

FWPA Standard

G02



Recycled Timber – Visually Graded Decorative Products

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FWPA Standard G02

Edition 01

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FWPA Standard
G02 Recycled Timber – Visually Graded Decorative Products
First Edition

January 2025

This FWPA Standard was originally developed under a project supported by Forest and Wood Products Australia and Department of Tourism, Regional Development & Infrastructure - Qld, with input and development from stakeholders, including industry associations, representatives of the recycled timber industry, government, researchers and specifiers. The Standard has been taken through a formal public review process under the guidance of the established FWPA Recycled Timber Standards Writing Committee. The FWPA Standard was issued for public comment on the 3rd September 2024, approved on behalf of FWPA on November 29th 2024 and published on January 7th 2025.

Keeping Standards up to date

FWPA Standards are living documents that reflect progress in science, technology, systems and regulations. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using the current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about FWPA Standards, drafts, amendments and new projects can be found by visiting www.fwpa.com.au.

FWPA welcomes suggestions for improvements and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities.

Preface

The objective of this FWPA Standard is to provide recycled timber manufacturers, suppliers and users with requirements for visually grading recycled hardwood timber intended for decorative applications.

Specifiers and purchasers of recycled timber should be aware of the following key points and considerations prior to specifying or ordering recycled timber:–

- (a) Recycled timber is sourced from a disparate range of buildings, structures and products from a wide geographical area and from a wide range of environmental exposures. The resulting products obtainable from recycled timber will therefore reflect previous use, and availability of individual species/species mixes, grades and products may change with time.
- (b) Detailed discussions between purchasers and suppliers prior to specifying or ordering recycled timber is the key to a successful commercial transaction.
- (c) Where practical, prior inspection should be undertaken of realistic representative sample of recycled timber product and that the grade/quality is agreed upon in writing between purchaser and supplier. The use of actual samples, electronic images etc, where available, may assist in facilitating satisfactory placement and delivery of the order.
- (d) It should be noted that the grades available under this standard are specific to recycled timber and include recycled timber features.

In respect of the application of this Standard:

- Statements expressed in mandatory terms in NOTES to tables or diagrams are deemed to be requirements of this Standard.
- NOTES to text contain general information and guidance. They are not an integral part of the Standard.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of this Standard, whereas an ‘informative’ appendix is only for information and guidance.

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Section 1 Scope and General

1.1 Scope

This FWPA Standard (referred to hereafter as Standard) applies to recycled hardwood timber only and sets grade descriptions for decorative recycled timber products. Recycled timber is timber that has been previously used and served its initial purpose. Recycled timber may be recovered from use for re-use either in its original cross-sectional size or re-manufactured to smaller dimensions.

This Standard covers products that: –

- (a) are manufactured from timber that has been sawn from larger members (e.g. girders, roof framing) into products such as flooring, cladding, lining, bench tops, joinery/ furniture stock
- (b) have been recovered from previous use and will be re-used without further sawing or machining (e.g. flooring)
- (c) are to be lightly loaded non-structural members of larger cross section (e.g. decorative beams and posts).

1.2 Application

Three grade descriptions provided in this Standard are for use with the sawn and milled timber products as specified in AS 2796.1 (e.g. flooring, cladding, lining, boards etc), where these products are sawn or milled from larger members. By agreement between purchaser and supplier these grade descriptions may also be applied to the products specified in AS 2796.1 that have been recovered from previous use and will be re-used without further sawing or machining.

Note See Clause 3.1(b) for requirements for products recovered from previous use to be re-used without further processing.

A fourth grade description is provided in this Standard for lightly-loaded larger cross sections non-structural members.

This standard also recognises that recycled hardwood will contain many features covered by the grade descriptions in AS 2796.2. However, recycled timber also contains many valued features that are either not covered or would be excluded by the grade descriptions in AS 2796.2. The grade descriptions given in this Standard are to be used independently of AS 2796.2 but this does not preclude the specification and grading of recycled timber to AS 2796.2, where agreed to between purchaser and supplier.

1.3 Referenced Documents

The following documents are referred to in this Standard:

AS 1604.1 Preservative-treated wood-based products Part 1 Products and treatment

AS 1684 Residential timber-framed construction

AS 2796.1 Timber – Hardwood – Sawn and milled products. Part 1: Product specification

AS 2796.2 Timber – Hardwood – Sawn and milled products. Part 2: Grade descriptions

AS 5604 Timber – Natural durability ratings

AS/NZS 1080.1 Timber – Methods of Test – Method 1: Moisture content

AS/NZS 4491 Timber – Glossary of terms in timber related Standards

FWPA Standard G01 – Recycled Timber – Visually Stress Graded Recycled Timber for Structural Purposes

1.4 Definitions

For the purpose of this Standard, the definitions given in AS/NZS 4491 and those given here apply. Where the definitions differ, for the purposes of this Standard those below apply.

1.4.1 Arris: The sharp intersection of two surfaces, e.g., the face and edge of a piece of timber (refer Figure 1).

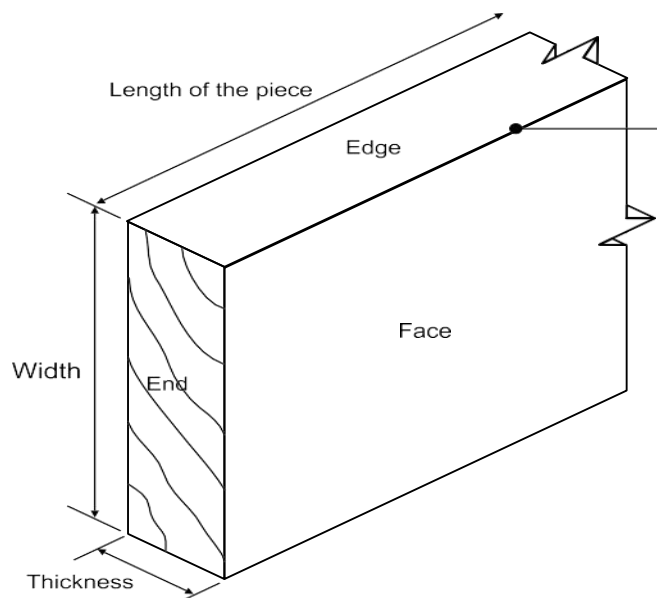


Figure 1 Timber surfaces and Arris

1.4.2 Backsawn: Timber that has been sawn or cut so that the average inclination of the growth rings to the wide faces is less than 45 degrees.

1.4.3 Bargeboard: Sawn or dressed boards that form a decorative capping at each end of a gable roof. Depending on the roof design and construction requirements, they can be fixed

to either the side of the flying rafters, the top chord of a truss, or directly to the ends of the roof outriggers. They are fixed at an angle corresponding to the slope of the roof and, at their lower ends, are usually fixed to the end of the fascia.

1.4.4 Board Width: For the purpose of grading, the overall finished width of the piece, including any tongue.

1.4.5 Bow: A deviation in the longitudinal direction of the piece causing the face to curve away from its intended flat plane (see Figure 2).

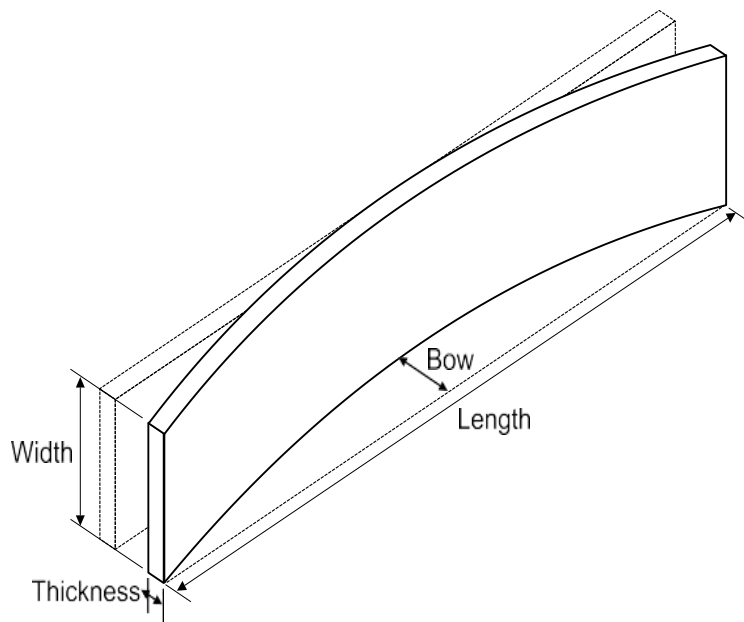


Figure 2 Bow

1.4.6 Check – longitudinal: Separation of fibres radially across growth rings and along the grain forming a fissure but not extending from one surface to another. Types include the following (see Figure 3):

- (a) **End check** – A check occurring at the end of a piece.
- (b) **Heart check** – A check extending from the pith outwards in any direction but not reaching the surface of the piece.
- (c) **Surface check** – A check confined mainly to the surface of the piece but of no appreciable depth, that is, depth not exceeding 10 percent of the thickness of the piece

