

TIMBER

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Timber Notes – Medium Hardwoods IV (Merbatu, Merpauh, Mertas, Nyalin, Pauh Kijang)

by

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- Trade Name:** Merbatu
- Species:** *Atuna* spp., *Kostermanthus* spp., *Parinari* spp. & *Maranthes corymbosa* Bl. (family Chrysobalanaceae).
- 1. Tree type and distribution:** Small to large trees with or without buttresses. Widely distributed in lowlands and montane forests.
- 2. Wood characteristics:** Timber hard and heavy. Heartwood reddish-brown and not well defined from the sapwood. Texture coarse but even. Grain straight, spiral or wavy.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 690 to 975 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take 1 1/2 and 3 1/2 months respectively. Kiln drying schedule D is recommended (tentative). Apply end-coating to minimise end-check formation.
- 6. Machining properties:** Difficult to very difficult to resaw and cross-cut. Slightly difficult to plane but the surface produced is smooth. Poor nailing property.
- 7. Durability:** Moderately durable under exposed conditions. Timber is amenable (average) to treatment.
- 8. Strength grouping:** B
- 9. Strength properties:** Based on tests carried out on *Parinari rubiginosum*.

Property (MPa)	Green	Air dry
Modulus of rupture	96	119
Modulus of elasticity	18 100	19 700
Maximum crushing strength	47.9	63.2

- 10. Uses:** Suitable for medium to heavy construction under cover, posts, beams, salt water piling and other marine construction. Also suitable for parquet flooring and railway sleepers.

- Trade Name:** Merpauh
- Species:** *Swintonia floribunda*, *S. floribunda* v. *floribunda*, *S. floribunda* v. *penangiana*, *S. robinsonii*, *S. schwenkii* and *S. spicifera*.
- 1. Tree type and distribution:** Four species in Peninsular Malaysia. Small to very tall trees. Distributed from lowlands to mountain forests, sometimes gregarious.
- 2. Wood characteristics:** Heartwood grey-brown to reddish-brown. Sapwood lighter-coloured and not well defined. Planed surface very lustrous. Stripe figure on radial surface and ornamental zig-zag on tangential surface. Texture coarse and even. Grain interlocked.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 640 to 880 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take between 2 1/2 to 4 months respectively. End-coating of boards to reduce incidences of end-checking during drying. Schedule E (tentative) can be used. However, good stickering practice must be adhered to.
- 6. Machining properties:** Difficult to very difficult to saw and cross-cut, but easy to plane and the surface produced is smooth. Nailing property ranges from good to very poor depending on species.
- 7. Durability:** Moderately durable for *Swintonia floribunda* var. *penangiana* and non-durable for *S. schwenkii* and *S. spicifera*. Timber of *S. penangiana* is easy to treat.
- 8. Strength grouping:** B
- 9. Strength properties:** Data based on the lower average values of *S. floribunda* v. *penangiana*, *S. schwenkii*, and *S. spicifera*.

Property (MPa)	Green	Air Dry
Modulus of rupture	76	97
Modulus of elasticity	14 200	15 700
Maximum crushing strength	37.7	47.7

- 10. Uses:** Suitable for light to medium construction under cover, interior finishing, panelling, solid door, partitioning and flooring.

- Trade Name:** Mertas
- Species:** *Ctenolophon parvifolius* Oliv. (family Chrysobalanaceae).
- 1. Tree type and distribution:** Small, medium occasionally large tree with buttresses as tall as 2.5 m. Occurs in all states except Perak and Kelantan in primary forest; ridges and hillsides usually below 300 m and seasonal swamps in Johore.
- 2. Wood characteristics:** The timber is hard and heavy. Heartwood brown to purple red-brown and not differentiated from the sapwood. Texture moderately fine and even. Grain interlocked and sometimes wavy.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 800 to 930 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take 1 1/2 and 4 months respectively. End-coating to minimise end-checks.
- 6. Machining properties:** Difficult to work, especially in the radial direction where 'picking-up' of grain frequently occurs. Poor nailing property.
- 7. Durability:** Moderately durable. Timber has average amenability to treatment.
- 8. Strength grouping:** B
- 9. Strength properties:** Based on tests carried out on *Ctenolophon parvifolius*.

