

Recommended Practice / February 2004

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Introduction

Timber is an organic material with a wide variety of physical and mechanical properties. It is important that a timber species is selected which has the properties suitable for its intended use.

The information should be used as a guide only as there can be significant variation within a species.

Plantation grown hardwoods which are becoming more readily available may also have different properties.

This data sheet includes a schedule of the most common timber species available in Australia. For information on other species not listed, reference should be made to TRADAC.

Where a species group has been included, the properties scheduled are based on that of the lowest rated species in the group.

Standard Name and Botanical Name

The names listed in the schedule are those generally defined in AS1148-2001, TIMBER-NOMENCLATURE-AUSTRALIAN, NEW ZEALAND AND IMPORTED SPECIES. However some botanical names have been changed to reflect recent botanical classification changes. Some species may be known by other names in some regions.

Strength Group

Strength Groups are groupings of species with similar properties (e.g. density, strength and modulus of elasticity) in accordance with AS 2878, TIMBERS - CLASSIFICATION INTO STRENGTH GROUPS.

The schedule lists the strength groups **S1** (highest) through to **S7** (lowest) for unseasoned timber, and **SD1** (highest) through to **SD7** (lowest) for seasoned timber.

Visual stress grading of structural members utilise the strength group of the species modified by the strength reducing characteristics (knots, sloping grain etc.) of the particular member.

Joint Group

The joint group is a classification of species for joint design, based primarily on density. **J1** (unseasoned) and **JD1** (seasoned) species have the highest joint strength properties and **J6** (unseasoned) **JD6** (seasoned) the lowest.

Density

Density is listed in the schedule for unseasoned (U/S) and seasoned (S) timber. The seasoned density is based on a moisture content of 12%. The unseasoned density is very approximate as it will depend on the moisture content at the time of measurement. It has been provided only as a guide to determine the self weight of an unseasoned member.

Hardness

Hardness is a measure of a species resistance to indentation, wear or abrasion. It also gives an indication of the difficulty of sawing and planing. It is measured in kN and is determined by the Janka hardness test (The higher the number, the greater hardness).

Toughness

Toughness is a measure of timbers ability to resist shocks and blows, and is synonymous with impact strength. For the purpose of this schedule, the simplified classifications **L** (low), **M** (medium) and **H** (high) have been adopted.

Specific toughness classifications (Nm) are scheduled in AS 1720.2, SAA TIMBER STRUCTURES CODE PART 2: TIMBER PROPERTIES.

Moisture Content

"Green" timber (when it is freshly sawn) has a very high moisture content. Timber will dry down to the "equilibrium moisture content" of the surrounding environment.

Moisture content influences strength properties, stiffness, hardness, abrasion resistance, machining properties, thermal conductivity, dimensional stability, resistance to decay and nail holding ability.

Moisture content is expressed as a percentage of the weight of water over the oven-dry weight of the wood. For the purpose of this schedule, "Seasoned" timber means having a moisture content of 12%.

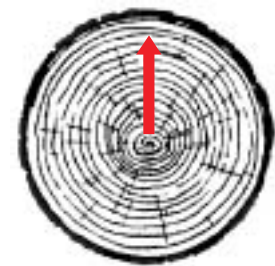
Shrinkage

As timber dries, it shrinks. Shrinkage is the percentage reduction in dimension from 'green' (above 25%) to 12% moisture content.

The schedule provides the shrinkage values for the tangential direction. Radial shrinkage is approximately half the tangential. Longitudinal shrinkage in most species is much lower and generally is between 0.1% and 0.3%. However, the effect of grain distortion and reaction wood, such as around knots, can sometimes result in noticeable longitudinal shrinkage.



Tangential



Radial

% Unit Tangential Movement (UTM)

Percentage (%) unit tangential movement is the percentage dimensional change for each 1% moisture content change (between 25% and 3% moisture content).

Movement = U.T.M. x (% change in moisture content) x (board width ÷ 100)

Durability

Durability of timber is the ability to perform its task for a required period of time. This means its performance when exposed to hazards such as decay (fungi) and insects (termites and borers).