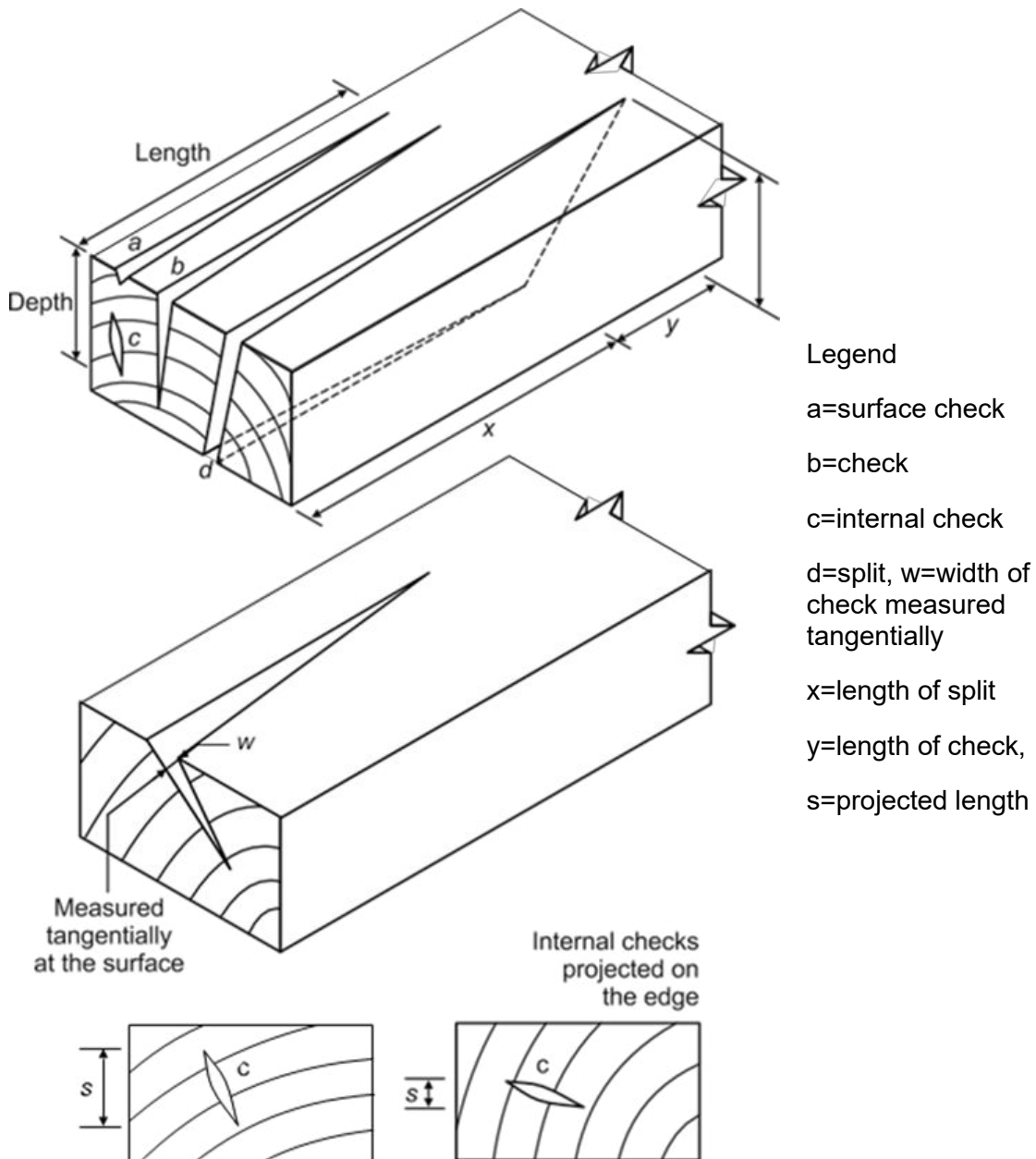


Figure 3 Longitudinal Checks

1.4.7 Cladding: Dressed or sawn boards that form part of the external wall covering whose function includes keeping weather out of a structure.

1.4.8 Concealed surface: That part of a surface intended to be concealed from view when the product is fixed into position or is assembled.

1.4.9 Cover width: The actual width that will become the exposed surface when a product is fixed into position

1.4.10 Exposed surface: That part of a surface intended to be exposed to view when the product is fixed into position or is assembled.

1.4.11 Fascia: Sawn or dressed boards that form part of the decorative perimeter of the

roof. They serve a dual purpose, being decorative, in that they can hide as well as support internal spouting (box guttering), and functional, in that they can be used to support external spouting while still being decorative. They are fixed horizontally to the ends of the rafters or trusses and serve to both hide the ends of the rafters or trusses and to support the outside edge of the under-eaves

1.4.12 Fracture, cross: A fracture not in the direction of the fibres and resembling a breakage of the fibre.

1.4.13 Gum pocket: A cavity that contains or has contained gum or kino (see Figure 4).

1.4.14 Gum vein: A ribbon of gum or kino between growth rings that may be bridged radially at short intervals by wood tissue (see Figure 4).

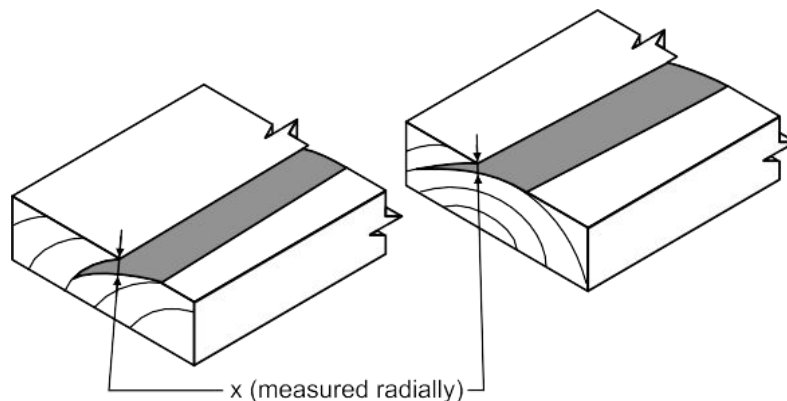


Figure 4 Gum Pockets, Gum Veins, Bark Pockets, Overgrowths of Injury

1.4.15 Gum vein, loose: A gum vein associated with extensive discontinuity of wood tissue.

1.4.16 Gum vein, tight: A gum vein that is bridged radially at close intervals with woody tissue and not associated with extensive discontinuity of wood tissue.

1.4.17 Heart: The portion of a log that is near the growth centre (pith or log centre) and which is of reduced strength. (see Figure 5).

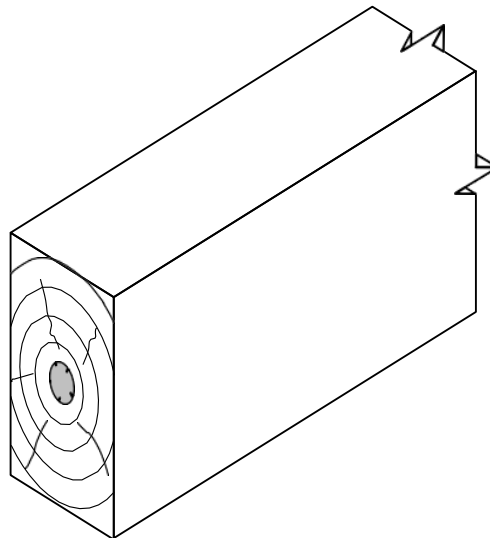


Figure 5 Heart

1.4.18 Heartwood: Wood which in the living tree had ceased to contain living cells and in which the reserve materials (e.g., starch) had been removed or changed into more durable substances.

1.4.19 Hole: A hole extending partially or entirely through the piece and attributable to any cause as follows:

- (a) Borer hole – A small hole in timber caused by the larval or adult stage of a wood boring insect, e.g., Lyctid, Anobiid, Bostrychid, Platypodid or Lymexylid.
- (b) Grub hole – A hole or excavation usually larger than a borer hole made by the larval or adult stage of an insect, e.g., Cerambycid, Buprestid or Lepidoptera.
- (c) Pinhole – Usually stained, made by a pinhole borer, i.e. Platypodid or Lymexylid.
- (d) Plugged hole – A hole filled by inserting a matching piece of wood.
- (e) Termite hole – See termite gallery.
- (f) Bolt Holes – Mechanical damage in the form of a cylindrical hole, caused by removal of bolts that were inserted during a previous use of a piece of wood

1.4.20 Knot: A section of a branch that is embedded in the wood of a tree trunk or of a larger branch (see Figure 6). Knots are defined with respect to their position on a cross-section of a piece or by their appearance on a surface:

- (a) Defective knot – A loose or unsound knot.
- (b) Loose knot – A knot that is not held firmly in place by growth and which cannot be relied upon to remain in place in the piece.
- (c) Sound knot – A knot solid across its face, as hard as the surrounding tissue and free from decay.
- (d) Unsound knot – A knot more or less decayed and softer than the surrounding tissue; not solid across the face; checked or split

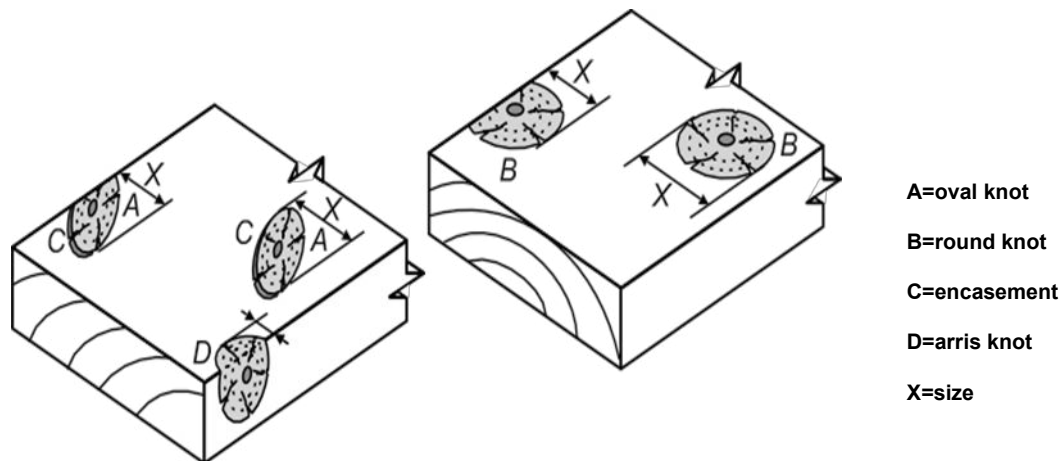


Figure 6 Knots in sawn timber

1.4.21 Light decking: Dressed, sawn or reeded boards, produced with or without chamfered or rounded arises, primarily intended for domestic deck purposes; not to be confused with bridge and wharf decking.

