

### Timber Notes - Light Hardwoods VII (Sentang, Sepetir, Sesendok, Terap, Terentang)

by

K.S. Gan, K T. Choo & S. C. Lim

- Trade name:** Sentang
- Species:** *Azadirachta excelsa*.
- 1. Tree type and distribution:** Tree to 50 m tall and 4 m girth. Present in lowland forests and frequently cultivated in the villages in central and north Peninsular Malaysia.
- 2. Wood characteristics:** Heartwood reddish-brown and distinct from the sapwood which is straw to pale red in colour. Texture is slightly coarse and uneven. Grain straight to interlocked. Figure on tangential surface.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 560 to 770 kg m<sup>-3</sup> air dry.
- 5. Drying and relative movement:** 15 mm boards take approximately 2 months to air dry and 40 mm boards take 4 months. For kiln drying, schedule E/F (tentative) is recommended.
- 6. Machining properties:** Easy to work and produces high quality finish.
- 7. Durability:** Non-durable.
- 8. Strength grouping:** C
- 9. Strength properties:**

Property (MPa)	Green	Air dry
Modulus of rupture	55.5	78.0
Modulus of elasticity	6770	9425
Maximum crushing strength	31.2	40.5

- 10. Uses:** Suitable for furniture manufacture, joinery works, interior finishing panelling, partitioning, fancy articles, carving, window frame, sliced veneer, flooring and turnery.

- Trade name:** Sepetir
- Species:** Mainly made up of genus *Sindora* but *Copaifera palustris* has also been classified as sepetir in the trade.
- 1. Tree type and distribution:** Big to very large trees reaching 45 m tall and 3 m girth. Scattered throughout lowland to 760 m altitude.
- 2. Wood characteristics:** Heartwood pink-brown to red-brown to red-brown weathering to darker shade; often streaked with darker-coloured layers and distinct from the sapwood which is light pink. Texture moderately fine and even. Grain shallowly interlocked.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 530 to 785 kg m<sup>-3</sup> air dry.
- 5. Drying and relative movement:** 15 mm boards take approximately 3 months to air dry and 40 mm boards take 5 months. Sapwood is likely to be attacked by powder-post beetles. For kiln drying, schedule G is recommended. However, careful stacking, closer sticker spacing and placing weights on top of stack to reduce incidences of warping are suggested for timber containing dark streaks. Type II movement.
- 6. Machining properties:** Slightly difficult to difficult to resaw and cross-cut but is easy to plane and surface produced is smooth. Nailing property is rated good.
- 7. Durability:** Moderately durable (*Sindora coriacea*). Timber is difficult to treat.
- 8. Strength grouping:** C
- 9. Strength properties:** Data based on tests carried out on *Sindora coriacea*.

Property (MPa)	Green	Air dry
Modulus of rupture	71	92
Modulus of elasticity	11 700	13 600
Maximum crushing strength	36.4	46.3

- 10. Uses:** Suitable for light construction, joinery and panelling, high-class cabinet and furniture (for timber containing dark streaks).

- Trade name:** Sesendok
- Species:** *Endospermum malaccense* in Peninsular Malaysia. Other species of *Endospermum* are present in East Malaysia.
- 1. Tree type and distribution:** Medium to large trees reaching 40 m tall and 3 m girth. Common throughout Peninsular Malaysia in lowland to lower mountain forest up to 1000 m altitude.
- 2. Wood characteristics:** Heartwood bright yellow with a greenish tinge and not distinct from the sapwood. Planed surface without figure. Texture coarse but even. Grain straight to spiral, interlocked or wavy. Wood soft and light.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 305 to 655 kg m<sup>-3</sup> air dry.
- 5. Drying and relative movement:** 15 mm boards take 2 months to air dry and 40 mm boards take 3 months. Slight insect attacks. For kiln drying, schedule J recommended. High humidity sterilization treatment against insect and blue stain attacks required. Type II movement for *E. malaccense*.
- 6. Machining properties:** Easy to saw and plane. Planed surface produced is smooth. Nailing property is excellent.
- 7. Durability:** Non-durable. Very easy to treat with preservative.
- 8. Strength grouping:** D
- 9. Strength properties:** Data based on tests carried out on green samples of *Endospermum malaccense*.

Property (MPa)	Green	Air dry
Modulus of rupture	39	-
Modulus of elasticity	8500	-
Maximum crushing strength	20.8	-

**10. Uses:** Suitable for light manufacture of match splints and boxes. Also suitable for pattern making, drawing board, tray, plywood, crate and toys.

