

NATURANEXA

ULIN PROPERTIES

**Botanical name:**

Eusideroxylon Zwageri, Lauraceae family.

Local names

Ulin, kayu besi, billian, bulian

Other names

Bornean ironwood (Malaysia)

Geographical distribution

All over Kalimantan, Sumatra, Sulawesi in Indonesia and Borneo in Malaysia

Habitus

The tree height may reach 50 m, the diameter is 200 cm and over. The trunk has many small buttresses (*elephant-foot appearance*). The outer bark is grey. The trees' leaves are dark green, simple, leathery, elliptical to ovate, 14-18 cm long (5.5-7.5 inches) and 5-11 cm wide (2-4 inches). Seedlings require some shade, while older trees need plenty of light. The timber retains a pleasant lemon odour.

CITES (Washington Convention of 2017) No trade restrictions.

General characteristics**Colour**

The heartwood when cut is coloured light brown to almost bright yellow. During the aging process the heartwood darkens to deep reddish brown, very dark brown or almost black.

Texture

Wood texture fine and even

Grain

The grain is straight or slightly interlocked.

Touch

The wood surface is smooth or alternately smooth and rough owing to the interlocked grain.

Gloss

The wood surface is glossy.

Figures

The radial section shows stripes in a darker colour.

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Silviculture

Habitat

It can be found in valleys and on hillsides and even on low ridges when soil moisture is sufficient at elevations between sea level and 625 m.

Regeneration

Eusideroxylon zwageri has a very slow growth rate of mean radial growth of 0.058 cm per year. It is a canopy species in primary forests. The species is considered unsuitable for large-scale plantations due to slow growth and inadequate seed and seedling supply. Manual selection of trees in natural forests is common.

Fruit

The fruit are drupes, a drupe borne on a pedicel with or without persistent tepals at its base, or is seated in \pm deeply cup-shaped receptacle (cupule), or is enclosed in an accrescent floral tube. The fruit contains one seed without an endosperm. The fruit are poisonous to humans but have medicinal properties.



Flat sawn



Quarter sawn

Cross sections



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Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.93
Monnin hardness ⁽¹⁾	7.9
Coefficient of volumetric shrinkage	0.64 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	1.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	86 MPa
Static bending strength ⁽¹⁾	143 MPa
Longitudinal modulus of elasticity ⁽¹⁾	22,690 MPa

⁽¹⁾ At 12% moisture content, with 1MPa=1N/mm²

Structure

Vessels

Vessels are diffuse-porous, medium-sized and generally evenly distributed, arranged in short radial rows (2-3 vessels).

Parenchyma

Moderate abundancy of aliform paratracheal parenchyma.

Growth rings

Growth rings boundaries are indistinct or absent.

Physical properties

Density

1.1+ (1.100kg/m³)

Strength class

I

Shrinkage

The wood has a radial shrinkage rate of 2-4.5% and a tangential shrinkage rate of tangential 4.5-7.5%

Preservation treatment

This wood does not require any preservation treatment against dry wood borer, nor in case of temporary humidification or permanent humidification.

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Durability and treatability

Durability

heartwood is rated as very durable - immune to termite attack; service life of up to 100 years in direct soil contact and more than 20 years for marine work in tropical waters has been reported.

Treatability

Ulin ironwood is difficult to treat.

Drying

The timber dries slowly, and care is needed to avoid checks and splits.

No oven drying.

Slight risk of distortion.

No known specific risk of hardening or collapsing.

High risk of checking.

Veneer and plywood

Ulin ironwood is suitable for veneer but not for plywood because of its high hardness and specific gravity.

Working properties

Despite its hardness, Ulin is not so difficult to work, e.g., with hardened tipped saws or it can be planed smoothly with small cutting angle. Holes should be drilled before nailing to prevent splitting.

Uses

Due to its high strength and durability, - Ulin ironwood is used for heavy construction under roof as well as in the open, such as bridges, railway sleepers, electric poles, flooring, marine construction, boat building, vehicular bodywork and housing.

Sawing and machining

Blunting effect fairly high. Not recommended for peeling. Good for slicing; note this species requires strong steaming before slicing.

Assembling

Good for nailing and screwing but requires pre-boring.

Notes: High specific gravity: important that gluing be performed in compliance with The code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading according to MGR grading rules (2009).

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility.

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Fire Safety

Conventional French grading

Thickness > 14mm: M3 (moderately flammable)

Thickness < 14mm: M4 (readily flammable)

Euroclass grading D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Heavy carpentry
- Vehicle or container flooring
- Exterior joinery
- Bridges: parts in contact with water or ground
- Bridges: parts not in contact with water or ground
- Exterior panelling
- Hydraulix works: fresh water
- Hydraulic works: sea water
- Flooring
- Industrial or heavy flooring
- Sliced Veneer
- Decking
- Sleepers
- **Outdoor or exposed structures**