1.4.22 Lining: Dressed or sawn boards that are intended to form part of the interior wall or ceiling covering of a structure.

1.4.23 Lyctid: The commonly used term in the timber and building industries for the lyctine beetles.

1.4.24 Moulding: A piece of timber machined to a specified profile for use in finishing or decorating.

1.4.25 Overlap: The difference between board width and cover width of weatherboards, chamferboards and some lining board profiles.

1.4.26 Overlay strip flooring: A milled product intended to be installed over a solid supporting substrate to give the appearance of strip flooring.

1.4.27 Quartersawn: Timber that has been sawn or cut so that the average inclination of the growth rings to the wide faces is more than 45 degrees.

1.4.28 Recycled timber: Recycled timber is post-consumer, pre-used timber, which has served its original purpose.

1.4.29 Sapwood: The outer layers of the wood of a tree, which, when the tree was living, contained tissue in which water and food materials were conveyed and stored; generally lighter in colour than the heartwood (see Figure 7).

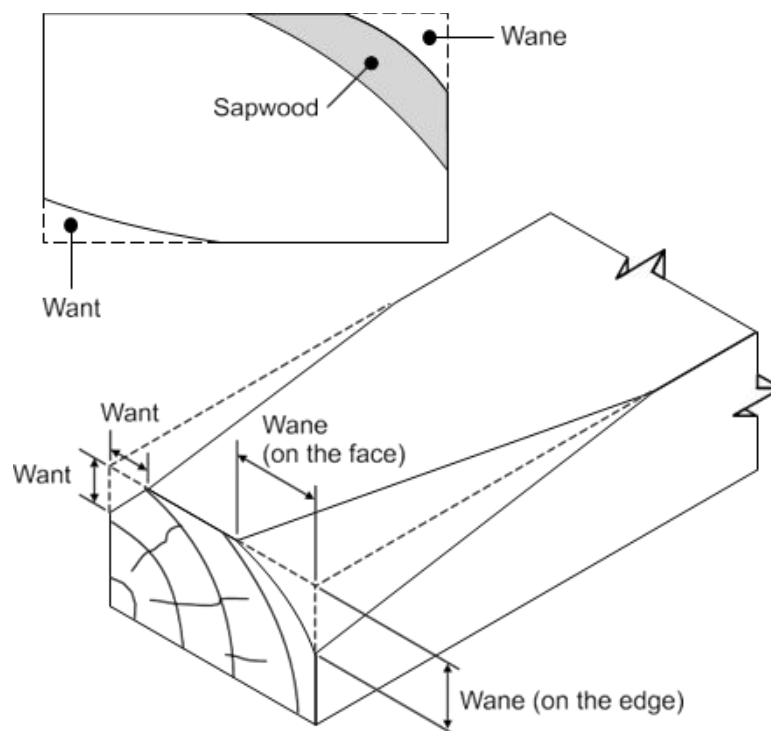


Figure 7 Wane, want and sapwood

1.4.30 Shake: A partial or complete dislocation, breakage or longitudinal separation of wood fibres due to causes other than drying and usually originating either in the standing tree or in the log during felling or conversion as in the following:

(a) Heart shake – A shake extending from the pith of a tree (see Figure A3.5).

- (b) Ring shake – A shake following a growth ring. Also referred to as a shell shake or cup shake and the timber may be described as shelly (see Figure A3.5).
- (c) Star shake – A number of adjoining heart shakes in the form of a star.

1.4.31 Shell-off: Missing material resulting from a ring shake.

1.4.32 Species Group: A group assigned to a species of timber as an indicator of its basic strength classification.

1.4.33 Split: A longitudinal separation of wood fibres, which extends through a piece from one surface to another in sawn timber or through round timber.

1.4.34 Split, end: A split at the end of a log or piece.

1.4.35 Spring: A deviation in the longitudinal direction of the piece causing the edge to curve away from its intended flat plane (see Figure.8).

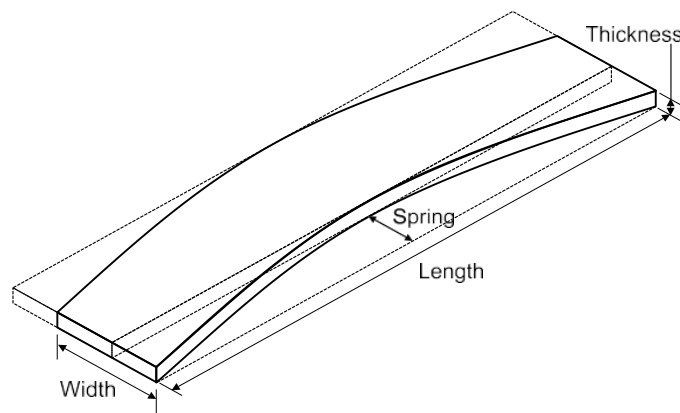


Figure 8 Spring

1.4.36 Strip flooring: Flooring made from machined timber with tongued and grooved joints intended to be installed over joists, battens or an underlay. This may be end-matched.

1.4.37 Termite gallery: An irregularly shaped passage or burrow excavated by termites in the bark or wood.

An enclosed termite gallery is one that is not completely open to visual inspection throughout its entire length.

1.4.38 Thickness (T): The smaller dimension of the cross-section of a piece of timber (see Figure 9).

1.4.39 Twist: A spiral distortion along the length of a piece of timber (see Figure 9).

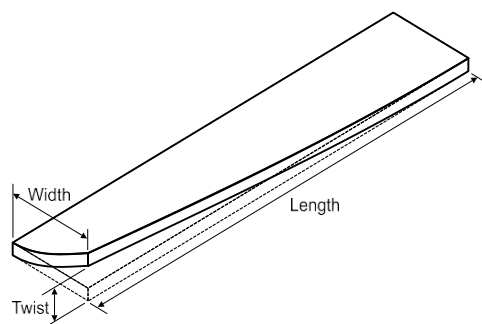


Figure 9 Twist

1.4.40 Wane: The presence of the original underbark surface with or without bark, on any face or edge of a piece of timber (see Figure 7).

1.4.41 Want: The absence of wood, other than wane, from the corner or surface of a piece of timber (see Figure 7).

1.4.42 Warp: A distortion that is generally regular, part or all of the surface having become curved.

1.4.43 Width (W): The larger dimension in the cross-section of a piece (see Figure 1).

1.5 Grades

1.5.1 Grades

The grades specified in this Standard are primarily based on features and the desired aesthetic appearance of recycled timber.

The grades applying to recycled sawn and milled timber referred to as the 'recycled feature grades' are as follows (appropriate abbreviations in brackets):

- (a) RECYCLED FEATURE GRADE 1 – (RFG1)
- (b) RECYCLED FEATURE GRADE 2 – (RFG2)
- (c) RECYCLED FEATURE GRADE 3 – (RFG3)

In addition to the above, one grade description is provided for larger end section, lightly-loaded, non-structural members.

- (d) RECYCLED DECORATIVE (RDG)

Recycled structural timber shall be graded in accordance with FWPA Standard GO1 Recycled Timber – Visually Stress Graded for Structural Purposes.

This Standard does not preclude the use of grades other than those described herein, provided that it can be shown that these other grades satisfy the performance requirements for that product. Any such other grade shall be adequately documented and the product identified in accordance with Clause 1.6 (see also Clause 1.7).

Other grades may be specified by agreement between the purchaser and supplier, however adequate strength shall be maintained for flooring and light decking.

NOTE For products manufactured from timber that has been sawn from larger members, other grades may be specified by agreement between the purchaser and supplier as provided for in AS 2796.1.

1.5.2 Ordering

The order shall nominate as applicable the grade, species or species mix and surface finish (refer clause 2.5).

1.6 Identification

Where a parcel or member is graded as complying with this standard, the following details shall be clearly stated on the invoice: –

- (a) The name of this standard
- (b) The grade
- (c) The species, or that mixed species have been supplied, if applicable
- (d) The durability class if applicable
- (e) If graded as seasoned, the word 'SEASONED' or the abbreviation 'S'
- (f) If preservative treated, additional branding in accordance with AS 1604.

Alternatively, if the timber is branded, labelled, stamped or marked to indicate that it complies with this Standard, the information in (a) to (f) shall be legibly marked on each piece.

1.7 Claim of Compliance

In any statement or claim of compliance with this Standard, one of the following shall apply:

- (a) Reference to one of the grades described in this Standard is a claim of compliance with the general requirements, product requirements and grading requirements set out in this Standard for that specific grade and that the product is of recycled timber.
- (b) Reference to this standard and a grade other than those described in this Standard is a claim of compliance with the general requirements and product requirements set out in this Standard and the requirements of the other grade and that the product is of recycled timber. It is also a claim that product performance (e.g. structural adequacy for flooring) is appropriate for the intended use.

