Maximum permissible BOW and SPRING													
L (M)	Width (mm) for spring / Thickness (mm) for bow												
	38	50	75	100	125	150	175	200	225	250	275	300	350
1.8	10	10	7	5	4	3	3	3	2	2	1	1	1
2.4	20	15	12	9	7	6	5	4	4	4	3	3	3
3.0	35	25	19	14	11	9	8	7	6	6	5	5	4
3.6	50	35	25	20	16	13	12	10	9	8	7	7	6
4.2	60	45	28	25	22	18	16	14	12	11	10	9	8
4.8	70	50	30	30	29	24	21	18	16	14	13	12	10
5.4	75	55	40	40	36	30	26	23	20	18	17	15	13
6.0	80	60	45	45	45	37	30	28	25	22	20	19	16
6.6	85	65	50	45	45	45	39	34	30	27	25	23	19
7.2	90	70	55	50	50	50	46	40	36	32	29	27	23

Maximum permissible TWIST					
Length (nom.)	Thickness (nom.)	Width (nom. – mm)			
		Up to 100	101-150	151-200	201-300
2.4	Up to 50	5	7	10	15
	51 – 75	4	6	8	11
3.6	Up to 50	8	13	18	25
	51 – 75	6	9	13	19
4.8	Up to 50	10	16	23	33
	51 – 75	7	12	17	24
5.7 and over	Up to 50	12	20	28	40
	51 – 75	9	15	21	30

The table below shows selected species from AS 2082-2007 Table A5: *Specific in-grade tested hardwood species (Containing heart).*

The top row of F grades for each species applies to pieces free of heart. The lower row applies to pieces containing heart, pith or heart shakes.

Strength groups and F grades for selected species from Table A5 in AS 2082-2007					
Standard trade name	**Str. group**	**Str. No. 1**	**Str. No. 2**	**Str. No. 3**	**Str. No. 4**
Blackbutt	S2 (SD2)	F22 (F34) *F22 (F27)**	F17 (F27) *F17 (F27) **	F14 (F22) *F14 (F22) **	F11 (F17) *F11 (F17) **
Forest red gum	S3 (SD4)	F14 (F17) *F14 (F14) **	F14 (F17) *F14 (F14) **	F11 (F14) *F11 (F14) **	F8 (F11) *F8 (F11) **
Grey box	S2 (SD2)	F22 (F34) *F22 (F27) **	F17 (F27) *F17 (F27) **	F14 (F22) *F14 (F22) **	F11 (F17) *F11 (F17) **
Grey ironbark	S1 (SD1)	F27 (F34) *F22 (F27) **	F22 (F34) *F22 (F27) **	F17 (F27) *F17 (F27) **	F14 (F22) *F14 (F22) **
Red ironbark (mixed)	S2 (SD3)	F22 (F27) *F22 (F27) **	F17 (F22) *F17 (F22) **	F14 (F17) *F14 (F17) **	F11 (F14) *F11 (F14) **
Spotted gum	S2 (SD2)	F22 (F34) *F22 (F27) **	F17 (F27) *F17 (F27) **	F14 (F22) *F14 (F22) **	F11 (F17) *F11 (F17) **

* Applicable grade if pieces contain heart or heart shakes, within the limitations shown overleaf

Building Learning

Visually stress-graded HARDWOOD

Ready-reckoner for Australian Standard 2082-2007

INTRODUCTION: This ready-reckoner provides a summary of the basic grading rules for visually stress-graded sawn hardwood. It is not designed to be used in place of the Australian Standard document, and should not be relied upon as a formal statement of the grade requirements. For a full and accurate description of all grade requirements, please consult the source document: AS 2082-2007.

SIZES AND TOLERANCES:

- *unseasoned*: ±3 mm on width and thickness
- *seasoned*: + 5, - 0 mm on width and thickness
- *sized*: as above; but a maximum variation of 2 mm between pieces
- *dressed*: +2, - 0 on width and thickness
- *tolerance on squareness*: ± 2 degrees
- *length:* not less than specified length

COMBINATION OF CHARACTERISTICS: Characteristics must be assessed in combination when the distance between them is less than twice the width of the piece. The distance is measured parallel to the length of the piece. A combination is permitted if the aggregate size is less than one characteristic of maximum permissible size.

CHARACTERISTICS CLOSE TO AN ARRIS – May be assessed as for want or wane, with the exception of enclosed termite galleries.

MOISTURE CONTENT – Where seasoned timber is specified, 90% of pieces must have a MC of 15% maximum, with none at more than 18%, at the time of production.

STRUCTURAL APPEARANCE GRADES – The same limitations apply for structural grades, except that the following are not permitted: loose, unsound or defective knots; holes exceeding 3 mm; termite galleries; loose gum veins and ring shakes; gum pockets and overgrowths of injury; checks wider than 1 mm; decay; included bark; primary rot; want or wane; lyctid-susceptible sapwood; damage caused by hooks or ropes.