Timber species have different natural durability characteristics. Species are given a durability classification based upon their expected service life in the ground or outside above the ground when exposed to hazards.

Class	Rating	Expected Service Life (yrs)	
		In Ground	Outside above Gr
1	High	> 25	> 40
2	Reasonably High	15-25	15 to 40
3	Moderate	5-15	7 to 15
4	Low	< 5	< 7

The durability classifications apply to the heartwood (true wood) of a species. The sapwood of all timber, irrespective of species, is not durable and can be regarded as durability Class 4.

The sapwood of most species can be made durable by impregnation with chemicals.

Note: Only the sapwood of timber can be impregnated and therefore treatment will not change the natural durability of the truewood (heartwood) of a species.

Species marked '*' are termite resistant in accordance with AS 3660.1

Lyctid Susceptibility

The susceptibility of the sapwood of individual hardwood species to attack by lyctid borers is classified as follows:

- S** = Susceptible
- NS** = Not Susceptible

In Queensland and New South Wales, legislation prohibits the sale and use of lyctid susceptible timber species which contains untreated sapwood.

Early Fire Hazard Indices

The Building Code of Australia requires fire hazard indices for certain applications. The schedule lists the following:

- Ignitability index (scale **0 -20**)
- Spread of flame index (**0-10**)
- Smoke developed index (**0-10**)

Bushfire Rated

✓ indicates that untreated timber of this species is equivalent to "fire retardant treated timber" when tested in accordance with AS/NZS 3837. Refer Technical Data Sheet No. 24 Timber Construction in Bushfire Prone Areas.

Those species indicated ✓* are considered by the Warrington Fire Research Group to also be suitable if assessed in accordance with proposed changes to the standard - refer report at www.timber.org.au.

Colour

The colour of seasoned heartwood can vary between species and often within a species. In most cases, the colour of sapwood is either a lighter shade of the heartwood or a white/cream colour. The information in the schedule should be used as a general guide only.

- W** = white, yellow, pale straw to light brown
- P** = pink, to pink brown
- R** = light to dark red

B = brown, chocolate, mottled or streaky.

Common Uses

The schedule lists common uses of species but not necessarily all uses for which a species is suitable. The listing does not include uses where an individual species is used in a species mix. It assumes that normal good design, workmanship, finishing and maintenance practices will be followed. The schedule includes:-

- (i) **In Ground:**
Conditions of use include in or on the ground, or in persistently damp or badly ventilated situations, e.g. embedded poles or posts, landscaping timber.
- (ii) **Framing Above Ground - Exposed:**
Conditions of use include framing exposed to the weather, but clear of the ground and well ventilated, e.g. sub-floor framing to decks, verandah posts etc.
- (iii) **Framing Above Ground - Protected:**
Fully protected from the weather and other dampness, and well ventilated e.g. wall framing with weatherproof cladding.
- (iv) **Decking:**
Exposed to weather, clear of the ground and well ventilated, e.g. verandah flooring, boardwalks, wharves.
- (v) **Cladding:**
Exposed to the weather and clear of the ground.
- (vi) **Internal Flooring:**
Fully protected from the weather. Consideration may need to be given to species hardness and toughness relative to the specific application.
- (vii) **Panelling:**
Wall and ceiling linings fully protected from the weather.
- (viii) **External Joinery:**
Exposed to the weather (or not fully protected), e.g. window sills, external door, window frames, handrails, balusters, stairs and newel posts.
- (ix) **Internal Joinery:**
Fully protected from the weather, e.g. door jambs, mouldings, internal staircase material, railings.

Uses are indicated as follows:

- O** = commonly used
- P** = commonly used but preservative treated

Availability

This schedule provides guidance on availability. This will vary in local areas and with time. Specific advice should be sought from local timber suppliers or Timber Queensland.

- R** = regular
- L** = limited.

If you need more information on the subject of this data sheet, please contact Timber Queensland. We need your feedback to ensure that future revisions continue to meet the needs of timber users.