NOTE Manufacturers making a statement of compliance with this Standard on a product, packaging, or promotional material related to that product are advised to ensure that such compliance is capable of being verified.

Section 2 Product Requirements

2.1 Timber Species

Decorative recycled hardwood products shall be supplied in parcels or as individual members complying with one of the following, as applicable: –

- (a) Mixed hardwoods where the species are similar in properties or appearance (colour), or in both.
- (b) Mixed hardwoods where the species are deliberately selected with dissimilar appearance.
- (c) Single species.

NOTE Products from recycled hardwood timber of individual species may not be readily available. Also, individual species identification may require specialist services

2.2 Sapwood and Low Durability Heartwood

Some products covered by this Standard could be used in exposed situations or other areas of significant decay risk. Untreated sapwood and low durability heartwood are not restricted by the grading rules in this Standard except for limits on Lyctid susceptible sapwood.

However, building codes and AS 1684 restrict the use of low durability timber including untreated sapwood where such timber is not suitably protected from the ingress of moisture.

NOTE 1 Where products are used in weather-exposed or other hazardous situations, the presence of untreated sapwood and untreated heartwood of low durability requires ongoing maintenance to ensure an adequate service life.

NOTE 2 The untreated sapwood of any species is considered non-durable when exposed to the weather or the ingress of moisture, regardless of the durability rating of the heartwood of that species.

NOTE 3 To achieve maximum service life, any untreated sapwood must be protected from weather exposure and the ingress of moisture.

2.3 Sapwood Susceptible to Lyctid Borer

Sapwood susceptible to Lyctid borers shall be immunised against such attack in accordance with AS 1604.

NOTE 1 The method for the detection of Lyctid susceptible sapwood is given in AS 1604.

NOTE 2 Guidelines for the immunization of susceptible sapwood are given in AS 1604 and further information is available from state forestry departments and WoodSolutions (www.woodsolutions.com.au/timber-preservation).

2.4 Preservative Treatment

Where timber is preservative treated, treatment shall be in accordance with AS 1604.

If products are preservative treated with a waterborne preservative, the moisture content of the products will increase. Products so treated shall be re-seasoned to comply with the seasoning requirements for those products.

NOTE Generally, only the sapwood of hardwoods can be impregnated with preservative

2.5 Surface Finish and Finish Imperfections

2.5.1 Surface Finish

When graded recycled timber is specified to this Standard, the surface finish may be: –

- (a) as in its recovered state or,
- (b) a remanufactured surface (e.g. ground, wire brushed, sawn or machined etc)

2.5.2 Machining and surface imperfections

When products covered by this Standard are manufactured from timber that has been sawn or milled from larger recycled members, the following machining and surface imperfection limitations apply.

Machining imperfections and surface imperfections on exposed surfaces shall not exceed the limits specified in Table 2.1, or as otherwise specified. Machining imperfections and surface finish imperfections on concealed surfaces, which do not prevent the proper fixing of the product or unduly impair its strength, are permitted.

Table 2.1 Machining and surface finish imperfections

Imperfection	Internal Products		External Products
	Sanded after installation	Not sanded after installation	
Skip, hit and miss	Permitted once per board and not deeper than 0.5 mm	Not permitted	Not permitted
Cutter marks	Must exceed 10 in number per 30 mm	Must exceed 15 in number per 30 mm	Must exceed 10 in number per 30 mm
Raised grain, ridges, torn grain	Permitted when not deeper than 0.5 mm	Permitted when not higher or deeper than 0.5 mm	Permitted when not deeper than 0.5 mm
Chip marks or roller marks	Permitted up to two-thirds the length	Permitted up to one-third the length	Permitted up to one-third the length
Pause marks or glazed surfaces	Permitted provided that each occurs not more than once per piece		
Knot chipping	Permitted up to 3 mm in width.		
Torn corners and edges, gouge, kick out	Not permitted		

2.6 End Matched Product

Tongues and grooves at the ends of end-matched products shall be milled across the ends of the board cleanly, at right angles to the longitudinal axis of the board with the tongue and groove dimensions and tolerances appropriate to the product.

NOTE The end matching need not be of the same profile as the tongue and groove on the edge of the board (e.g. in secret nail profiles) and may be manufactured either left hand or right hand.

2.7 Plugging and Patching

Plugging and patching of products shall be permitted by agreement between purchaser and supplier. Where used, plugs and patches shall be of materials such as glued plugs, epoxy resins or similar suited to their intended applications.

2.8 Termite Resistance

Termite Resistance will be identified by reference to AS 5604.

2.9 Bushfire Attack Level (BAL) Ratings

BAL – 12.5 & 19

For General Timber Use - Timber must have a density of 750 kg/m³ or greater.

For Joinery Timber (Windows & Doors only) - Timber must have a density of 650 kg/m³ or greater.

BAL – 29

Timbers classified as having a BAL 29 rating - Blackbutt, Kwila (Merbau), Red Ironbark, Spotted Gum, River Red Gum, Silvertop Ash, Turpentine

Section 3 Product Requirements

3.1 General

When grading products (other than lightly-loaded non-structural members) to this Standard and

- (a) the product is manufactured from timber that has been sawn from larger members then the product requirements set out in Sections 3 to 10 of AS 2796.1 shall apply, or where
- (b) the product has been recovered from previous use and will be re-used without further sawing or machining, then the requirements of sections 3 to 10 of AS 2796.1 do not apply, except for the applicable clauses for moisture content, or if there is specific agreement between purchaser and supplier to apply these requirements.

When grading lightly-loaded non-structural members the product requirements of AS 2796.1 do not apply and aspects relating to product requirements (e.g. moisture content and tolerances etc) are as set out in Clause 3.2.

NOTE Product specification aspects generally have a significant effect on product performance. For example, high moisture content material often results in high in-service shrinkage, distortion and increased checking.

3.2 Lightly Loaded Non-Structural Members

3.2.1 General

Recycled lightly loaded non-structural members must meet the minimum dimensional requirements specified in the order in terms of length, depth and width, except where permitted characteristics, want, wane or hit and miss occurs, measured at any point in the length of a piece.

3.2.2 Bow Spring

Bow and spring shall be evenly distributed and shall not exceed 25 mm per 3.6 m length of the piece or equivalent curvature in other lengths.

3.2.3 Moisture Content

The moisture content in these larger cross section members may be variable due to past history and whether any re-sawing has taken place. This Standard does not impose any specific moisture content requirements on these members. From a utility perspective moisture content needs to be considered as in-service stability may be affected and more pronounced checking may occur depending on the member supplied.

3.3 Residual Fixings

Unless otherwise agreed between the purchaser and supplier, recycled timber shall be supplied relatively free of nails, screws, bolts, brackets or similar fixings.

NOTE It may not be practical or possible to detect and remove 100% of all fixings that can occur in recycled timber and indeed some purchasers may deem retention of some residual fixings as a desirable feature

Section 4 Grading Requirements

4.1 Grading Method

4.1.1 *General*

Each piece shall be graded on the face, back, edges and ends, as appropriate, in accordance with this Section, and the appropriate grade description given in Section 5.

4.1.2 *Basis*

Grading is based on visual assessment of individual pieces. The amount (size) of a feature or group of features (within a piece) is compared to the maximum amount of that feature permitted for the grade.

The maximum amount of features permitted is set out in a grade description. All features in the piece shall comply with the limits given in the grade description. Grade descriptions are primarily based on features and desired aesthetic appearance. They are also based on utility considerations.

4.1.3 *Grade Limits*

The grade descriptions describe material containing the maximum amount of permitted feature for the particular grade. Each parcel shall contain a range of material such that not all of the material contains the maximum amount of permitted feature for the grade.

4.1.4 *Variation in Assessment*

Within any parcel, grading differences may occur if the parcel is re-graded by another grader or inspector. If the differences relate to less than 5% of the pieces and grade limits in these disputed pieces are not considered to exceed grade limits by more than 10%, then this is considered to be an acceptable variation.

4.1.5 *Grading and Profile check*

A check of the grading of the timber may be required sometime after the grading undertaken by the producer or supplier.

Where the purpose of the check is to estimate the accuracy of the previous grading or machining, reasonable allowance shall be made for changes that may have occurred since that time. These changes may include but are not limited to –

- (a) change in dimensions and tolerances due to moisture uptake or loss (swelling or shrinkage);
- (b) increase in distortion (bow, spring, twist and cup);
- (c) increase in, or development of features due to subsequent processes (e.g., sanding)

(d) in unseasoned products or where significant moisture gradients exist, an increase in, or development of, seasoning checks, splits, end splits and shakes;

NOTE 1 Critical changes may arise due to moisture content change. For example, the formation of large checks affecting the structural adequacy of the piece or excessive twist affecting the utility of the piece. Such changes in a piece may be cause for rejection of the piece with respect to its final application.

NOTE 2 Where timber products are sanded after installation, reasonable allowance should be made for features on the exposed surface that become larger or appear as a result of the removal of the original surface.

4.2 Measurement of Features

The measurement of features shall be as given in Appendix B.

4.3 Combination of Features

Combination of features shall be limited in products where adequate strength is a consideration (e.g. flooring on joists or battens but not overlay flooring installed over a structural sub-floor). In such cases, a combination of features shall be permitted if the combination is less than that of one feature of the maximum permissible size.