Property (MPa)	Green	Air dry
Modulus of rupture	100	122
Modulus of elasticity	15 700	18 100
Maximum crushing strength	49.2	61.6

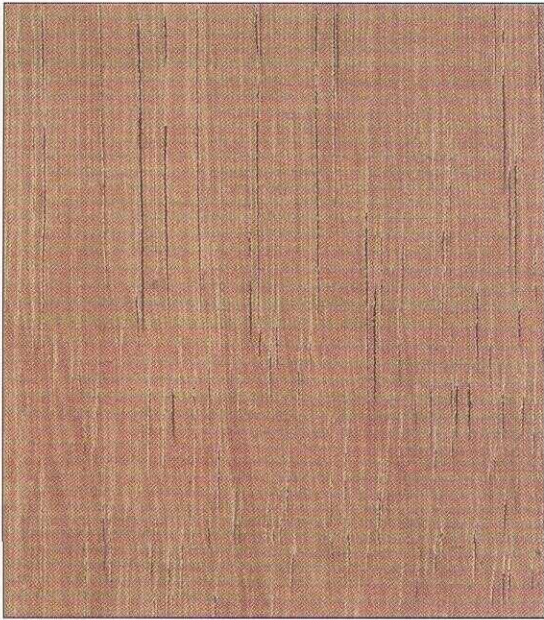
- 10. Uses:** Suitable for medium construction, posts, beams, joints, marine construction, parquet flooring, heavy duty flooring, power transmission poles and heavy duty pallets.

- Trade Name:** Nyalin
- Species:** *Xanthophyllum* spp. (family Polygalaceae).
- 1. Tree type and distribution:** Small to big tree. Found inland, usually primary forest, from lowlands to high mountains; fairly common as understorey and main storey trees but seldom gregarious. Absent from mangrove and peat swamps.
- 2. Wood characteristics:** The timber is hard to very hard and heavy to very heavy. Heartwood white to bright yellow darkening to orange-yellow and not differentiated from the sapwood. Texture coarse and even. Grain interlocked.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 595 to 960 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take 4 and 5 months respectively.
- 6. Machining properties:** Easy to saw and works well. Planed surface is moderately smooth. Good nailing property.
- 7. Durability:** Non durable under exposed conditions. Susceptible to dry wood termites.
- 8. Strength grouping:** B
- 9. Strength properties:** Based on test carried out on *Xanthophyllum verrucosum*.

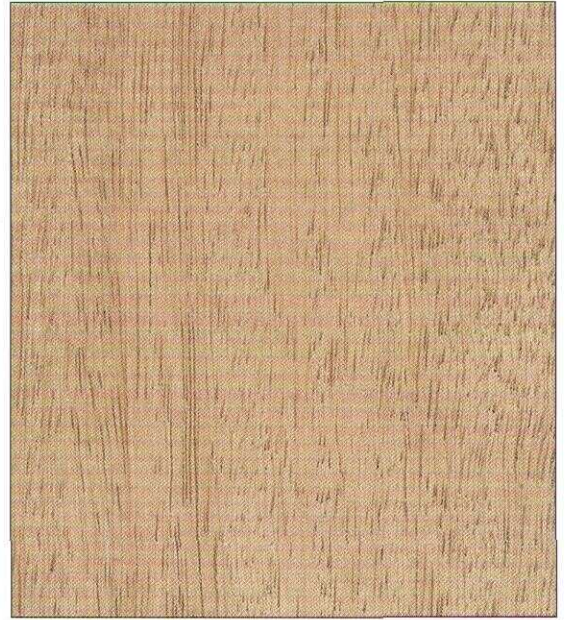
Property (MPa)	Green	Air dry
Modulus of rupture	76	101
Modulus of elasticity	13 000	14 800
Maximum crushing strength	36.8	53.2

- 10. Uses:** Suitable for medium or heavy construction which is protected from dry wood termite attacks. Also suitable for panelling, parquet flooring, planking and plywood manufacture.