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See TQL Data Sheet 16b for Species
Charts

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																	
Standard Trade Name	Botanical Name	Strength Group		Joint Group		Density (kg/m ³)		Hardness (seasoned) (kN)	Toughness	Tangential Shrinkage %	% Unit Tangential Movement	Durability Class (Termite Resistant)	Lytic Susceptibility	Early Fire Hazard			Bushfire Rated	Colour	Common Uses							Availability varies region by region						
		Unseasoned	Seasoned	Unseasoned	Seasoned	Unseasoned	Seasoned							Ignitibility	Spread of Flame	Smoke Development			Framing Above	Framing Above Ground-Exposed	Framing Above Ground-Protected	Decking	Cladding	Internal Flooring	Paneling		External Joinery	Internal Joinery				
gum, river, red	<i>Eucalyptus camaldulensis</i>	S5	SD5	J2	JD2	1150	900	9.7	M	L	8.9	0.31	2*	S	-	-	-	✓	R	0	0	0	0	0	0	0	0	0	0	0	0	L
gum, rose	<i>Eucalyptus grandis</i>	S3	SD4	J2	JD2	1100	750	7.3	M	M	7.5	0.30	3	NS	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	R	
gum, shining	<i>Eucalyptus nitens</i>	S4	SD4	J3	JD3	1100	530	5.8	M	M	12.8	0.33	4	S	-	-	-	-	W	-	-	-	-	-	-	-	-	-	-	-	L	
gum, spotted	<i>Corymbia maculata/ Corymbia citridora</i>	S2	SD2	J1	JD1	1200	1100	10.1	H	H	6.1	0.38	2*	S	13	3	3	✓	B	-	0	0	0	0	0	0	0	0	0	0	R	
hardwood, Johnstone River	<i>Backhousia bancroftii</i>	S2	SD3	J1	JD1	1150	950	-	-	-	6.4	0.39	3	NS	-	-	-	-	B	-	-	-	-	-	-	-	-	-	-	-	L	
hemlock western	<i>Tsuga heterophylla</i>	S6	SD6	J4	JD4	800	500	2.7	L	L	5.0	-	4	NS	14	9	3	-	W	-	-	0	-	-	0	-	-	-	-	0	L	
ironbark, grey	<i>Eucalyptus paniculata</i>	S1	SD1	J1	JD1	1250	1100	16.3	H	H	7.5	0.39	1*	NS	-	-	-	-	WRB	0	0	0	0	0	0	0	0	0	0	0	R	
ironbark, red	<i>Eucalyptus sideroxylon</i>	S2	SD3	J1	JD1	1200	1100	11.9	H	M	6.3	0.37	1*	S	-	-	-	✓	R	0	0	0	0	0	0	0	0	0	0	0	R	
ironwood Cooktown	<i>Erythrophloeum chlorostigmychys</i>	S1	SD1	-	-	-	1220	13.0	-	-	3.0	-	1	S	-	-	-	-	RB	0	-	-	-	-	-	-	-	-	-	-	L	
jarrah	<i>Eucalyptus marginata</i>	S4	SD4	J2	JD2	1100	800	8.5	L	L	7.4	0.30	2*	S	13	6	3	✓	R	-	0	0	0	0	0	0	0	0	0	0	R	
kapur	<i>Dryobalanops</i> spp.	S3	SD4	J2	JD2	1100	750	5.4	L	M	6.0	-	3	NS	13	7	3	-	WPR	-	-	-	-	-	-	-	-	-	-	-	L	
karri	<i>Eucalyptus diversicolor</i>	S3	SD2	J2	JD2	1150	900	9.0	M	M	9.9	0.40	3	NS	13	5	3	-	P	-	0	0	0	0	0	0	0	0	0	0	R	
keruing	<i>Dipterocarpus</i> spp.	S3	SD3	J2	JD2	950	750	4.6	H	H	9.5	-	4	S	-	-	-	-	R	P	0	0	0	0	0	0	0	0	0	0	L	
kwila (merbau)	<i>Intsia bijuga</i>	S2	SD3	J2	JD2	1150	850	8.8	M	M	2.5	-	2*	S	-	-	-	✓	R	-	0	0	0	0	0	0	0	0	0	0	R	
mahogany, Philippine, red, dark	<i>Shorea</i> spp.	S5	SD6	-	JD3	-	650	3.2	-	-	4.0	-	3	S	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	0	R	
