

Timber Notes - Light Hardwoods II

by

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- Trade name:** Machang
- Species:** *Mangifera* spp. There are 15 species in Peninsular Malaysia. Small to large trees. Species which are medium to large are: *Mangifera caesia*, *M. foetida*, *M. gracilipes*, *M. griffithii*, *M. indica*, *M. lagenifera*, *M. macrocarpa*, *M. magnifica*, *M. odorata*, *M. pentandra*, *M. quadrifida*, *M. superba*, *M. whitmorei*, *M. sp. 'A'*, *M. sp. 'B'*.
- 1. Tree type and distribution:** Small to large tree of scattered distribution in lowlands and hill forests.
- 2. Wood characteristics:** Heartwood light brown or light grey brown and not differentiated from the sapwood. Occasionally with chocolate or black streaky coreword. Texture moderately coarse to coarse and even. Grain interlocked and wavy.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 545 to 610 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm take about 3 and 4 months respectively. Type II Movement.
- 6. Machining properties:** Slightly difficult to resaw when green but is easy when dry. Planing is easy but the surface produced is moderately smooth with grain pick-up on the radial side. Nailing property is excellent.
- 7. Durability:** Non durable under exposed conditions.
- 8. Strength grouping:** C
- 9. Strength properties:** Data based on the lower average values of tests carried out on *Mangifera foetida* and *M. indica*.
- | Property (MPa) | Green | Air dry |
|---------------------------|-------|---------|
| Modulus of rupture | 44 | 57 |
| Modulus of elasticity | 6700 | 7500 |
| Maximum crushing strength | 21.8 | 32.1 |
- 10. Uses:** Suitable for light construction, boxes, crates, pallets and plywood manufacture. Corewood can be used for decorative veneer production.

- Trade name:** Medang
- Species:** Species of the family Lauraceae. There are 16 genera and about 213 species in Peninsular Malaysia.
- 1. Tree type and distribution:** Small to medium trees in most cases except *Alseodaphne albifrons*, *A. insignis*, *A. intermedia*, *A. macrantha*, *A. micrantha*, *A. obovata*; *Beilschmiedia dictyneura*, *B. insignis*, *Cinnamomum altissimum*, *C. porrectum*, *C. sintoc*, *C. impressa*; *Cryptocarpa rugulosa*; *Endiandra kingiana*, *E. maingayi*; *Litsea castanea*, *L. cordata*, *L. curtisii*, *L. cylindrocarpa*, *L. elliptica*, *L. firma*, *L. maingayi*, *L. robusta*; *Phoebe* sp. 'A' which are big trees. The species are distributed in the lowlands and becoming more abundant reaching the top layer of the canopy between 1200-1600 m altitude.
- 2. Wood characteristics:** Heartwood very variable, light-straw, red-brown to olive brown. Sapwood ill-defined. Surface dull. Texture moderately fine but even. Grain interlocked or wavy.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 400 to 800 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 and 3^{1/2} to 5 months respectively.
- 6. Machining properties:** Easy to slightly difficult to resaw, and easy to moderately easy to cross-cut. Easy to plane and the surface produced is smooth to moderately smooth.
- 7. Durability:** Non-durable.
- 8. Strength grouping:** C
- 9. Strength properties:** Data based on tests carried out on *L. firma*

Property (MPa)	Green	Air dry
Modulus of rupture	51	64
Modulus of elasticity	9400	10100
Maximum crushing strength	25.2	34.9

- 10. Uses:** Suitable for decorative work such as interior finishing, panelling, furniture and cabinet making. Also suitable for plywood manufacture, and the heavier species are suitable for medium construction under cover.

- Trade name:** Melantai
- Species:** *Shorea macroptera*.
- 1. Tree type and distribution:** Large tree which can achieve a girth of 2.1 m in 61 years. It inhabits low-lying but well drained jungle, from sea level to 855 m. Abundant in hilly jungle and frequently associated with Seraya (*Shorea curtisii*) in hill dipterocarp forest. Common from South Kedah and Kelantan to Johore.
- 2. Wood characteristics:** Heartwood yellow-pink weathering to light pink with yellowish tinge. Sapwood lighter in colour and not differentiated from the heartwood. Texture moderately coarse and even. Grain straight to interlocked. Planed surface lustrous. Stripe figure on radial surface.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 415 to 625 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take about 2 months and 4 months respectively. For kiln drying, schedule H is recommended.
- 6. Machining properties:** Easy to work and planed to smooth and highly lustrous surface. Nailing property rated good.
- 7. Durability:** Non-durable.
- 8. Strength grouping:** C
- 9. Strength properties:**
- | Property (MPa) | Green | Air dry |
|---------------------------|--------|---------|
| Modulus of rupture | 60 | - |
| Modulus of elasticity | 11 300 | - |
| Maximum crushing strength | 30.1 | - |
- 10. Uses:** Suitable for interior finishing, mouldings, panelling, doors, rotary cut veneers and plywood.

