

TIMBER

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Timber Notes – Medium Hardwoods II (Bekak, Derum, Keruing, Keruntum, Kulim)

by

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- Trade Name:** Bekak
- Species:** *Aglaia* spp. (family Meliaceae).
- 1. Tree type and distribution:** Small to large tree. Distributed in lowlands to hill forest of up to 1500 m altitude.
- 2. Wood characteristics:** Wood moderately hard and moderately heavy. Heartwood brick-red or dark red darkening to dark red-brown on exposure and moderately to sharply differentiated from the sapwood which is light yellow. Texture moderately to slightly coarse and even. Grain interlocked.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 705 to 1025 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take 1½ months and 3½ months respectively.
- 6. Machining properties:** Fairly easy to slightly difficult to resaw and is difficult to cross-cut. Planing is easy to slightly difficult and the planed surface is smooth. Excellent nailing property.
- 7. Durability:** Durable. Timber difficult to treat.
- 8. Strength grouping:** B
- 9. Strength properties:** Based on tests carried out on *Aglaia rubiginosa*.

Property (MPa)	Green	Air dry
Modulus of rupture	87	117
Modulus of elasticity	15 300	16 800
Maximum crushing strength	44.3	60.0

- 10. Uses:** Suitable for light to medium construction, boat decking and planking, heavy duty flooring, parquet flooring and power-line post when treated.

- Trade Name:** Derum
- Species:** *Cratoxylum formosum* (Jack) Dyer, *C. cochinchinense* (Lour) Bl and *C. maingayi* Dyer. (family Hypericaceae).
- 1. Tree type and distribution:** Small to large tree. Distributed from lowland and swampy to mountain, but nowhere in abundant.
- 2. Wood characteristics:** Wood hard and heavy. Heartwood brown to red-brown and not differentiated from the sapwood. Texture fine and even. Grain straight, interlocked or wavy.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 705 to 945 kg m³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take 3 months and 6 months respectively.
- 6. Machining properties:** Slightly difficult to difficult to resaw and easy to difficult to cross-cut. Planing is easy to fairly easy and planed surface is smooth.
- 7. Durability:** Moderately durable. Timber difficult to treat.
- 8. Strength grouping:** B
- 9. Strength properties:** Based on tests carried out on *Cratoxylon formosum*.

Property (MPa)	Green	Air dry
Modulus of rupture	76	94
Modulus of elasticity	12 500	15 200
Maximum crushing strength	37.8	48.1

- 10. Uses:** Suitable for heavy to medium construction under cover, post, tool handles and wooden pallets.

- Trade Name:** Keruing
- Species:** *Dipterocarpus* species. There are 31 species in Peninsular Malaysia.
- 1. Tree type and distribution:** Mainly large to very large trees. Distributed in the lowland or hill dipterocarp forests throughout the country.
- 2. Wood characteristics:** Heartwood red-brown or purple-red-brown and distinct from the sapwood which is grey-brown. Texture moderately coarse to coarse and even. Grain straight to interlocked. Planed surface fairly lustrous to dull. Stripe figure on radial surface.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 690 to 945 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take 2 – 4 1/2 months and 4 to 6 1/2 months to dry. For kiln drying, schedule D is recommended. Both Keruing kerut (*Dipterocarpus sublamellatus*) and Keruing gombang merah (*D. kustleri*) have Type III movement. However, Keruing gondol (*D. Kerii*), Keruing kipas (*D. kustulatus*), Keruing belimbing (*D. grandiflorus*) and Keruing sol (*D. Lowii*) all possess Type IV movement.
- 6. Machining properties:** Depending on species, working is rated easy to slightly difficult. Planed surface is generally smooth.
- 7. Durability:** Keruing gondol (*Dipterocarpus kerii*) is non-durable in ground contact condition when subject to weather extremities and attack by a wide range of wood attacking organisms. Others such as Keruing kerut (*D. sublamellatus*) and Keruing merah (*D. verrucosus*) are moderately durable. The timber has easy to average treatability with the exception of Keruing mempelas (*D. crinitus*) which is difficult to treat. Generally easily treated with preservative for 'less' oily species.
- 8. Strength grouping:** A & B
- 9. Strength properties:** Data based on the lowest average values of 9 species. *Dipterocarpus grandiflorus*, *D. baudii*, *D. cornutus*, *D. kunstleri*, *D. kerii*, *D. sublamellatus*, *D. crinitus*, *D. verrucosus* and *D. Lowii*.