- Trade Name:** Pauh kijang
- Species:** *Irvingia malayana* Oliv. ex Benn. (family Simaroubaceae)
- 1. Tree type and distribution:** Medium to large tree reaching 40 m tall and 300 cm girth. Found in lowland forests to 300 m. Of scattered distribution throughout Peninsular Malaysia except Perlis and Penang.
- 2. Wood characteristics:** Timber very hard and heavy. Heartwood dark greenish-brown, sometimes with a dark grey-brown striped core. Sapwood paler and not well defined. Texture moderately fine and even. Grain shallowly interlocked.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 930 to 1250 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take 5 and 7 months respectively. Kiln drying schedule D (tentative) is recommended. Prone to moderate surface checking. End-coating required.
- 6. Machining properties:** Slightly difficult to work when green and is difficult when dry. Planing is difficult but the planed surface is moderately smooth with some grain pickup on the radial surface. Poor nailing property.
- 7. Durability:** Moderately durable under exposed conditions. Timber is very difficult to treat.
- 8. Strength grouping:** A
- 9. Strength properties:**
- | Property (MPa) | Green | Air dry |
|---------------------------|-------|---------|
| Modulus of rupture | - | - |
| Modulus of elasticity | - | - |
| Maximum crushing strength | 59.0 | 70.5 |
- 10. Uses:** Suitable for heavy construction if treated, heavy duty furniture, panelling, parquet flooring and decorative furniture.



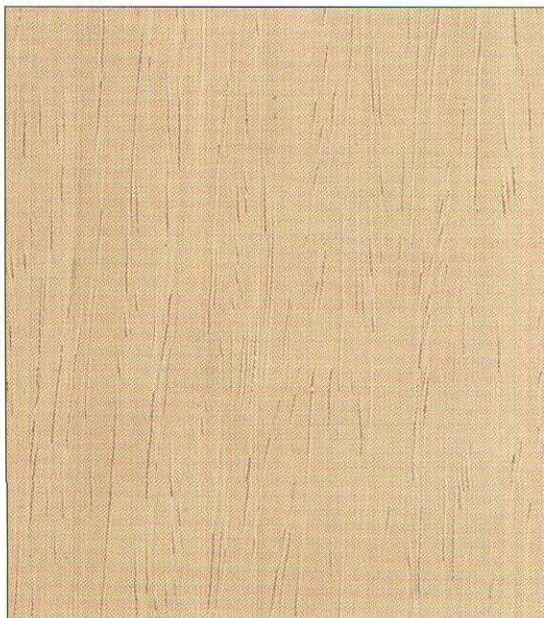
Merbatu



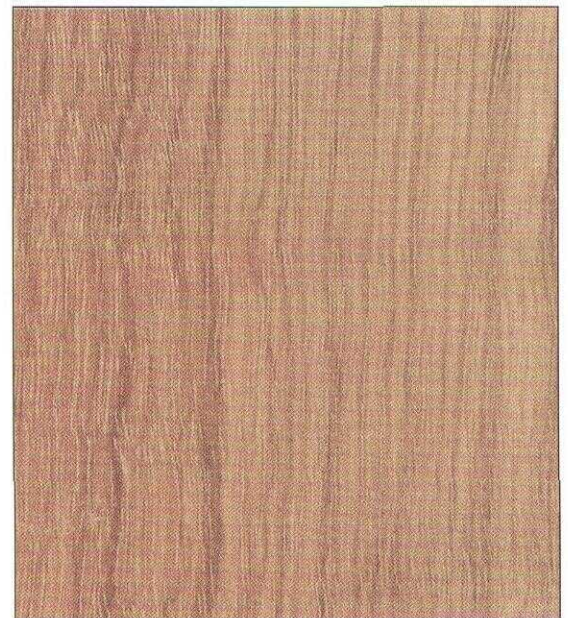
Merpauh



Mertas



Nyalin



Pauh kijang

BACKGROUND INFORMATION

1. Tree type and distribution

The distribution and size of tree are given.

