



## IMPORTED TIMBER

15

**Species:** *Dryobalanops* spp. principally  
*D. aromatica* Gaertn.

**Standard Trade Name:** Kapur.

**Common Names:** Camphorwood (Sabah), kapoer (Indonesia), kapor (Borneo) and keladan (Sarawak).

**1. Size of tree / type of forest:** Kapur species are large hardwoods of Malaysia and Indonesia.

**2. Wood description:** Heartwood is yellow, pink or reddish brown which darkening on exposure. Sapwood is distinctively paler and 50 mm to 150 mm wide. Texture is medium and even and the grain is sometimes slightly interlocked producing a small amount of figure on the radial surface. Freshly cut wood has a camphor-like odour.

**3. Wood density:**  
Green density (kg/m<sup>3</sup>): Unavailable  
Air-dry density (kg/m<sup>3</sup>): About 750 kg/m<sup>3</sup>  
Basic density (kg/m<sup>3</sup>): Unavailable

**4. Drying and shrinkage:**

	<u>Tangential Shrinkage (%)</u>	<u>Radial Shrinkage (%)</u>
Before reconditioning:	6.0	3.0
After reconditioning:	Unavailable	Unavailable

**5. Workability:** The presence of silica makes it somewhat difficult to work when seasoned. Wet wood is blackened by contact with iron. Glues satisfactorily but extra care is needed with urea-formaldehyde and phenol-formaldehyde. Pre-drilling may be needed when nailing near extremities.

**6. Durability Class:** 2

**7. Strength Groups:** S3 and SD3.

**8. Strength Properties:**

(Sabah timber)

Property	Units	Green	Dry
Modulus of Rupture	MPa	82	119
Modulus of Elasticity	MPa	11000	14000
Max Crushing Strength	MPa	41	66
Hardness	kN	4.0	5.4

**9. Uses:** Plywood, furniture, joinery, general construction, barge boards and fascias.

**10. Availability:** Readily available in Western Australia.

## BACKGROUND INFORMATION

### 1. Size of tree and type of forest

Small trees have average heights up to 15 m, medium 15 to 30 m, and large over 30 m. Types of forest are sclerophyll (with closed canopy), woodland (with scattered trees), or rain forest. Diameter breast height is stem diameter at 1.3 m above ground.

### 2. Wood description

For example, sapwood and heartwood colour, grain, figure

### 3. Wood density ( $\text{kg/m}^3$ )

Green density is the density of wood in the living tree, defined as green mass divided by green volume, and useful for estimating transport costs. It varies with season and growing conditions. Air-dry density is the average mass divided by volume at 12 per cent moisture content (this is the average environmental condition in the coastal capital cities around Australia). Basic density is oven-dry mass divided by green volume. This measure has the advantage that moisture content variations are avoided.

### 4. Drying and shrinkage

As wood dries, it shrinks more in the tangential direction (i.e. parallel to the growth rings) than it does in the radial direction (i.e. at right angles to the growth rings). The figures given are shrinkage from green to 12 per cent moisture content, before and after steam reconditioning treatment. Reconditioning recovers any cells that may have collapsed during drying, and is essential for species such as the ash-type eucalypts.

### 5. Workability

Comments are made on the comparative ease or difficulty of turning, nailing and bending, on susceptibility to splitting and other working properties.

### 6. Durability

The CSIRO Durability Classes are based on the performance in ground of outer heartwood when exposed to fungal and termite attack. Class 1 gives more than 25 years life, Class 2 gives 15 to 25 years, Class 3 gives 8 to 15 years, and Class 4 less than eight years. The ratings are not relevant to above-ground use. In late 1996, CSIRO published revised ratings, which include termite susceptibility.

### 7. Strength grouping

In grading of structural timber, each species is allocated a ranking for green timber of S1 (strongest) to S7, and for seasoned timber SD1 (strongest) to SD8.

Minimum values for strength groups for green timber (units are MPa)

Strength property	S1	S2	S3	S4	S5	S6	S7
Modulus of rupture	103	86	73	62	52	43	36
Modulus of elasticity	16300	14200	12400	10700	9100	7900	6900
Maximum crushing strength	52	43	36	31	26	22	18

Minimum values for strength groups for seasoned timber (units are MPa)

Strength property	SD1	SD2	SD3	SD4	SD5	SD6	SD7	SD8
Modulus of rupture	150	130	110	94	78	65	55	45
Modulus of elasticity	21500	18500	16000	14000	12500	10500	9100	7900
Maximum crushing strength	80	70	61	54	47	41	36	30

### 8. Strength Properties

Values are from Bootle, K.R. (1983). 'Wood in Australia. Types, properties and uses'. (McGraw-Hill)

### 9. Uses

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

### 10. Availability

Timber from many species is available only near the areas that the trees grow naturally or in plantations. Imported timbers and their current availability are identified.