

Australian Standard™

Timber structures

Part 2: Timber properties



This Australian Standard was prepared by Committee TM-001, Timber Structures. It was approved on behalf of the Council of Standards Australia on 8 November 2005.
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The following are represented on Committee TM-001:

A3P

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Australian Building Codes Board
Australian Timber Importers' Federation
Australian Wood Panels Association
Building Research Association of New Zealand
CSIRO Manufacturing and Infrastructure Technology
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TM/1, Timber Structures, to supersede AS 1720.2—1990. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

This Standard incorporates Amendment No. 1 (April 2006). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to provide a list of structural timbers and their properties. Information on the availability and source of particular species is normally available from local industry associations.

The main changes in this edition are as follows:

- (a) Inclusion of structural classification, as the new Appendix A, Tables A1 and A2, previously in AS 1720.1—1988.
- (b) Amendment of timber natural durability ratings to align with those given in AS 5604.

This Standard is the second part in a series of timber structures Standards, which is comprised of the following:

AS

1720 Timber structures

1720.1 Part 1: Design methods

1720.2 Part 2: Timber properties (this Standard)

1720.4 Part 4: Fire-resistance of structural timber members

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

CONTENTS

	Page
1 SCOPE AND GENERAL	4
2 REFERENCED DOCUMENTS.....	4
3 TABULATION OF SPECIES AND PROPERTIES.....	4
4 EXPLANATION OF TABLE 1	8
5 REFERENCES	13
APPENDIX A F-GRADES FOR VISUALLY GRADED TIMBER	14

STANDARDS AUSTRALIA

Australian Standard
Timber structures

Part 2: Timber properties

1 SCOPE AND GENERAL

This Standard sets out a table of species and their general properties, which can be used for the design of timber structures.

NOTES:

- 1 It is emphasized that structural timber exhibits considerable natural variability and, consequently, the information given herein might be inadequate when precise and specific data are required.
- 2 The inclusion of a species in this Part does not necessarily indicate that it is readily available.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1649 Timber—Methods of test for mechanical fasteners and connectors—Basic working loads and characteristic strengths

1720 Timber structures

1720.1 Part 1: Design methods

2082 Timber—Hardwood—Visually stress-graded for structural purposes

2209 Timber—Poles for overhead lines

2858 Timber—Softwood—Visually stress-graded for structural purposes

2878 Timber—Classification into strength groups

5604 Timber—Natural durability ratings

AS/NZS

1148 Timber—Nomenclature—Australian, New Zealand and imported species

4063 Timber—Stress-graded—In-grade strength and stiffness evaluation

ASTM

D143 Standard Test Methods for Small Clear Specimens of Timber

BS

373 Methods of testing small clear specimens of timber

3 TABULATION OF SPECIES AND PROPERTIES

Some species used for structural purposes are listed in Table 1 together with their classification and general properties.

NOTE: See Appendix A for information regarding assignment of F-grades to visually graded timber.