- Trade name:** Melunak
- Species:** Trade name for the timber of *Pentace* species, family *Tiliaceae*. There are 16 species of *Pentace* found in Peninsular Malaysia.
- 1. Tree type and distribution:** The trees are medium to large with straight and tall boles. The largest recorded tree is *P. excelsa* with a height of 60 m and girth of 400 cm. *Pentace* are found scattered in undulating, lowland as well as hill forests.
- 2. Wood characteristics:** Heartwood pink-brown to red-brown. Sapwood lighter in colour and not well defined. Planed surface fairly lustrous with stripe figure on the radial surface. Texture is moderately fine and even. Grain shallowly interlocked but sometimes deeply interlocked.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 530 to 755 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards takes approximately 3^{1/2} months and 5 months respectively. Type IV Movement.
- 6. Machining properties:** Slightly difficult to difficult to resaw and is easy to slightly difficult to cross-cut. Planing is easy to slightly difficult and planed surface is smooth.
- 7. Durability:** Moderately durable.
- 8. Strength grouping:** C
- 9. Strength properties:** Data based on tests carried out on *Pentace triptera*

Property (MPa)	Green	Air dry
Modulus of rupture	69	85
Modulus of elasticity	10 600	12 000
Maximum crushing strength	35.4	43.6

- 10. Uses:** Suitable for interior finishing, panelling, joinery, furniture. flooring and other light construction.

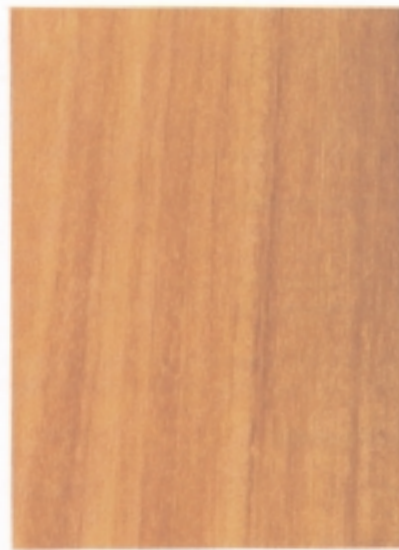
- Trade name:** Mempisang
- Species:** All species of the family Annonaceae. Species reaching timber size include *Alphonsea curtisii*, *A. elliptica*, *Canaga odorata*; *Cyathocalyx pruniferus*, *C. sumatranus*, *Mezzettia leptopoda*, *M. umbellata*; *Monocarpia marginalis*; *Platymitra siamensis*; *Polyalthia glauca*, *P. hypoleuca*, *P. lateriflora*; *Xylopia elliptica*, *X. ferruginea*, *X. fusca*, *X. magna*, *X. malayana*, *X. stenopetala*.
- 1. Tree type and distribution:** Very common and well represented in the lowlands to about 915 m altitude. There are 38 genera, 198 described species and out of which 26 genera and 131 species are trees.
- 2. Wood characteristics:** Heartwood light yellow with a greenish or pinkish tinge and not differentiated from the sapwood. Texture coarse and uneven. Grain fairly straight. Planed surface not lustrous. Attractive silver figure on radial surface. Timber soft to moderately hard.
- 3. Timber classification:** LHW.
- 4. Wood density:** Ranges from 515 to 720 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take between 1^{1/2} to 4 months and 2 to 5 months respectively.
- 6. Machining properties:** Easy to work and planed to moderately smooth surface. Nailing property is rated poor.
- 7. Durability:** Non durable.
- 8. Strength grouping:** C
- 9. Strength properties:** Data based on the lowest test values of *Xylopia fusca*, *Mezzettia leptopoda* and *Monocarpia marginalis*.

Property (MPa)	Green	Air dry
Modulus of rupture	57	80
Modulus of elasticity	12100	13400
Maximum crushing strength	26.5	41.4

- 10. Uses:** Suitable for general light construction, sliced veneers, packing cases and crate. Heavier species suitable for parquet and strip flooring and tool handles.



Machang



Medang



Melantai



Melunak



Mempisang

BACKGROUND INFORMATION

1. Tree type and distribution

The distribution and size of tree are given.

2. Wood characteristics

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

3. 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.

4. 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 720 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.

5. Drying and relative movement

Air drying time for 15 mm and 40 mm boards and moisture content are from Grewal (1979). 'Airseasoning 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. 19].

Movement Rating	Tangential Movement
Type I	< 1.5 %
Type II	1.5 % to 2.0 %
Type III	2.1 % to 2.5 %
Type IV	2.6 % to 3.0 %
Type 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-stacks in grave yard testing. Test-stacks 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. 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	9,700	6,600	5,500	3,100
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

8. Strength properties

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

9. Uses

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

TIMBER TECHNOLOGY BULLETIN

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