A combination exists when two or more features occur in a length of the piece such that there is less than twice the width of the piece between them (see Figure 10). Features in combination are not necessarily on the same surface.

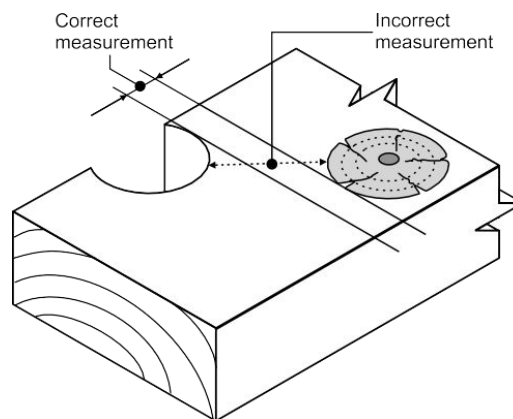


Figure 10 Measurement of distances between features.

The distance between the features shall be measured parallel to the length of the piece, between lines drawn at 90° to the arises (see Figure 11).

If bow, spring, twist, or cup is present in the piece, each shall be measured separately and deemed not to be in combination with each other or with any other feature.

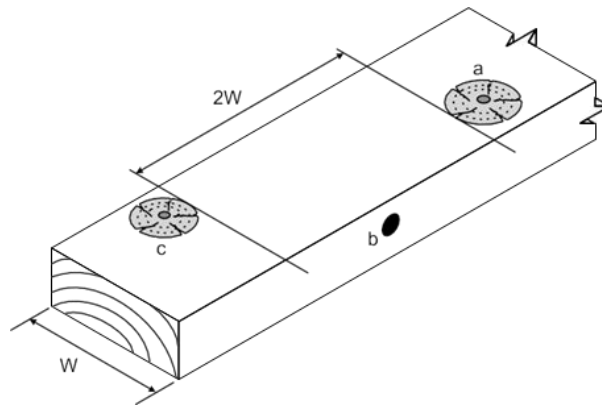


Figure 11 Examples of combinations

NOTE 1 c and b are in combination; a and b are in combination and a and c are not in combination

NOTE 2 Given that knot 'a' is 90% of its allowance, bolt hole 'b' is 15% of its allowance and knot 'c' is 85% of its allowance, the combination of 'b' and 'c' complies but the combination 'a' and 'b' do not.

Section 5 Grade Descriptions

5.1 Recycled Feature Grades

5.1.1 General

Products supplied to the 'feature grades' of this Standard shall comply with the general requirements of Section 2, product requirements specified in Section 3 and grading requirements of Section 4 of this Standard.

5.1.2 Features not Permitted

On any surface, each piece of hardwood in the 'recycled feature grades' outlined in clause 1.5.1 shall be free of the following features:

- (a) Enclosed termite galleries.
- (b) Heart shakes.
- (c) Shakes.
- (d) Cross-fractures, cross-shakes.
- (e) Splits.
- (f) End splits.
- (g) Decay, primary rot.
- (h) Lyctid susceptible sapwood.

Except, for overlay flooring that is not required to provide a structural function, splits and end splits are permitted.

5.1.3 Permissible Features

The permissible features and associated limits in each piece of hardwood in the 'feature grades' outlined in clause 1.5.1 are provided in Table 5.1.

Table 5.1 Grade limits for Recycled Feature Grades

Feature	Recycled Feature Grade 1 (RFG1)	Recycled Feature Grade 2 (RFG2)	Recycled Feature Grade 3 (RFG3)
On Exposed Surfaces			
Tight knots and any associated voids; individually or in aggregate	Not exceeding the lesser of 30 mm and 1/4 of the surface on which it occurs	Not exceeding the lesser of 40 mm and 1/3 of the surface on which it occurs	Not exceeding the lesser of 50 mm and 3/8 of the surface on which it occurs
Loose Knots	Not permitted unless secured with glue	As for holes	As for holes
Holes (borer, nail, screw, bolt holes, non-enclosed termite galleries and other holes)			
• up to 4 mm dia	Not more than 6 holes per 1.0 m length	Not more than 10 holes per 1.0 m length	Not more than 20 holes per 1.0 m length

Table 5.1 Grade limits for Recycled Feature Grades *Continued*

Feature	Recycled Feature Grade 1 (RFG1)	Recycled Feature Grade 2 (RFG2)	Recycled Feature Grade 3 (RFG3)
• over 4 mm to 10 mm	Not more than 2 holes per 1.0 m length and in flooring and light decking to be plugged	Not more than 4 holes per 1.0 m length and in flooring and light decking to be plugged	Not more than 6 holes per 1.0 m length and in flooring and light decking to be plugged
• over 10 mm to 25 mm	Not more than 1 hole per 1.0 m length and in flooring and light decking to be plugged	Not more than 2 holes per 1.0 m length and in flooring and light decking to be plugged	Not more than 3 holes per 1.0 m length and in flooring and light decking to be plugged
Tight gum veins	Quartersawn: surface width measured across feature, not exceeding 3mm and aggregate length not more than ½ length of the piece	Quartersawn: surface width measured across feature, not exceeding 3mm and aggregate length not more than ½ length of the piece	Quartersawn: surface width measured across feature, not exceeding 3mm and aggregate length not more than ½ length of the piece
Tight gum veins	Backsawn: Surface width across the feature not exceeding 20 mm, depth not exceeding 2 mm and length not exceeding 250 mm	Backsawn: Surface width across the feature not exceeding 20 mm, depth not exceeding 2 mm and length not exceeding 250 mm	Backsawn: Unlimited across the face, depth not exceeding 2 mm
Loose gum veins	Surface width measured across the feature not exceeding 10 mm, length not exceeding 50 mm and depth not exceeding 2 mm when backsawn and not one surface to another when quartersawn	Not one surface to another Not intersecting an end Surface width measured across the feature not exceeding 4 mm Length not exceeding 500 mm	Surface width measured across the feature not exceeding 20 mm, length not exceeding 100 mm and depth not exceeding 2 mm when backsawn and not one surface to another when quartersawn
Gum pockets, latex pockets and overgrowth of injury	Surface width measured across the feature not exceeding 10 mm, length not exceeding 50 mm and depth not exceeding 2 mm when backsawn and not one surface to another when quartersawn	Surface width measured across the feature not exceeding 10 mm, length not exceeding 50 mm and depth not exceeding 2 mm when backsawn and not one surface to another when quartersawn	Surface width measured across the feature not exceeding 10 mm, length not exceeding 50 mm and depth not exceeding 2 mm when backsawn and not one surface to another when quartersawn
Knot checks	Permitted	Permitted	Permitted
Checks other than internal	Width not exceeding 1 mm Individual length not exceeding 500 mm	Width not exceeding 2 mm Individual length not exceeding 1.0 m	Width not exceeding 3 mm Individual length not exceeding 1.0 m
Stain	Unlimited	Unlimited	Unlimited
Natural discolouration	Unlimited	Unlimited	Unlimited
Black speck	Unlimited	Unlimited	Unlimited
Non-lyctid susceptible sapwood (which includes appropriately treated sapwood)	Unlimited	Unlimited	Unlimited
Burls	Unlimited	Unlimited	Unlimited
Hobnails	Unlimited	Unlimited	Unlimited
Bow, Spring and twist and Cup	Refer Tables	Refer Tables	Refer Tables
Wane, wear and mechanical damage	Not permitted unless associated with past use and does not prevent the proper fixing of the product or unduly impair its strength	Not permitted unless associated with past use and does not prevent the proper fixing of the product or unduly impair its strength	Not permitted unless associated with past use and does not prevent the proper fixing of the product or unduly impair its strength
On Concealed Surfaces			
Features listed Above	To the limits on the exposed surface of recycled feature grade 3	To the limits on the exposed surface of recycled feature grade 3	To the limits on the exposed surface of recycled feature grade 3

5.1.4 Bow

Table 5.1.4 Maximum Permissible Bow

Product	Length	Width				
		15 mm	19 mm	25 mm	35 mm	45 mm
Joinery, dressed boards	1.2	2	2	1	1	1
	1.8	5	4	2	1	1
	2.4	10	7	3	2	2
	3.0	15	10	5	2	2
	3.6	22	14	7	4	3
	4.2	30	20	10	6	4
	4.8	40	25	13	8	6
	5.4	50	30	16	11	8
Strip flooring, light decking, lining boards, mouldings, bargeboards, sawn boards for feedstock, overlay	1.2	6	5	4	3	2
	1.8	13	11	9	7	5
	2.4	22	19	16	13	10
	3.0	35	10	25	20	15
	3.6	50	45	35	30	22
	4.2	70	60	40	40	30
	4.8	90	75	50	50	40
	5.4	110	95	65	65	50

5.1.5 Spring

Table 5.1.5 Maximum Permissible Spring

Product	Length	Width					
		60 mm	80 mm	90 mm	120 mm	140 mm	150 mm
Joinery, dressed boards	1.2	2	2	2	1	1	1
	1.8	5	4	4	2	1	1
	2.4	10	7	6	3	2	1
	3.0	15	12	10	5	2	2
	3.6	22	17	15	7	4	3
	4.2	30	23	20	10	6	4
	4.8	40	30	25	13	8	6
	5.4	50	37	30	16	11	8
Light decking, lining boards, cladding, fascia	1.2	5	4	3	2	2	1
	1.8	11	8	7	5	4	2
	2.4	19	15	13	10	6	3
	3.0	30	23	20	15	10	5
	3.6	45	35	30	22	15	7
	4.2	60	47	40	30	20	10
	4.8	75	58	50	40	25	13
	5.4	95	75	65	50	30	16
Strip flooring, mouldings, sawn boards for strip flooring	1.2	6	5	5	4	3	2
	1.8	14	12	11	9	7	5
	2.4	25	21	19	16	13	10
	3.0	40	33	30	25	20	15
	3.6	60	50	45	35	30	22
	4.2	80	67	60	50	40	30
	4.8	100	83	75	65	50	40
	5.4	130	106	95	80	65	50