Property (MPa)	Green	Air dry
Modulus of rupture	46	76
Modulus of elasticity	10 200	12 900
Maximum crushing strength	24.2	43.4

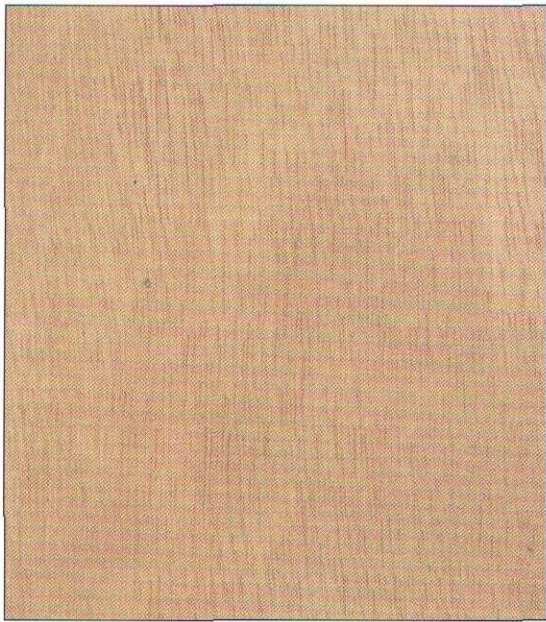
- 10. Uses:** Suitable for medium to heavy construction, posts, beams, joist, rafters, piling, truck body construction, container-flooring and when treated, suitable for railway sleepers, harbour works, bridges, power-transmission poles and telegraph poles.

- Trade Name:** Keruntum
- Species:** *Combretocarpus rotundatus* (Miq.) Danser. (family Rhizophoraceae).
- 1. Tree type and distribution:** Tree to 25 m tall, 300 cm girth. Extremely rare in Peninsular Malaysia but moderate to large supply, especially in Northern Sarawak.
- 2. Wood characteristics:** The wood is moderately hard and moderately heavy. Heartwood red or red-brown and sharply defined from the sapwood which is chalky-white in colour. Texture coarse and uneven. Grain interlocked. Silver grain present on quarters sawn surface due to the presence of broad rays.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 640 to 800 kg m³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take 3 and 6 months respectively. Schedule G is recommended for kiln drying (PRL, UK).
- 6. Machining properties:** Easy to saw and work. Nailing property is poor.
- 7. Durability:** Moderately durable and has average amenability to preservative treatment.
- 8. Strength grouping:**
- 9. Strength properties:** Data based on tests carried out on *Combretocarpus rotundatus*.

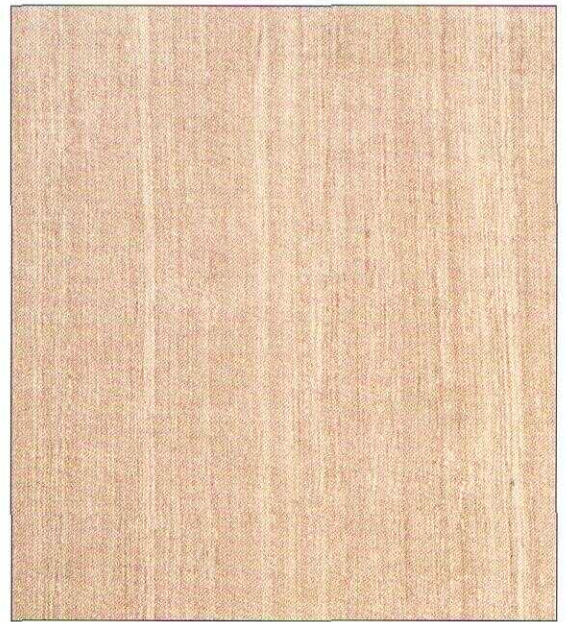
Property (MPa)	Green	Air dry
Modulus of rupture	80	136
Modulus of elasticity	14 550	17 150
Maximum crushing strength	7.5	11.9

- 10. Uses:** Suitable for flooring and panelling. When treated can be used for heavy construction and railway sleepers.

