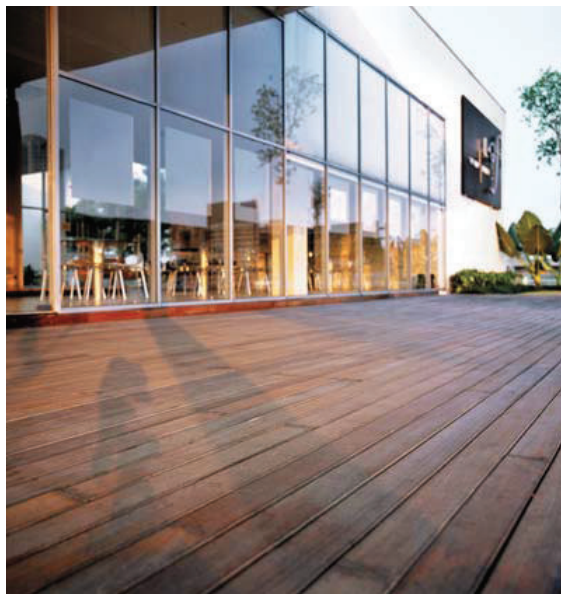


# NATURAL BEAUTY AT ITS BEST

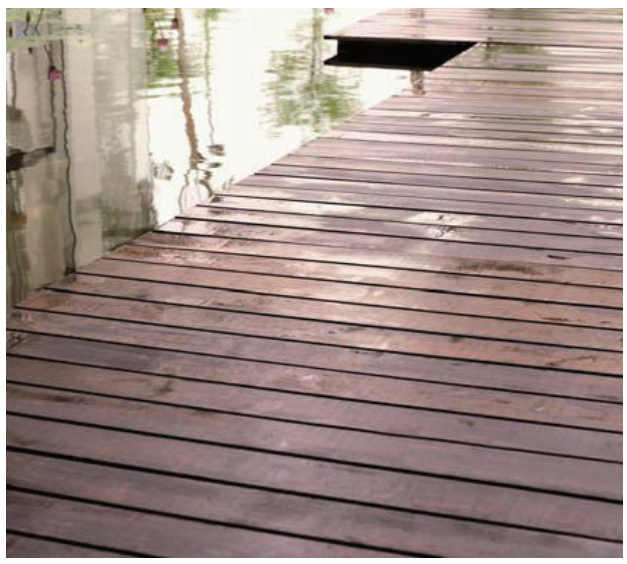
**Few materials can match the beauty and practicality of tropical timber for decking.**

**Unlike concrete, brick, stone, ceramic tiles or metal, timber decking can create a quick facelift to one's garden. It is simple to install, and does not require elaborate, time-consuming foundation work.**

**Timber effortlessly complements natural surroundings. Its flexibility allows landscape artists the freedom to incorporate enhancements such as handrails, balustrades, pergolas, screens and gazebos.**

# A SOUND CHOICE

**Malaysian hardwoods have established a reputation for quality, making them much sought-after by discerning buyers. Timbers such as Balau, Red Balau, Kempas, Keruing and Merbau are the best hardwoods for decking products because of their durability, strength and attractive grain.**



## Properties of some Malaysian Hardwood Timbers for Decking

### heavy hardwoods


Sapwood is lighter in colour and well defined from the heartwood, which is yellow-brown, brown or reddish brown. The grain is interlocked and the texture is moderately fine but even.


Sapwood is pale yellow in colour. Heartwood is yellowish to orange-brown when fresh, darkening to brown or dark red-brown on exposure. The texture is coarse but even, with interlocked grain.

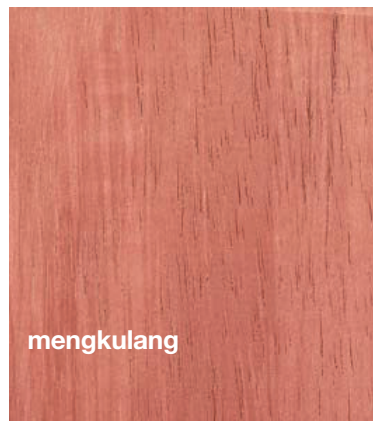
Sapwood is well-defined from the heartwood of purple red or dark red-brown colour. The grain is interlocked, often deeply interlocked. Texture is rather coarse and even.


Sapwood is light brown with a grey or pink-tinge and is not well-defined from the heartwood, which is light grey-brown with a pink-tinge. The grain is interlocked and texture is moderately coarse but even.


Sapwood is not well-defined from the heartwood which is light brown, pink-brown, red brown or purple brown with a grey tinge. The grain is interlocked, irregular or wavy. Texture is moderately fine and even.


Sapwood is white or pale yellow in colour. Heartwood is pinkish when fresh and darkens to bright orange-red or deep brown. The grain is interlocked, often very interlocked. The texture is coarse but even, except in areas where included phloem occurs.


Sapwood is purple-red or red-brown to grey-brown in colour. The heartwood is dark red-brown. Grain is straight to deeply interlocked. Texture is moderately coarse to coarse but even.




Sapwood is usually lighter in colour than and not always well-defined from the heartwood, which is red, red-brown to dark red-brown. The grain is straight to shallowly interlocked and texture is slightly to moderately coarse but even.

### light hardwoods


Sapwood and the heartwood are clearly demarcated. The former is yellow-brown with a pink tinge and the latter is deep red, red-brown, pink-brown or orange-brown. The timber has interlocked grains, and often comes with a striped figure. The texture is moderately coarse to coarse and uneven.