5.1.6 Twist and cup

Table 5.1.6 Maximum Permissible Twist and Cup

Length (m)	Twist per 25 mm of width (mm)		Cup, per 100 mm of width
	Up to 25 mm of thickness	over 25 mm of thickness	
1.2	1	0.5	1.0
2.4	2	1	1.0
3.0	2.5	1.25	1.0
3.6	3	1.5	1.0
4.2	3.5	1.75	1.0
4.8	4	2	1.0
5.4	4.5	1.0	1.0
6.0	5	2.5	1.0

5.2 Recycled Decorative Grade

5.2.1 General

Products supplied to Recycled Decorative Grade of this Standard shall comply with the general requirements of Section 2, product requirements specified in Section 3 and grading requirements of Section 4 of this Standard. This grade only applies to larger end-section members such as beams and posts that are lightly-loaded and not required to have any significant structural load carrying capacity.

5.2.2 Features not Permitted

On any surface, each piece of hardwood in Recycled Decorative Grade as outlined in Clause

1.5.1 shall be free of the following features:

- (a) Cross-fractures, cross-shakes.
- (b) Lyctid susceptible sapwood.

5.2.3 Permissible Features

The permissible features and associated limits in each piece of hardwood in the Recycled Decorative Grade outlined in Clause 1.5.1 are provided in Table 5.2.

The limits provided in Table 5.2 are intended as maximums to ensure satisfactory structural performance for these lightly loaded members. For product intended for use in external weather exposed applications, durability-based aspects including limiting 'open' characteristics such as checks, shakes and holes on surfaces where moisture could accumulate or be trapped should also be considered and further limited as appropriate. Requirements for connections and joints may also impose the need for additional restrictions.

The grade limits given in Table 5.2 do not preclude the use of grades other than those described provided that it can be shown that these other grades satisfy the performance requirements for that product. Any such other grade shall be agreed between purchaser and supplier and be adequately documented and the product identified in accordance with Clause 1.6.

Table 5.2 Grade Limits for Recycled Decorative Grade (RDG)

Feature	Recycled Decorative Grade (RD)
On Exposed Surfaces	
Knots (Tight, loose, sound or unsound)	Permitted up to ¼ of the width of the surface on which they occur
Holes and notches	Permitted up to ¼ of the width of the surface on which they occur
Longitudinal checks, shakes, heart shakes and splits	Up to 15 mm width, permitted provided they do not extend from one surface to another and not greater than L/2
End splits	Permitted up to 15 mm in width and up to 250 mm in length
Tight gum veins	Unlimited
Loose gum vein s and pockets	Up to 15 mm width, permitted provided they do not extend from one surface to another and exceeding one-half of the length of the piece
Stain and discoloration	Unlimited
Want, wane and mechanical damage	Permitted up to ¼ of the surface on which it occurs and not more than one-half of the length of the piece
Sound heart	Unlimited
Unsound heart, pipe etc	Not exceeding 1/9 of the cross-sectional area
Bow and Spring	Shall not exceed 25 mm per 3.6 m length of the piece or equivalent curvature in other lengths

Appendix A - Measurement of Board Dimensions, Distortion & Features (Normative)

A1 Measurement of board dimensions

Cross-sectional dimensions of rectangular sections and profiled sections shall be measured as shown in Figures A1.1 for moulded sections and A1.2 for tongue and groove (T&G) sections.

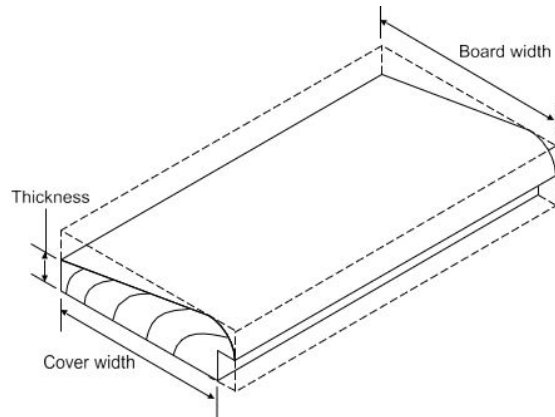


Figure A1.1 Moulded section dimensions

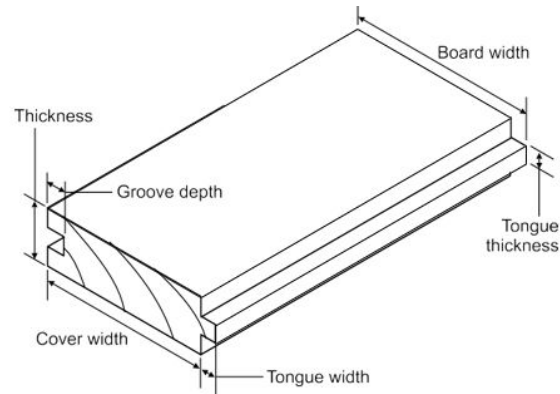


Figure A1.2 T&G section dimensions

A2 Measurement of distortion

When a piece has a combination of at least two of bow, spring, twist and cup, care needs to be exercised to measure each separately.

Bow and Spring

Bow and spring shall be measured as the maximum distance perpendicular to the surface of any point on the face (bow) or edge (spring) from a straight line joining the arris at one end to the same arris at the other end (see Figures A2.1 and A2.2).

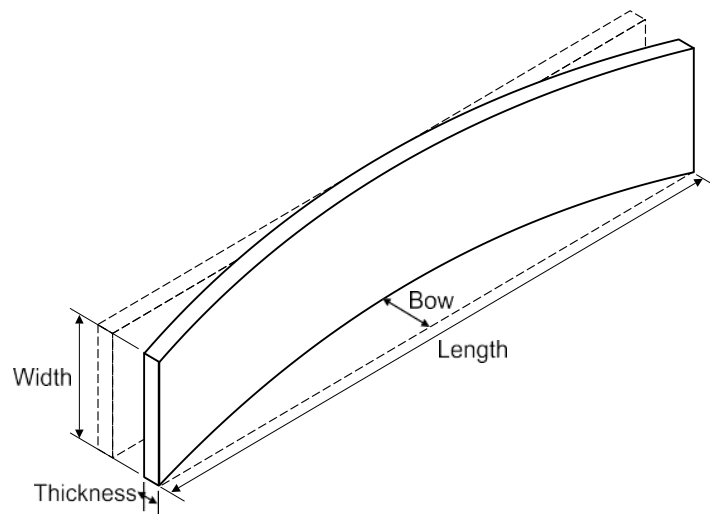


Figure A2.1 Bow

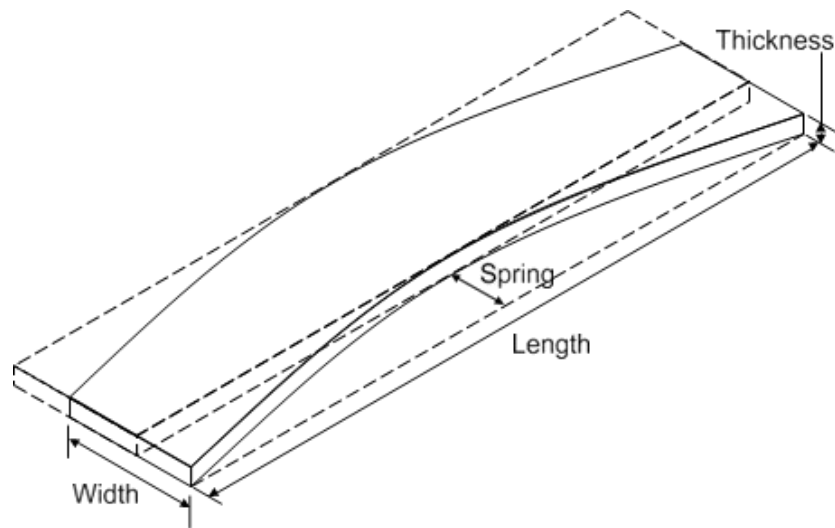


Figure A2.2 Spring

Twist

Twist shall be measured by placing the piece so that three of the corners of one face are in contact with a flat surface and measuring the perpendicular distance from the fourth corner to the flat surface (see Figure A2.3).

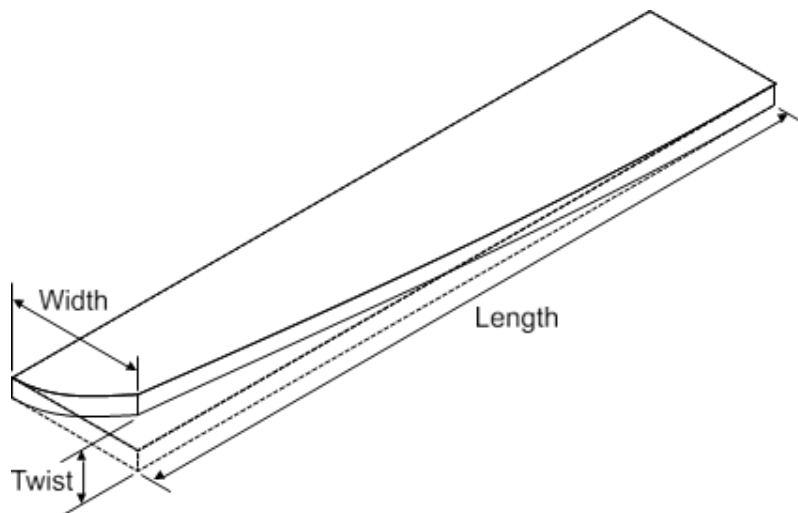


Figure A2.3 Twist

Cup

Cup shall be measured on the concave surface as the maximum perpendicular distance of any point on the surface of the piece from a straight line joining the arises of that surface (see Figure A2.4).