STRENGTH GROUPS, STRUCTURAL GRADES AND STRESS GRADES – Stress grades for various hardwood species have been revised in AS 2082-2007 following in-grade testing procedures on full size structural scantlings.

The table shown on the back of this ready-reckoner lists the F grades for selected species that may contain heart, within the specified limitations. To see the full list of applicable F grades for all hardwood species, consult Tables A1 to A5 in 2082-2007.

CHARACTERISTIC		GRADES AND MAXIMUM PERMISSIBLE LIMITS			
		Structural Grade No. 1	**Structural Grade No. 2**	**Structural Grade No. 3**	**Structural Grade No. 4**
		In all grades – pieces must be free from compression failures, other fractures and splits (other than end splits)			
KNOTS		1/7 face or edge	1/4 face or edge	1/3 face or edge	3/8 face or edge
		Includes knots that are tight or loose; sound or unsound; intergrown or not; round, oval or arris; single or in clusters; occluded branch stubs; and holes other than those caused by insects			
BORER HOLES (no decay)	*up to 3 mm dia.*	12 holes per 100 x 100 mm	20 holes per 100 x 100 mm	Unlimited if separated by at least twice their diameter	
	over 3 mm dia.	*Over 3 mm diameter, or when separated by less than twice their diameter:* As for knots			
TERMITE GALLERIES		*Enclosed:* not permitted *Not enclosed:* measured as for want or wane			
SLOPING GRAIN		*Jarrah:* 1 in 12 *All other species:* 1 in 15	*Jarrah:* 1 in 8 *All other species:* 1 in 10	*Jarrah:* 1 in 6 *All other species:* 1 in 8	*Jarrah:* 1 in 6 *All other species:* 1 in 6
HEART AND HEART SHAKES	*Species not listed in Table A5*	Not permitted if the smaller dimension is less than 175 mm Permitted within the middle third of width and thickness if the smaller dimension is 175 or over			
	Species listed in Table A5	1/20 cross-sectional area	1/9 cross-sectional area	1/6 cross-sectional area	1/3 cross-sectional area
TIGHT GUM VEINS		*Agg. length:* 1½ x piece length *Individual length:* *- one surface only:* ½ length *- one surface to another:* ¼ length	Unlimited		
LOOSE GUM VEINS **RING SHAKES** **INCLUDED BARK**		*Not one surface to another:* *Width:* 3 mm *Agg. length:* 1/10 length of piece	*Not one surface to another:* *Width:* 3 mm *Agg. length:* 1/6 length of piece	*Not one surface to another:* *Width:* 3 mm *Agg. length:* 1/4 length of piece	*Not one surface to another:* *Width:* 3 mm *Agg. length:* 1/3 length of piece
		One surface to another: not permitted		*One surface to another - intersecting an end:* as for end splits *otherwise:* not permitted	
GUM POCKETS, **LATEX POCKETS,** **RESIN POCKETS,** **OVERGROWTHS OF INJURY**		*Individual length:* lesser of 3 times width of piece or 300 mm			
		Individual width: *- one surface only:* 12 mm or 1/4 of surface *- one surface to another:* 6 mm or 1/8 of surface	*Individual width:* *- one surface only:* 20 mm or 1/3 of surface *- one surface to another:* 12 mm or 1/4 of surface	*Individual width:* *- one surface only:* 25 mm or 1/2 of surface *- one surface to another:* 20 mm or 1/3 of surface	*Individual width:* *- one surface only:* 30 mm or 1/2 of surface *- one surface to another:* 25 mm or 1/3 of surface
		One surface to another and intersecting end: as for end splits			
END SPLITS – *aggregate length*		100 mm or width of piece		150 mm or 1½ x width of piece	
SURFACE CHECKS		*Width:* 3 mm			
		Ind. length: 1/4 length of piece	*Ind. length:* 1/3 length of piece	*Ind. length:* 1/2 length of piece	*Ind. length:* 1/2 length of piece
INTERNAL CHECKS		1/10 loss of cross-sectional area in aggregate			
PRIMARY ROT		*Depth:* 3 mm *Aggregate area in any 2 m length:* 150 x 100 mm			
WANT, WANE, **LYCID-SUSCEPTIBLE SAPWOOD**		*Cross-sectional area:* 1/10	*Cross-sectional area:* 1/5		
		On face: 1/2 width; *On edge:* 1/3 thickness			
HIT AND MISS		*Within the limits for want and wane:* permitted *Exceeding the limits for want and wane:* depth 3 mm and individual length 600 mm			
CUPPING		1 mm per 50 mm of width			