mahogany, Philippine, red, light	<i>Shorea, Pentacme, Parashorea</i> spp.	S6	SD7	-	JD4	-	550	2.6	-	-	6.5	-	4	S	-	-	-	-	W	-	-	-	-	-	-	-	-	-	-	0	R	
mahogany, red	<i>Eucalyptus resinifera</i>	S2	SD3	J1	JD1	1200	950	12.0	M	M	6.3	0.34	2*	S	-	-	-	-	R	-	0	0	0	0	0	0	0	0	0	0	L	
mahogany, southern	<i>Eucalyptus botryooides</i>	S2	SD3	J2	JD2	1100	900	9.2	M	M	9.8	0.37	2*	NS	-	-	-	-	R	-	0	0	0	0	0	0	0	0	0	0	L	
mahogany, white	<i>Eucalyptus acmenoides</i>	S2	SD3	J1	JD2	1150	1000	10.1	M	M	5.4	0.34	1*	NS	-	-	-	-	W	-	0	0	0	0	0	0	0	0	0	0	R	
marri	<i>Eucalyptus calophylla</i>	S3	SD3	J2	JD2	1150	850	7.1	M	M	6.6	0.34	3	S	-	-	-	-	W	-	-	-	-	-	-	-	-	-	-	-	L	
meranti, red, dark	<i>Shorea</i> spp.	S5	SD6	J4	JD3	1100	650	3.5	-	-	5.0	-	4	S	14	9	4	-	R	-	-	-	-	-	-	-	-	-	-	0	R	
meranti, red, light	<i>Shorea</i> spp.	S6	SD7	-	JD5	-	400	2.4	-	-	4.4	-	4	S	14	9	4	-	P	-	-	-	-	-	-	-	-	-	-	0	R	
messmate	<i>Eucalyptus obliqua</i>	S3	SD3	J3	JD3	1100	750	7.4	M	M	11.3	0.36	3	S	13	5	3	-	W	-	0	0	0	0	0	0	0	0	0	0	R	
messmate, Gympie	<i>Eucalyptus doeziana</i>	S2	SD3	J1	JD1	-	955	-	-	-	6.0	-	1*	NS	-	-	-	-	W	0	0	0	0	0	0	0	0	0	0	0	L	
oak, American	<i>Quercus</i> spp.	S6	SD6	-	-	-	750	-	-	-	5.0	-	-	S	-	-	-	-	W	-	-	-	-	-	-	-	-	-	-	0	L	
pelawan (Northern Box)	<i>Tristania</i> spp.	S2	SD2	J1	JD1	1145	920	-	M	M	7.0	-	2	NS	-	-	-	-	PR	-	-	-	-	-	-	-	-	-	-	0	R	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																							
Standard Trade Name	Botanical Name	Strength Group		Joint Group		Density (kg/m ³)		Hardness (seasoned) (KN)	Toughness		Tangential Shrinkage %	% Unit Tangential Movement	Durability Class (*Termite Resistant)	Lycid Susceptibility	Early Fire Hazard			Bushfire Rated	Colour	Common Uses																		
		Unseasoned	Seasoned	Unseasoned	Seasoned	Unseasoned	Seasoned		Unseasoned	Seasoned					Ignitibility	Spread of Flame	Smoke Development			Ground-Exposed Framing Above	Ground-Protected Framing Above	Decking	Cladding	Internal Flooring	Paneling	External Joinery	Internal Joinery	Availability varies region by region										
peppermint, narrow-leaved	<i>Eucalyptus australiana</i>	S4	SD4	J3	JD2	JD2	JD2	800	1100	7.5	L	L	13.2	0.36	3	S	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L
pine, caribbean	<i>Pinus caribaea</i>	S6	SD6	J4	JD4	JD4	JD4	550	-	-	-	-	5.0	0.34	4	NS	-	-	-	W	P	P	P	P	P	P	P	P	P	P	P	P	P	P	-	R		
pine, hoop (Araucaria)	<i>Araucaria cunninghamii</i>	S6	SD5	J4	JD4	JD4	JD4	550	800	3.4	L	L	3.8	0.23	4	NS	14	7	2	W	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	-	R	