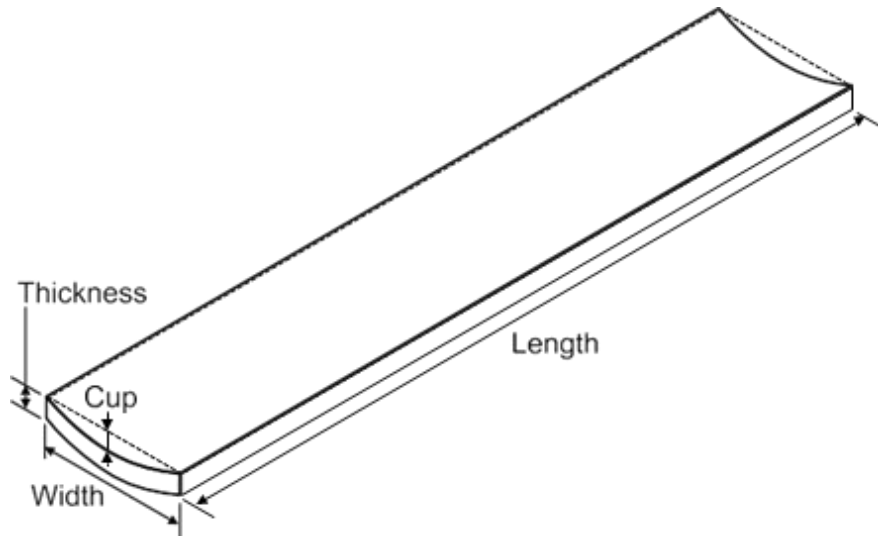


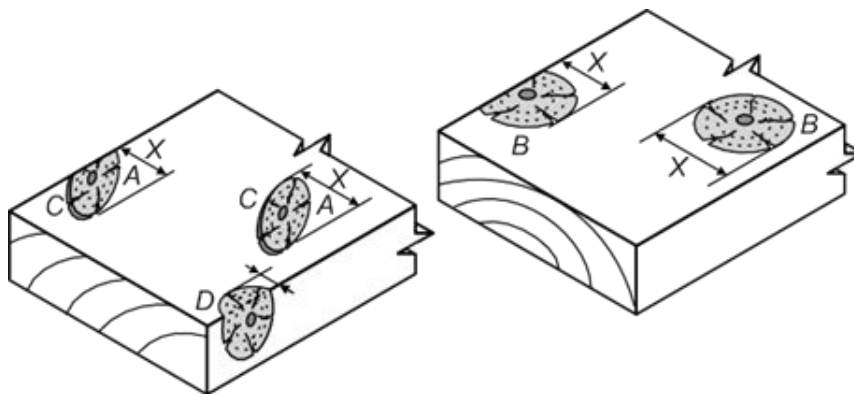
Figure A2.4 Cup

A3 Measurement of Features

Knots in sawn and milled timber

These include the following:

- (a) Sound knots and knot holes – The size shall be the width as measured between lines enclosing the knot or hole and parallel to the arises of the piece (see Figure A3.1).
- (b) Arris knots – The size shall be the dimension of the knot that forms the lesser proportion of the surfaces on which it occurs, as measured between lines touching the boundaries of the knot on both surfaces and parallel to the arris that intersects the knot (see Figure A3.1).



A=oval knot, B=round knot, C=encasement, D=arris knot, X=size

Figure A3.1 Knots in sawn and milled timber

Slope of Grain

Slope of grain shall be determined by one of the methods described in AS/NZS 1080.2.1, AS/NZS 1080.2.2 or AS/NZS 1080.2.3, and shall be measured over a distance sufficient to

determine the general slope. Localized variations, where the grain deviates over less than half the surface, may be disregarded. Grain deviation around knots shall be disregarded providing such deviation does not significantly affect the general slope within the piece (see Figure A3.2).

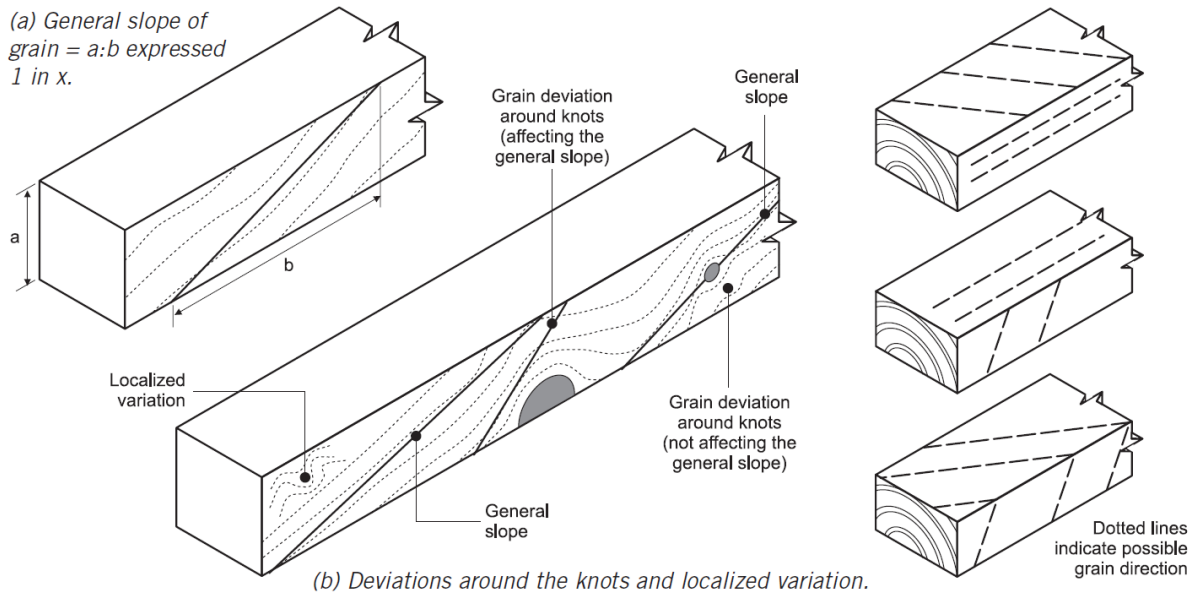


Figure A3.2 Slope of grain

Gum pockets, Gum veins, overgrowth of injury and primary rot

The widths of gum pockets, gum veins, resin pockets, overgrowths of injury and primary rot shall be measured radially (see Figure A3.3)