TABLE 1
STANDARD TRADE NAMES AND GENERAL PROPERTIES OF SOME COMMON SPECIES

Index No.	Standard trade name	Origin	Species brand	Classification	Strength group		Joint group		Design density† (kg/m³)		Janka hardness, side grain (kN)		Tangential cleavage (N/mm)		Toughness (N·m)		Shrinkage %	Tendency to split for unseasoned timber	% Unit tangential movement	Natural durability class§		Sapwood lyctus susceptible	Termite resistant	Marine borer durability
					G	D	G	D	G	D	G	D	G	D	In-ground contact	Outside above ground								
8	alder, rose	Q	(RA)	H	S6	SD6	J4	JD4	1050	550	—	—	—	—	—	—	5.2‡	—	0.23	4	—	NS	NR	4
22	ash, alpine	N, T, V	AA	H	S4	SD4	J3	JD3	1050	650	4.0	5.0	60.4	70.2	17.1	18.9	8.5‡	high	0.35	4	3	S(N, T), NS(V)	NR	4
30	ash, mountain	T, V	MA	H	S4	SD3	J3	JD3	1050	650	3.4	4.9	49.9	72.6	17.0	20.0	13.3‡	high	0.36	4	3	NS	NR	4
37	ash, silvertop	N, T, V	ST	H	S3	SD3	J2	JD2	1100	850	6.7	9.7	79.3	101.0	22.6	22.6	10.6‡	high	0.36	3	2	NS	NR	4
84	blackbutt	N, Q	BB	H	S2	SD2	J2	JD2	1150	900	6.4	8.9	70.0	77.0	21.1	22.0	7.3‡	medium	0.37	2	1	NS	R	3
86	blackbutt, New England	N, Q	NA	H	S3	SD3	J2	JD2	1150	850	6.6	9.2	84.5	86.4	16.9	20.7	11.4‡	high	0.36	2	2	S	R	2
87	blackbutt, W.A.	W	BA	H	S4	SD5	J2	JD2	1100	850	5.5	6.9	—	—	—	—	—	—	—	2	1	S	R	3
121	box, brush	N, Q, Y	BH	H	S3	SD3	J2	JD2	1150	900	7.8	9.1	83.3	110.4	20.7	16.2	9.7‡	high	0.38	3	3	NS	R	2
127	box, grey, coast	N, V	CB	H	S1	SD1	J1	JD1	1200	1100	10.3	12.8	95.6	90.6	28.0	31.1	8.2	medium	0.42	1	1	S	R	3
150	box, yellow	N, Q, V	YB	H	S3	SD4	J1	JD1	1200	1050	10.5	13.0	92.6	89.4	21.5	16.0	6.2	low	0.39	1	1	NS	R	—
165	brownbarrel	N, V	BL	H	S4	SD4	J3	JD3	1100	750	5.0	5.5	63.3	86.1	18.9	18.1	11.8‡	high	0.34	4	3	S	NR	4
178	candlebark	N, S, T, V	CD	H	S5	SD5	J3	JD3	1100	700	5.0	5.9	58.4	63.7	16.2	11.7	12.2‡	high	0.34	4	3	S	NR	4
114	fir, Douglas	Nth Amer.	DF	S	S5	SD5	J4	JD4	700	550	2.1	3.0	38.0	39.0	10.8	12.0	4.0	low	—	4	4	NS	NR	4
		NZ(P)		S6	SD6	J5	JD5	800	420	2.2	3.6	43.8	42.0	—	—	—	Low	—	—	—	—	—	—	
253	gum, blue, southern	N, T, V	(SB)	H	S3	SD2	J2	JD2	1150	950	7.3	11.4	83.6	111.1	23.7	26.5	7.7‡	medium	0.40	3	2	S	NR	4
254	gum, blue, Sydney	N, Q	SY	H	S3	SD3	J2	JD2	1100	850	5.8	8.1	71.8	84.0	17.8	18.4	9.5	high	0.35	3	2	S	NR	3
266	gum, grey	N, Q	GG	H	S1	SD2	J1	JD1	1150	1050	—	—	—	—	—	—	—	—	—	1	1	NS	R	2
267	gum, grey, mountain	N, V	MT	H	S3	SD2	J2	JD2	1100	850	6.5	9.9	81.9	101.7	20.4	20.0	11.9‡	high	0.39	3	2	S	NR	4
269	gum, manna	N, Q, S, T, V	MN	H	S4	SD4	J3	JD2	1100	750	5.1	5.8	65.8	73.5	17.8	16.0	12.0‡	high	0.34	4	3	S	NR	4
272	gum, mountain	N, T, V, Q	MO	H	S4	SD5	J3	JD3	1100	700	5.2	5.7	65.3	72.3	17.9	17.4	11.5‡	high	0.35	4	3	S	NR	4
279	gum, red, forest	N, Q, V, G	(FR)	H	S3	SD4	J1	JD1	1150	1000	8.6	11.3	76.3	98.5	19.4	17.6	8.6	high	0.34	1	1	NS	R	2
281	gum, red, river	N, Q, S, V, W, Y	RR	H	S5	SD5	J2	JD2	1100	900	6.8	9.6	81.0	94.8	15.6	10.6	8.9‡	high	0.31	2	1	S	R	2
284	gum, rose	N, Q	RO	H	S3	SD4	J2	JD2	1100	750	5.5	7.3	73.3	88.7	22.4	18.5	7.5	medium	0.30	3	2	NS	NR	4
289	gum, shining	N, V	(SH)	H	S4	SD4	J3	JD3	1100	650	4.8	5.8	70.9	57.8	17.4	15.8	9.4‡	high	0.33	4	3	S	NR	4
293	gum, spotted	N, Q, V	SG	H	S2	SD2	J1	JD1	1200	1000	8.8	10.1	78.8	86.1	25.3	27.5	6.1	low	0.38	2	1	S	R	4

(continued)