Sapwood is not clearly defined from the heartwood which is medium red to deep red to deep red-brown. The grain is interlocked. The texture is moderately

Sapwood is light yellow-brown and frequently darker than the heartwood which is light golden brown and darkens to a deep brown on exposure. Its texture is moderately coarse and even, with interlocked grain.


Sapwood is not sharply defined from the heartwood, which is light to dark yellow and darkens on exposure. Texture is moderately coarse but even, with shallow to deeply interlocked grain, occasionally with slight spiral grain.


Sapwood is well-defined. The heartwood is light yellow-brown to yellow-brown or brown. The grain is interlocked and sometimes wavy. The texture is moderately coarse but even.

| species | strength | tangential movement | air-dry density (kg/m³) | remarks |
|---|---|---|---|---|
| Balau | very strong | Type III | 850-1,155 | This timber is suitable for heavy-duty applications and has good working properties. Pre-boring before nailing is recommended. |
| Merbau | strong | Type III | 515-1,040 | A popular timber for joinery in Europe, particularly Belgium and The Netherlands. The timber is attractive and particularly suitable for decorative flooring. Pre-boring before nailing is recommended. |
| Red Balau | strong | Type III | 800-880 | This timber is suitable for heavy constructional work. It is moderately durable and is slightly difficult to saw, but planing is easy and the surface produced is smooth. |

## medium hardwoods

| species | strength | tangential movement | air-dry density (kg/m³) | remarks |
|---|---|---|---|---|
| Kelat | strong | Type III | 495-1,010 | Suitable for medium traffic flooring. Machines easily and takes a good finish. Pre-boring before nailing is recommended. |
| Kempas | very strong | Type V | 770-1,120 | An excellent flooring timber for indoor use and equally good for external decking. Classified as durable in the UK. Avoid included phloem. |
| Keruing | strong | Type IV & V | 690-945 | A popular timber for container flooring and truck bodywork. Easy to work and has good nailing properties. Can be preservative treated to enhance durability. |
| Mengkulang | strong | Type III | 625-895 | An attractive timber with good strength properties and popular for joinery work in Europe. Can be preservative treated to enhance its durability for decking. Satisfactory working properties and easy to nail. |
| Merpauh | strong | Type II | 640-880 | Some difficulty in sawing but otherwise has good working properties. Though not very durable in exposed conditions, the timber is very easy to treat with preservatives. |

## light hardwoods

| species | strength | tangential movement | air-dry density (kg/m³) | remarks |
|---|---|---|---|---|
| Bintangor | moderately strong | Type II | 465-865 | An easy to work timber but pre-boring is recommended before nailing. Though not very durable the timber can be used with preservative treatment. |
| Dark Red Meranti | moderately strong | Type I & II | 560-865 | The most important timber exported to Europe where it is very popular for joinery. Has good working properties and is easy to nail. Suitable for low traffic flooring. |
| Gerutu | moderately strong | Type IV | 575-880 | The timber is suitable for light to medium construction under cover and strip flooring. Its nailing property is rated as excellent. |
| Mersawa | moderately strong | Type III | 515-735 | Satisfactory working properties and easy to nail. Has sufficient durability but should not be used in contact with the ground. Suitable for low traffic flooring. |
| Yellow Meranti | moderately strong | Type II | 575-735 | Popular for plywood manufacturing, the timber can also be rendered for decking with preservative treatment. Suitable for low traffic flooring. |

## Notes to the properties of Malaysian timbers

### strength classification

The strength properties have been determined using the test procedure described in ASTM designation: D143-52 developed by the American Society for Testing Materials.

**Basic Stresses and Moduli of Elasticity for Strength Groups for Malaysian Timber in the Green Condition (m.c. > 19%), (MPa)**

| strength group | bending and tension parallel to grain | compression parallel to grain | compression perpendicular to grain | shear parallel to grain | modulus of elasticity | |
|---|---|---|---|---|---|---|
| | | | | | mean | minimum |
| very strong | 20.69 | 17.24 | 1.72 | 2.76 | 13,800 | 8,600 |
| strong | 17.24 | 13.79 | 1.03 | 2.07 | 11,000 | 6,200 |
| moderately strong | 12.41 | 9.65 | 0.69 | 1.38 | 9,000 | 5,200 |
| weak | 7.59 | 6.55 | 0.41 | 1.38 | 5,700 | 3,000 |

### movement

The method used in the determination of the movement of different timber species is similar to the procedure described in "The Movement of Timbers – Technical Note No. 38, Princess Risborough Laboratory, BRE, UK, 1976". However, the constant humidity – temperature settings required for the two exposure tests were adjusted to 30°C/95% relative humidity with equilibrium moisture content (EMC) of 20%, and 30°C/60% relative humidity with EMC of 12% respectively.

A total of 20 pieces of quarter-sawn and flat-sawn representative samples were used to measure the radial and tangential movements of each species of timber.

These were obtained from 30 mm boards which had been air seasoned for three to six months to attain the air-dry EMC of approximately 14 to 19%. Each sample was then fine-dressed to a thickness of 6 mm and cut to a standard length of 50mm and width of 150 mm.

For the purpose of describing the movement of the Malaysian timbers for decking, the following classification was used:

| 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% |

*Source: Movement of Seasoned Timber in Service – FRIM Technical Information Handbook No. 18, 1998*