- Trade name:** Terap
- Species:** *Artocarpus elasticus* (terap nasi), *A. scortechinii* (terap hitam).
- 1. Tree type and distribution:** Medium-sized tree rarely reaching 45 m tall and 210 cm girth. Common in low-land forest and open country throughout the country.
- 2. Wood characteristics:** Heartwood yellow-brown or orange-brown and not distinct from the sapwood. Texture coarse but even. Grain interlocked.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 400 to 560 kg m<sup>-3</sup> air dry.
- 5. Drying and relative movement:** 15 mm boards take 1 to 3<sup>1/2</sup> months to air dry and 40 mm boards take 2<sup>1/2</sup> to 4 months. Slight warping and susceptible to powder-post beetle and fungal attacks. For kiln drying, schedule E (tentative) is recommended.
- 6. Machining properties:** Generally easy to resaw, plane and cross-cut. Nailing property is rated as good.
- 7. Durability:** Non-durable. Very easy to treat with preservative for *A. scortechinii* and *A. elasticus*.
- 8. Strength grouping:** C
- 9. Strength properties:** Data based on test carried out on *Artocarpus scortechinii*.

Property (MPa)	Green	Air dry
Modulus of rupture	57	67
Modulus of elasticity	9 900	10 300
Maximum crushing strength	29.9	35.0

- 10. Uses:** Suitable for light construction, strip flooring, pattern-making, furniture joinery, core veneer, box, crate and wooden pallet.

- Trade name: Terentang
- Species: *Camposperma auriculatum* (terentang daun besar), *C. coriaceum* (terentang simpoh) and *C. squamatum* (terentang daun kecil).
1. Tree type and distribution: Medium to large trees reach 40 m tall and 235 cm girth. Present in lowland to mountain forests up to 1600 m; often forming pure stands in swamp forests, otherwise usually found in valleys near stream.
2. Wood characteristics: Heartwood grey-pink or mauve-grey without any figure on surface and root distinct from the sapwood. Wood soft and light. Texture fine and even. Grain interlocked.
3. Timber classification: LHW
4. Wood density: Ranges from 320 to 560 kg m<sup>-3</sup> air dry.
5. Drying and relative movement: Seasoning properties vary with species. *Camposperma auriculatum* 15 mm boards take 1 month to air dry and 40 mm boards take 2 months. *Camposperma coriaceum* - 40 mm boards take 5 months to air dry. Slight warping and prone to insect attacks and staining.
6. Machining properties: Easy to resaw and cross-cut. Planing is easy but the planed surface is rough and woolly with considerable picking up of the grain. Nailing properly is rated as excellent.
7. Durability: Non-durable. Very easy to treat with preservative for *C. auriculatum*.
8. Strength grouping: D
9. Strength properties: Data based on tests carried out a *Camposperma* sp.
- | Property (MPa)            | Green | Air dry |
|---------------------------|-------|---------|
| Modulus of rupture        | 31    | 42      |
| Modulus of elasticity     | 5 700 | 7 000   |
| Maximum crushing strength | 15.4  | 22.4    |
10. Uses: Suitable for match-box, match splint, disposable chopsticks, shoe soles, sandals and veneer



Sentang



Sepetir



Sesendok



Terap



Terenteng

## 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  $800 \text{ kg m}^{-3}$  and the timbers are naturally durable. Medium Hardwoods (MHW) are timbers with density  $720 - 800 \text{ kg m}^{-3}$  but lack sufficient natural durability. Light Hardwoods (LHW) are timbers with density below  $720 \text{ kg m}^{-3}$  and are 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 15 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 (%)
Type I	< 1.5
Type II	1.5-2.0
Type III	2.1-2.5
Type IV	2.6-3.0
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 graveyard 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 condition 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
Durable	5-10
Moderately durable	2-5
Non-durable	0-2

Susceptibility to fungal, termite attacks and treatability 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 are 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**

*Editor*

**K.T. Choo**

*Editorial Panel*

**Assoc. Prof. Dr. Mohd. Zamin Jumaat**

Department of Civil Engineering  
Faculty of Engineering, University Malaya  
59100 Kuala Lumpur

**Dr. Razali Abdul Kader**

Golden Hope Plantation Bhd  
Research & Development Department  
Oil Palm Research Station  
P. O. Box No. 207  
42700 Banting, Selangor DE

**Mr. C. T. Yap**

26, Jalan 3, Eng Ann Estate  
Klang, Selangor DE