

Timber Advisory Notes



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and Land Management

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Species: *Eucalyptus astringens* (Maiden) Maiden.

Standard Trade Name: Brown mallet

Common Names: Brown mallet

1. Size of tree / type of forest: Brown mallet is a small to medium-sized tree, 10-25 m in height and with diameter at breast height (dbh) to 0.7 m, but is occasionally found up to 30 m tall and 1 m dbh. Brown mallet grows in the south-west of Western Australia on the drier, inland side of the jarrah (*E. marginata*) forest, in the 300 to 400 mm rainfall zone. It occurs from north-west of York to Narrogin and Wagin, southward to GMT Barker and eastwards to near Kondinin, Lake Grace and Ravensthorpe.

2. Wood description: Heartwood light red-brown to dark grey-brown, with reddish streaks. Sapwood is up to 30 mm wide and distinctly paler.

3. Wood density:

Green density (kg/m ³):	About 1120 kg/m ³ .
Air-dry density (kg/m ³):	About 980 kg/m ³ .
Basic density (kg/m ³):	About 770 kg/m ³ .

4. Drying and shrinkage:

	<u>Tangential Shrinkage (%)</u>	<u>Radial Shrinkage (%)</u>
Before reconditioning:	7.0	5.5
After reconditioning:	4.4	3.6

5. Workability: Rather hard to work but dresses well. The grain is often interlocked and the timber is easy to dry.

6. Durability Class: 2/1 Decay 2 Decay + termites (CSIRO revised ratings 1996)

7. Strength Groups: S1 and SD2.

8. Strength Properties:

Property	Units	Green	Dry
Modulus of Rupture	MPa	113	179
Modulus of Elasticity	MPa	15000	19000
Max Crushing Strength	MPa	53	94
Hardness	kN	9.9	15.0

9. Uses: General construction (particularly on farms), tool handles, mining timbers and fuel. The bark has a high tannin content (40 per cent or more), which can be used for tanning leather and adhesives manufacture.

10. Availability: Limited to Western Australia and available in small quantities around the Narrogin area.

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 (kg/m³)

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.