2. Wood characteristics

The colours of sapwood and heartwood, figure, appearance on planed surface and any other characteristic features of the timber.

3. Timber classification

Under the Malaysian Grading Rules (1984), timbers are classified as Heavy Hardwood (HHW) when their density exceeds 800 kg m^{-3} and the timbers are naturally durable. Medium Hardwoods (MHW) are timbers with density exceeding 729 kg m^{-3} but lack sufficient natural durability. Light Hardwoods (LHW) are timber with density below 720 kg m^{-3} and not naturally durable in exposed condition.

4. Wood density

Green density of freshly sawn board, defined as green mass divided by green volume. It varies with the freshness of the log in the log yard before processing and seasoning. Air dry density is the average mass divided by volume at 15 per cent moisture content.

5. Drying and relative movement

Air drying time for 13 mm and 40 mm boards and moisture content are from Grewal (1979), "Air-seasoning Properties of Some Malaysian Timbers", Timber Trade Leaflet No. 41. Suitable kiln drying schedule is mentioned [Schedules based on Grewal (1988), "Kiln Drying Characteristic of Some Malaysian Timbers", Timber Trade Leaflet No.42]. The relative movement (whenever is available) is defined as the change in dimension of a piece of timber when exposed to the service conditions of 60% RH/ 30 °C and 95% RH/ 30 °C respectively, and expressed as percentage of the value at 60% RH/ 30 °C. The movement ratings stated are based on values of the corresponding tangential movement [Choo *et al.* (1998), "Movement of Seasoned Timber in Service", FRIM Technical Information Handbook No. 18].

Movement rating	Tangential movement
Class I	< 1.5 %
Class II	1.5% to 2.0%
Class III	2.1% to 2.5%
Class IV	2.6% to 3.0%
Class V	> 3.1 %

6. Machining properties

Comments are made on the comparative ease or difficulty of sawing, planing, turning, boring, peeling, gluing and other wood working properties.

7. Durability

Durability ratings of Malaysian Timbers are based on performance of test-sticks in graveyard testing. Test-stakes of 50 x 50 x 600 mm are buried in test grounds and their performance monitored. The number of years that the timber can last under such conditions is used to classify the durability of the timber. Under the system, timbers are classified as follows;

Rating	Number of years
Very durable	more than 10 years
Durable	5-10 years
Moderately durable	2-5 years
Non-durable	0-2 years

Susceptibility to fungal and termite attacks may be mentioned.

8. Strength grouping

In the strength grouping of timber under each trade name, ranking is allocated from A (strongest) to D (weakest). Minimum values for strength groups based on common grade for dry timber (below 19% moisture content) (units are in MPa).

Strength group	A	B	C	D
Modulus of elasticity	9700	6600	5500	3100
Bending and tension parallel to grain	12.41	9.65	7.24	4.83
Compression parallel to grain	11.03	7.93	5.51	4.14
Compression perpendicular to grain	1.45	0.90	0.55	0.45
Shear parallel to grain	1.45	0.90	0.62	0.62

9. Strength properties

Values are from Lee *et al.* 1979, "The Strength Properties of Some Malaysian Timbers". Malaysian Forest Service Trade Leaflet No. 34.

10. Uses

Various past and potential uses are given, but the list is obviously not exhaustive.

TIMBER TECHNOLOGY BULLETIN

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