pine, radiata	<i>Pinus radiata</i>	S6	SD6	J4	JD4	JD4	JD4	550	800	3.3	M	L	5.1	0.27	4	NS	14	8	3	W	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	-	R	
pine, slash	<i>Pinus elliotii</i>	S5	SD5	J4	JD4	JD4	JD4	650	850	3.4	L	L	4.2	0.30	4	NS	-	-	-	W	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	-	R	
ramin	<i>Gonystylus</i> spp.	S4	SD4	-	JD3	-	JD3	650	-	5.8	-	-	5.5	-	4	S	14	7	3	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L	
socau (Northern Box)	<i>Paltaquium hornei</i>	S3	SD2	J2	JD2	JD2	JD2	890	1010	-	M	M	6.4	-	2	5	-	-	-	PR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	
stringybark, Blackdown	<i>Eucalyptus sphaerocarpa</i>	S3	SD3	J1	JD1	-	JD1	1000	-	-	-	-	7.0	-	2*	S	-	-	-	B	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	L	
stringybark, brown	<i>Eucalyptus baxteri</i>	S3	SD3	J2	JD2	JD2	JD2	850	1100	7.5	M	M	10.4	0.33	3	NS	-	-	-	B	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	L	
stringybark, white	<i>Eucalyptus eugenioides</i>	S3	SD3	J2	JD2	JD2	JD2	1000	1100	9.0	M	M	10.6	0.36	2*	NS	-	-	-	P	-	0	0	0	0	0	0	0	0	0	0	0	0	0	-	L		
stringybark, yellow	<i>Eucalyptus muellerana</i>	S3	SD3	J2	JD2	JD2	JD2	900	1150	8.6	M	M	7.5	0.37	2*	NS	-	-	-	W	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R		
tallowwood	<i>Eucalyptus microcarps</i>	S2	SD2	J1	JD2	JD2	JD2	1000	1200	8.6	M	M	6.1	0.37	1*	S	12	5	4	W	✓	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	L	
taun	<i>Pometia pinnata</i>	S4	SD4	-	JD3	-	JD3	700	-	-	-	-	5.5	-	3	S	-	-	-	R	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	R	
turpentine	<i>Syncarpia glomulifera</i>	S3	SD3	J2	JD2	JD2	JD2	950	1050	11.6	M	M	13.0	0.35	1*	NS	-	-	-	PB	✓	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	L	

Commercial Species Groups

ash, Victorian oak, Australian oak, Tasmanian	<i>Eucalyptus</i> spp.	S4	SD4	J3	JD3	JD3	JD3	650	1050	4.9	M	M	13.3	0.36	4	S	-	-	-	W	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	R
hardwood, mixed (Qld/Nth. NSW)	<i>Eucalyptus</i> spp. <i>Corymbia</i> spp.	S3	SD3	J2	JD2	JD2	JD2	750	1150	-	M	M	-	-	3	S	-	-	-	WPRB	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	R
softwoods, mixed Australian grown	pinus spp.	-	SD7	-	JD4	JD4	JD4	550	850	-	L	L	-	-	4	NS	-	-	-	W	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	R
softwoods, imported (unidentified)	mixed spp.	S7	SD8	J6	JD6	JD6	JD6	400	850	-	L	L	-	-	4	NS	-	-	-	W	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	R
hemfir	mixed spp.	-	SD7	-	JD5	JD5	JD5	-	-	-	L	L	-	-	4	NS	-	-	-	W	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	R
Spruce pine fir (SPF)	mixed spp.	-	SD7	-	JD6	JD6	JD6	-	-	-	L	L	-	-	4	NS	-	-	-	W	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	R