durability

<u>Common Name</u>	<u>Botanical Name</u>	<u>Common/Market Names</u>	<u>Durability Class</u> <u>Ground Contact</u>	<u>IBC/IRC Compliant</u>
Iron Woods® Ipe	Tabebuia spp (Lapacho Group)	Brazilian Walnut	1	Yes
Iron Woods® Cumaru	Dipterix odorata	Brazilian Teak, Red Cumaru, Yellow Cumaru	1	Yes
Massaranduba	Manilkara bidentata	Brazilian Redwood	1	Yes
Teak	Tectona grandis	Teak	1	Yes
Iron Woods® Red Balau	Shorea spp	Batu, Red Selangan Batu	1	Yes
Iron Woods® Garapa	Apuleia leocarpa	Garapa Gold, Brazilian Ash	1	Yes
Cambara	Erismia uncinatum	Cambara, Cedrino	2	Yes
Genuine Mahogany	Swietenia macrophylla	Genuine Mahogany	2	Yes
Western Red Cedar	Thuja plicata	Cedar	2	Yes
Redwood	Sequoia spp	Redwood	2	Yes
Meranti (Dark Red)	Shorea spp	Meranti Batu, Mahogany	3	No
Meranti (Light Red)	Shorea spp	Iuan, Mahogany	4	No
Balau (Yellow)	Shorea spp	Yellow Selangan Batu	2	Yes

Fire Resistant Wood

International Building Codes do not reference Naturally Fire Resistant Wood. They do however reference in section... 2303.2 Fire-retardant-treated wood. Fire-retardant wood is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have when tested in accordance with ASTM E84 or UL723, a listed flame spread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally the flame front shall not progress more than 10-1/2 feet (3200mm) beyond the centerline of the burners at any time during the test.

As such natural untreated wood with a flame spread index of 25 or less meeting a NFPA Class A standards are typically considered fire resistant.

Species selection will have a significant impact on both the appearance and performance of any exterior building project. To meet code a wood species must be selected that meets the definition of “Naturally Durable” under International Building Code and International Residential Code compliance requirements.

The International Building Code (IBC) and International Residential Code (IRC) require the use of Treated or Naturally Durable Wood having the durability of Redwood or Cedar as a minimum standard for deck constructions. These codes do not however address the fire –resistance of decking materials.

Both Redwood and Cedar have a fire rating of Class C. It is important to note that the fire rating of wood is associated with heartwood. As such untreated sapwood of Redwood, Cedar or any other species must always be considered as non-fire-resistant as would most composite products.

Commonly Used Wood Decking Species – Natural Fire Resistance

<u>Common Name</u>	<u>Botanical Name</u>	<u>Common/Market Names</u>	<u>Fire Rating Class</u>	
			<u>ASTM E84</u>	<u>IBC/IRC Compliant</u>
Iron Woods® Ipe	Tabebuia spp (Lapacho Group)	Brazilian Walnut	A	Yes
Iron Woods® Cumaru	Dipterix odorata	Brazilian Teak, Red Cumaru, Yellow Cumaru	A	Yes
Massaranduba	Manilkara bidentata	Brazilian Redwood	A	Yes
Teak	Tectona grandis	Teak	A	Yes
Iron Woods® Red Balau	Shorea spp	Batu, Red Selangan Batu	A	Yes
Iron Woods® Garapa	Apuleia leocarpa	Garapa Gold, Brazilian Ash	A	Yes
Cambara	Erisma uncinatum	Cambara, Cedrino	C	No
Genuine Mahogany	Swietenia macrophylla	Genuine Mahogany	C	No
Western Red Cedar	Thuja plicata	Cedar	C	No
Redwood	Sequoia spp	Redwood	C	No
Meranti (Dark Red)	Shorea spp	Meranti Batu, Mahogany	C	No
Meranti (Light Red)	Shorea spp	Iuan, Mahogany	D	No
Balau (Yellow)	Shorea spp	Yellow Selangan Batu	B	No

Design Values

Design Values are assigned to lumber in a scientific manner to provide material of predictable strength properties to meet the requirements of engineering design based on clearly defined Lumber Grading Rules, Lumber Moisture Content and ASTM – 245 Physical and Mechanical Properties Testing.

Lumber Grading Rules

Lumber Grading Rules are, in effect specifications of quality in that the maximum knots, slope of grain and other strength reducing characteristics are described in sufficient detail so that the procedures of ASTM D - 245 test data can be applied and working stresses assigned to the specified quality.

Lumber Moisture Content

Lumber Moisture Content variations above the fiber saturation point have no effect on the strength of wood. As wood dries below the saturation point strength increases.

Allowable Design Values

Allowable Design values are assigned to lumber in a scientific manner by calculating in a variety of pre-established reduction factors, established grading rules and moisture content to ASTM – 245 test established maximum design values which include

- 1) Static Bending Properties
 - a) Fiber Stress and Bending
 - b) Modules of Rupture
 - c) Modules of Elasticity

- 2) Compression Parallel to Grain
- 3) Compression Perpendicular to Grain
- 4) Hardness
- 5) Shear Parallel to Grain
- 6) Shear Perpendicular to Grain

When wood products are specified or purchased without Scientifically Established Allowable Design Values, such wood can only be considered for aesthetic and not structural applications.

Commonly Used Wood Species – Structural Application

<u>Common Name</u>	<u>Botanical Name</u>	<u>Common/Market Names</u>	<u>Certified Allowable Design Values</u>	<u>IBC/IRC Compliant</u>
Iron Woods® Ipe	Tabebuia spp (Lapacho Group)	Brazilian Walnut	Yes	Yes
Iron Woods® Cumaru	Dipterix odorata	Brazilian Teak, Red Cumaru, Yellow Cumaru	YES	Yes
Massaranduba	Manilkara bidentata	Brazilian Redwood	No	No
Teak	Tectona grandis	Teak	No	No
Iron Woods® Red Balau	Shorea spp	Batu, Red Selangan Batu	Yes	Yes
Iron Woods® Garapa	Apuleia leocarpa	Garapa Gold, Brazilian Ash	Yes	Yes
Cambara	Erismia uncinatum	Cambara, Cedrino	No	No
Genuine Mahogany	Swietenia macrophylla	Genuine Mahogany	No	No
Western Red Cedar	Thuja plicata	Cedar	Yes	No
Redwood	Sequoia spp	Redwood	Yes	No
Meranti (Dark Red)	Shorea spp	Meranti Batu, Mahogany	No	No
Meranti (Light Red)	Shorea spp	Iuan, Mahogany	No	No
Balau (Yellow)	Shorea spp	Yellow Selangan Batu	No	No

Timber Holdings developed and published proprietary grading rules, allowable design values and specification language for design professionals which have set the standards for over 40 years. The availability of Certified Compliance Standards have become synonymous with the Iron Woods® brand.

References:

- U.S Forest Products Laboratory Wood Technical Fact Sheets
- Australian Timber Standard AS 5604-2005
- Queensland Department of Agriculture, Fisheries and Forestry
- Iron Woods Certified Allowable Design Values
- Iron Woods Certified Decking, Lumber and Timbers Load and Span Tables