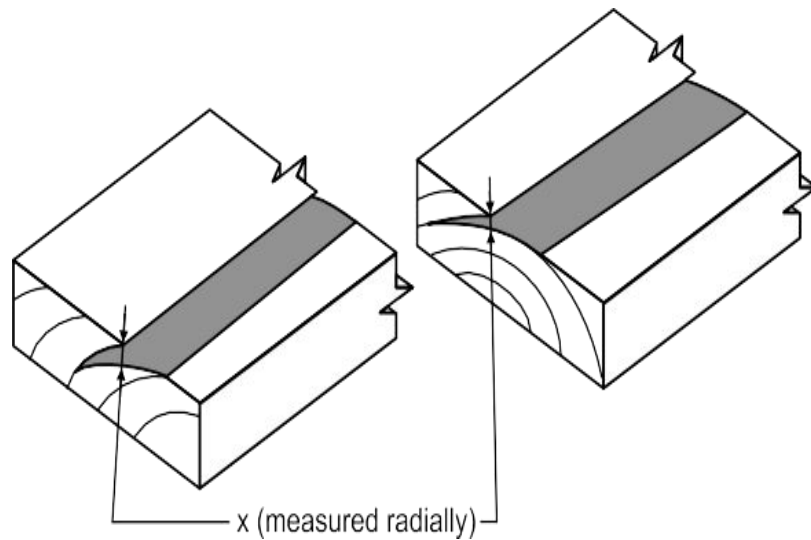


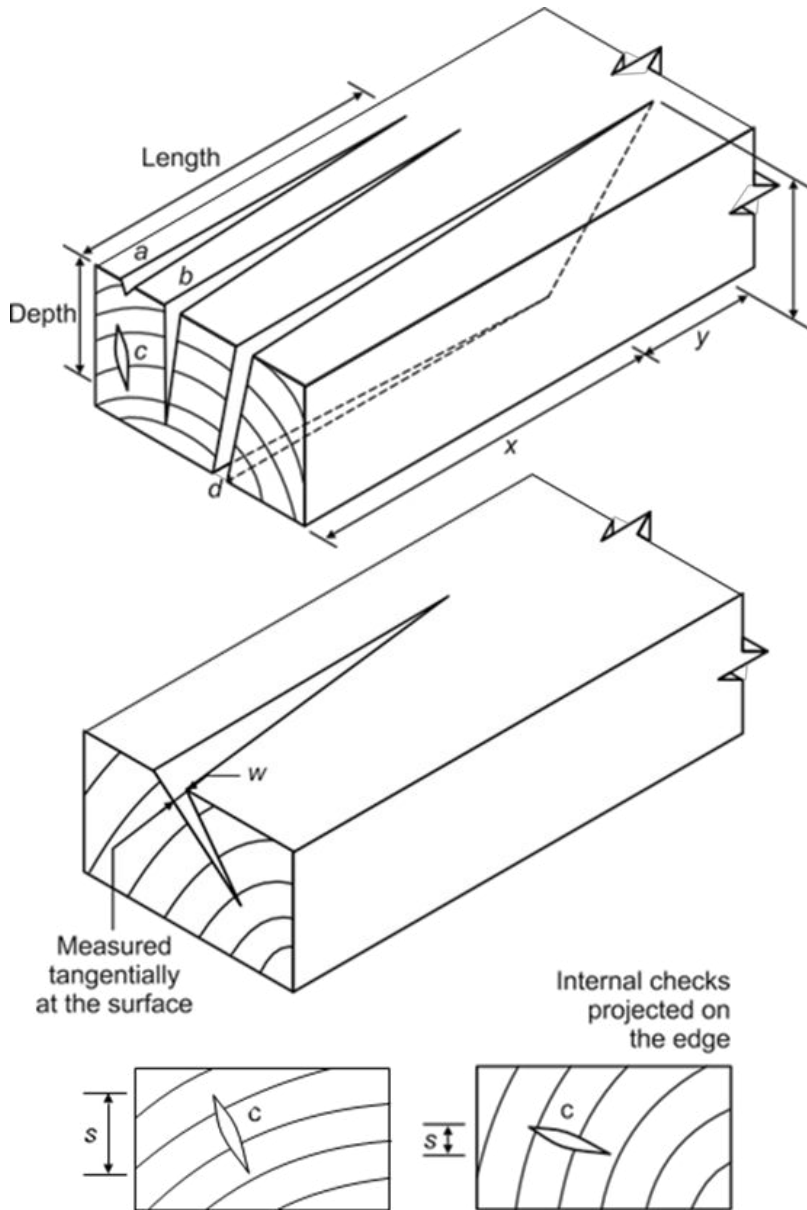
Figure A3.3 Gum pockets, gum veins, bark

Checks

The measurement of checks shall be as follows (see Figure A3.4):

- (a) For checks other than internal checks, the width shall be measured tangentially at the surface at 90 degrees to the longitudinal direction of the check. The length shall be measured parallel to the arises.
- (b) For internal checks, the size shall be measured at their projected length s , on the thickness of the piece.

Checks are not to be confused with shakes (see Figure A3.5)



Legend

- a=surface check
- b=check
- c=internal check
- d=split, w=width of check measured tangentially
- x=length of split
- y=length of check,
- s=projected length

Figure A3.4 Checks and splits

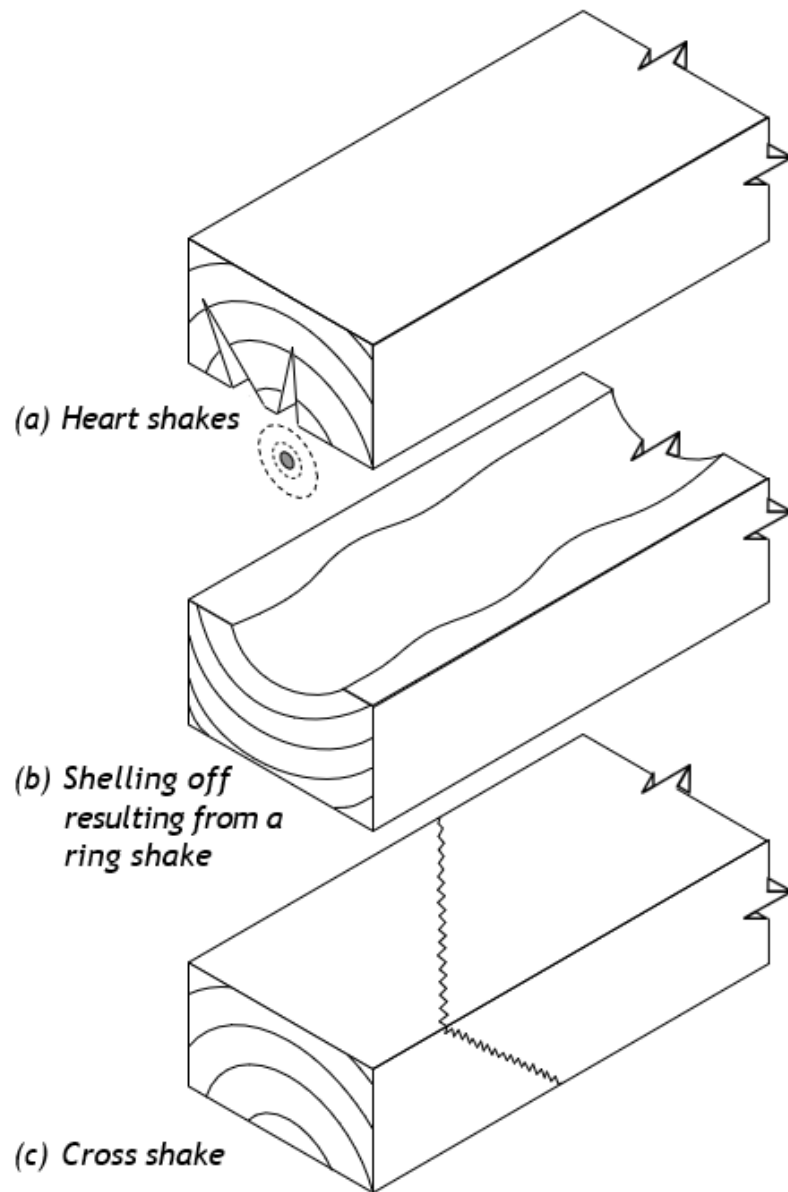


Figure A3.5 Shakes

Wane, want and Lyctid-susceptible sapwood

Wane, want and Lyctid-susceptible sapwood shall be measured as the amount by which the cross-section of the piece is deficient or is Lyctid-susceptible sapwood (see Figure A3.6).

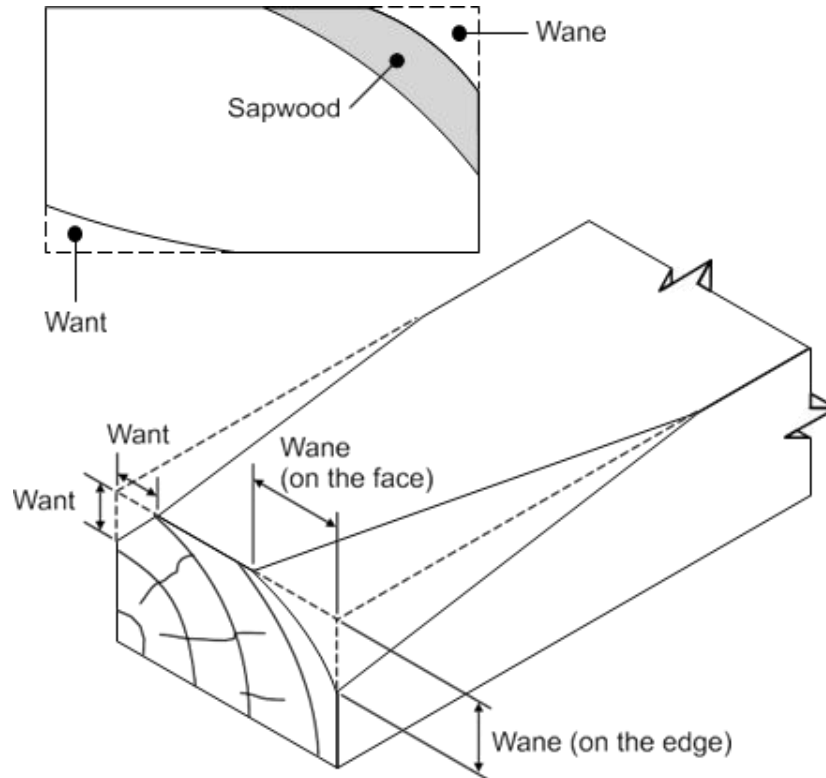


Figure A3.6 Want, Wane and Lyctid-susceptible sapwood

Appendix B - Guidelines for Specifiers and Purchasers of Recycled Timber (Informative)

When enquiring about or ordering recycled timber products in accordance with this standard, the following particulars should be supplied, where appropriate, preferably in this sequence:–

- a) The product required e.g. Structural recycled hardwood
- b) The Species Group and Recycled Grade in accordance with this Standard e.g. SG2, RG1
- c) If a milled product, the finished dimensions
- d) Any special requirements such as particular species, moisture content or required level of durability for specific applications.
NOTE Generally, only the sapwood of hardwoods can be impregnated with preservative
- e) Any special requirements in respect of colour or colour matching. (Inspection and agreement of a representative sample is strongly recommended).
- f) Hole plugging required/not required
- g) Surface finish (sawn, dressed, brushed, wired etc)
- h) Lengths (set, multiple, lineal etc)
- i) Pre-delivery finishing (coatings, sealers, end grain anti split plates etc)
- j) Packaging requirements (wrapping, blocks, corner strap protection, pack size/weight)
- k) Place and time of delivery and
- l) Delivery and on-site storage requirements (e.g. protection from the weather)



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