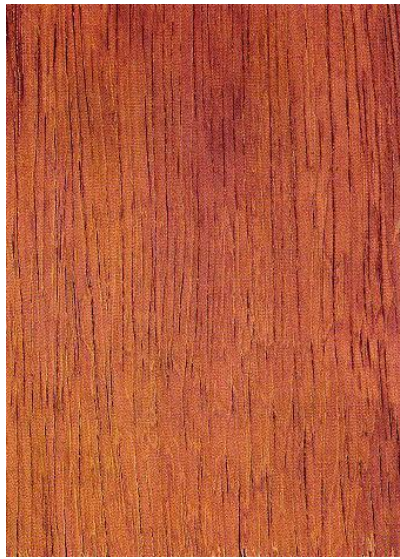


Tualang



INTRODUCTION

The Standard Malaysian Name for the timber of *Koompassia excelsa* (Leguminosae). Vernacular names applied include *kayu raja* (Sarawak), *mengaris* (Sabah) and *tapang* (Sarawak). This is a monospecific timber. The sapwood is buff-coloured or yellow-brown, often with a pink tinge and is sharply differentiated from the heartwood, which is reddish brown to deep brick-red-brown when fresh and darkens with age to a deep chocolate-brown.

Also known as Mengaris (Brunei); Bengaris, Mengaris, Menggeris, Sialang, Tualang and Wehis (Indonesia); Koompassia (Papua New Guinea); Ginoo and Manggis (Philippines); and Tulae and Yuan (Thailand).

DENSITY

The timber is a Medium Hardwood with a density of 800-865 kg/m³ air dry.

NATURAL DURABILITY

Tualang is classified as moderately durable under exposed conditions. The durability rating is based on the standard graveyard tests conducted at the Forest Research Institute Malaysia (FRIM) on specimens of dimension 50 mm x 50 mm x 600 mm. In the first series of such tests, all 6 specimens were completely destroyed after 3.5 years (Foxworthy & Woolley, 1930). In the second test, 60 specimens were used and the average service life was 3 years (Jackson, 1965). The sapwood of the timber is susceptible to both powder-post beetle and fungi attacks, while the heartwood is readily destroyed by termites.

PRESERVATIVE TREATMENT

The timber is amenable to preservative treatment and is classified as easy to treat.

TEXTURE

Texture is rather coarse but even except in areas where included phloem occurs. Grain is interlocked, often deeply interlocked.

STRENGTH PROPERTIES

The timber falls into Strength Group A (Engku, 1988b) or SG 3 (MS 544:Part 2:2001).

Strength Properties of Tualang

Test Condition	Modulus of Elasticity(MPa)	Modulus of Rupture (MPa)	Compression parallel to grain (MPa)	Compression perpendicular to grain (MPa)	Shear strength (MPa)
Green	16,400	102.0	53.4	7.17	11.3
Air dry	17,800	121.0	62.0	8.00	16.3

MACHINING PROPERTIES

It is easy to resaw and cross-cut when green but is slightly difficult to resaw when dry. Planing is easy in either condition and the surface produced is smooth to moderately smooth.

Machining Properties of Tualang

Test Condition	Sawing		Planing		Boring		Turning	
	Re-sawing	Cross Cutting	Ease of planing	Quality of finish	Ease of boring	Quality of finish	Ease of turning	Quality of finish
Green	easy	easy	easy	smooth	easy	rough	-	-
Air dry	slightly difficult	easy	easy	moderately smooth	slight difficult	rough	easy	moderately smooth

NAILING PROPERTY

Nailing property is rated as good.

AIR DRYING

The timber dries moderately slowly to slowly with slight end-checking, surface-checking and insect attacks as the main sources of degrade. 13 mm thick boards take 3.5 months to air dry, while 38 mm thick boards take 6 months.

KILN-DRYING

Kiln Schedule E is recommended.

Kiln Schedule E

Moisture Content (%)	Temperature (Dry-bulb)		Temperature (Wet-bulb)		Relative Humidity (%) (approx.)
	° F	° C	° F	° C	
Green	120	48.5	115	46.0	85
60	120	48.5	113	45.0	80
40	125	51.5	116	46.5	75
30	130	54.5	117	47.0	65
25	140	60.0	120	49.0	55
20	155	68.0	127	53.0	45
15	170	76.5	136	58.0	40

SHRINKAGE

Shrinkage is average, with radial shrinkage averaging 1.5% and tangential shrinkage averaging 1.7%.

DEFECTS

The major defect that is associated with the timber of *tualang* is the presence of hard abnormal tissues commonly known as included phloem. It is observed that *tualang* is even more severely riddled with included phloem than *kempas* (*Koompassia malaccensis*). In sawn timber, bands and patches of included phloem

similar to those found in *kempas* can often be seen (Ser, 1981). These zones of abnormal tissues are likely to result in seasoning degrade and mechanical weakness in the timber. Some minor defects that have been recorded are shot holes, pin holes, heart rot and hollow pith. Apart from these, the logs of freshly-felled *K. excelsa* are generally free from other defects.

USES

When treated, the timber is suitable for all heavy construction, like posts, beams, joists, columns (heavy duty), piling, railway sleepers and power transmission poles. Untreated, the timber is suitable for flooring (heavy traffic), panelling, mouldings, heavy duty furniture, fender supports, office and shop fittings, tool handles (impact) and plywood.