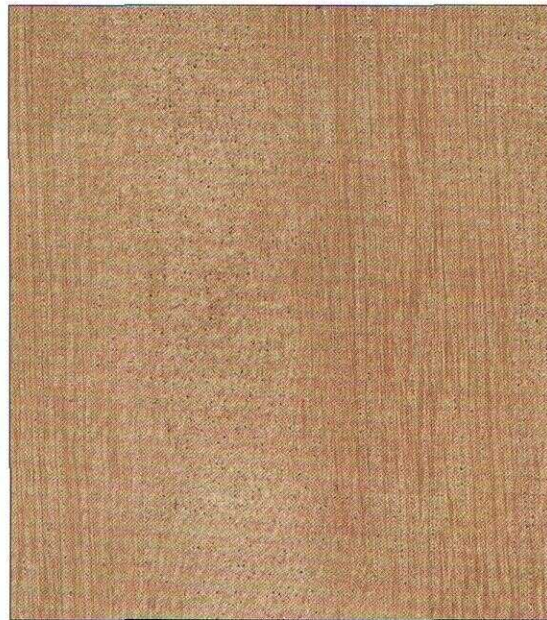
- Trade Name:** Kulim
- Species:** *Scorodocarpus borneensis*.
- 1. Tree type and distribution:** Medium-sized tree or rarely large reaching 36 m tall, 210 cm girth. Common throughout the country except Perlis & N. Kelantan, lowlands to 150 m or rarely to 600 m; hillsides and ridges.
- 2. Wood characteristics:** Heartwood dark purple-brown turning to dark brown on exposure. Sapwood lighter-colour and moderately distinct. Texture moderately fine and even. Grain interlocked. Planed surface dull. Freshly cut wood with garlic smell.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 640 to 975 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. Timber is susceptible to end-check and split.
- 6. Machining properties:** Slightly difficult to difficult to resaw and is easy to slightly difficult to cross-cut. Slightly difficult to plane but the planed surface is smooth. Nailing property is rated poor.
- 7. Durability:** Moderately durable and has average amenability to treatment.
- 8. Strength grouping:** A
- 9. Strength properties:**
- | Property (MPa) | Green | Air dry |
|---------------------------|--------|---------|
| Modulus of rupture | 78 | 107 |
| Modulus of elasticity | 13 300 | 14 900 |
| Maximum crushing strength | 44.4 | 57.0 |
- 10. Uses:** Suitable for medium construction under cover, posts, beams, joists, rafters, and bridges. Also suitable for flooring, railway sleepers and power transmission poles *when treated with preservative*.



Bekak



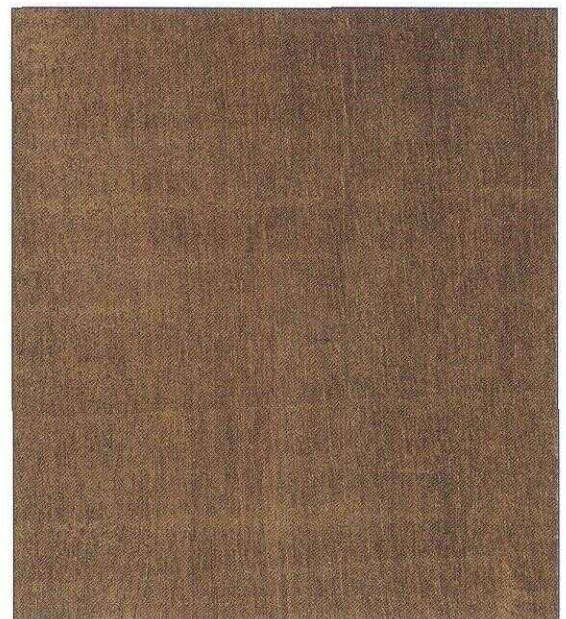
Derum



Keruing



Keruntum



Kulim

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.

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