TABLE 1 (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18					
Index No.	Standard trade name	Origin	Species brand	Classification	Strength group		Joint group		Design density [†] (kg/m ³)	Janka hardness, side grain (kN)	Tangential cleavage (N/mm)		Toughness (N·m)		Shrinkage %	Tendency to split for unseasoned timber	% Unit tangential movement	Natural durability class		Sapwood lyctus susceptible	Termite resistant	Marine borer durability
					G	D	G	D			G	D	G	D				In-ground contact	Outside above ground			
310	hardwood, Johnstone River	Q	(JR)	H	S2	SD3	J1	JD1	1150	1000	—	—	—	6.4	—	—	0.39	3	2	S	NR	4
139*	hemlock	Nth Amer	(WH)	S	S6	SD6	J4	JD4	750	500	2.1	2.7	35.4	27.5	9.2	9.2	—	4	4	NS	NR	4
322	ironbark, grey	N, Q	GI	H	S1	SD1	J1	JD1	1250	1100	10.8	16.3	87.3	78.4	30.0	33.0	0.39	1	1	NS	R	3
325	ironbark, red	N, Q, V	RI	H	S2	SD3	J1	JD1	1200	1050	10.7	11.9	93.4	74.6	26.0	23.0	0.37	1	1	S	R	2
326	ironbark, red, broad-leaved	N, Q	BI	H	S1	SD1	J1	JD1	1200	1100	12.0	14.0	—	—	—	—	—	1	1	NS	R	—
327	ironbark, red, narrow-leaved	N, Q	NI	H	S2	SD3	J1	JD1	1250	1050	12.0	14.0	—	—	—	—	—	1	1	NS	R	—
341	jarrah	W	J	H	S4	SD4	J2	JD2	1100	800	5.7	8.5	67.4	81.2	14.2	13.2	0.30	2	2	S	R	3
154*	kapur	S. E. Asia	(KR)	H	S3	SD4	J2	JD2	1100	750	4.0	5.4	55.0	62.0	13.8	15.4	—	3	2	NS	NR	4
344	karri	W	K	H	S3	SD2	J2	JD2	1150	900	6.0	9.0	80.5	74.9	22.6	23.0	0.40	3	2	NS	NR	4
169*	keruing	S. E. Asia	(KG)	H	S3	SD3	J2	JD2	—	780	3.2	4.6	44.0	62.0	26.7	32.5	—	3	3	S	NR	4
173*	kwila (merbau)	S. E. Asia	(KW)	H	S2	SD3	J2	JD2	1150	850	7.6	8.8	78.0	87.0	21.6	19.4	—	3	1	S	R	3
384	mahogany, red	N, Q	RM	H	S2	SD3	J1	JD1	1200	950	9.1	12.0	67.0	75.8	17.4	19.1	0.34	2	1	S	R	2
387	mahogany, southern	N, V	SM	H	S2	SD3	J2	JD2	1100	900	7.0	9.4	75.2	84.5	18.1	19.9	0.37	3	2	NS	R	—
391	mahogany, white	N, Q	WM	H	S2	SD3	J1	JD2	1150	950	8.9	10.1	66.0	—	19.7	19.2	—	1	1	NS	R	2
432	marri	W	ME	H	S3	SD3	J2	JD2	1100	850	6.6	7.1	69.8	75.8	21.4	23.2	0.34	3	3	S	NR	4
221*	meranti, dark red	S. E. Asia	(DM)	H	S5	SD6	J4	JD3	1100	650	3.1	3.5	47.0	—	—	—	—	4	3	S	NR	4
434	messmate	N,Q,S,T,V	MS	H	S3	SD3	J3	JD3	1100	750	5.3	7.2	64.5	82.8	17.0	16.7	0.36	3	3	S	NR	4
477	oak, silky, northern	Q	(NO)	H	S6	SD7	J4	JD4	1050	500	3.1	3.5	64.0	72.0	14.7	8.8	0.31	4	—	S	NR	4
486	oak, tulip, brown	N, Q, G	(BO)	H	S2	SD2	J2	JD2	1150	900	5.6	7.3	—	—	—	—	0.44	4	—	S	NR	4
488	oak, tulip, red	Q	(TO)	H	S3	SD4	J2	JD2	1100	750	6.4	9.0	83.5	103.2	24.6	18.6	—	4	—	S	NR	4
505	penda, red	Q	PD	H	S2	SD2	J1	JD1	1150	1050	13.8	16.2	—	—	—	—	0.36	2	1	NS	R	2
512	peppermint, narrow-leaved	N, T, V	NL	H	S4	SD4	J3	JD2	1100	600	5.2	7.1	69.8	81.2	14.9	14.4	0.36	3	3	S	NR	4
533	pine, Caribbean	N, Q	PB	S	S6	SD6	J4	JD4	—	550	2.7	—	—	—	—	—	0.34	4	4	NS	R	4
544	(pine) cypress, white	N, Q, S, V, W, Y	WC	S	S5	SD6	J3	JD3	850	700	4.6	6.1	43.2	37.4	12.9	7.3	0.30	2	1	NS	R	2

(continued)