

Deck Master[®] Construction Standard

Following are recommended best construction practices for external timber decks. Additional explanation for these recommendations can be found in the *Deck Master[®] Construction Standard Explanatory Notes*. The number in brackets [] is the reference number of the explanatory note. Greater detail is provided on *Deck Master[®]* website.

Unless otherwise noted, the recommendations contained in the *Construction Standard* are not mandatory or automatically applied by your local Deck Master, who may have access to suitable alternative materials and may have developed alternative techniques which have been found to be effective and efficient. It is suggested that you gain an overall understanding of the materials and construction issues from the Construction Standard and then discuss your requirements for your project with your local Deck Master, with reference to the Construction Standard, and if you require or prefer that specific materials or techniques be incorporated into your project, that you discuss your requirements with your local Deck Master and come to a suitable agreement.

	Notes and comments
<p>➤ Governing Standard - The decking project shall comply in all respects with the Building Code of Australia (BCA). In addition, the following good practices shall be implemented.</p> <p>➤ Good quality workmanship eg timber members cut accurately to length, ends cut square and mitred joints formed accurately, is important for the initial and longer term appearance of the deck and also for good performance over the long term through the use of appropriate construction and finishing techniques, many of which are outlined below. However note that “good quality workmanship” is subjective and if you have specific expectations you should discuss these with your local Deck Master and come to a suitable agreement.</p> <p>➤ Design - For design purposes, structural timber should be minimum F14 hardwood [1] or F7 seasoned softwood (depending on preference and suitability for conditions). Long and large sections are becoming increasingly difficult to obtain so we would suggest that you consult with your local timber supplier for ready availability of timber size and length before commencing design and set your post spacings (and resultant bearer and joist spans) consistent with availability and economy.</p> <p>➤ Structural timbers for the subframe of weather exposed decks should be:</p> <ul style="list-style-type: none"> - highly durable - durability Class 1 hardwoods to AS 5604 – 2003, for each of the in-service conditions - above ground and in-ground [2] with sapwood treated to the appropriate hazard level - of low shrinkage (if unseasoned) or seasoned - if unseasoned, less than 8% tangential shrinkage and - treated to the appropriate hazard level if section contains sapwood <p>Suitable structural timbers in hardwood include (please refer to the essential notes below):</p> <ul style="list-style-type: none"> - For above ground¹ (in conditions which are not extreme): Spotted Gum and Blackbutt² - For above & in-ground³: Iron Bark, Forest Red Gum⁴, Grey Gum⁵, Grey Box (Gum-topped Box), White Mahogany, Tallowwood and Gympie Messmate. <p>These are “standard trade names⁶”. Species with similar or local names shall not be substituted for those listed above without reference to the designer and written confirmation by the builder of suitability for the application, particularly in relation to durability rating and shrinkage.</p>	<p>Compliance with BCA is mandatory.</p> <p>Good quality workmanship is mandatory.</p> <p>Any particular requirements should be agreed between the Deck Master and customer, and noted.</p>

1 These species are classified in AS 5604 - 2003 as durability 1 outside above ground and durability 2 in ground contact.

2 **Blackbutt** (Eucalyptus Pilularis) is not to be confused, or substituted, with New England Blackbutt (Eucalyptus Andrewsii) which is a lower durability and higher shrinkage timber. Blackbutt is best used under cover.

3 These species are classified in AS 5604 - 2003 as durability 1 outside above ground and durability 1 in ground contact.

4 **Forest Red Gum** (Eucalyptus tereticornis) is a high durability & low shrinkage timber suitable for external use & is not to be confused, or substituted, with “Sydney Blue Gum” (Eucalyptus saligna), a low durability & high shrinkage timber **unsuitable** for weather exposed use

5 **Grey Gum** (Eucalyptus Propinqua) is a high durability & low shrinkage timber suitable for external use & is not to be confused, or substituted, with “Mountain Grey Gum” (Eucalyptus Cypellocarpa), a low durability & high shrinkage timber **unsuitable** for external use.

The list of suitable structural timbers in hardwood, is not exhaustive. Contact your local timber supplier for information on suitable timbers (high durability, low shrinkage and appropriate treatment) available in your area.

In some areas, hardwood structural timber may only be readily available in lower stress grades and lower durability. Durability class 2 (*outside above ground classification*) timber *may* be suitable for use in above ground conditions provided that it is: of low shrinkage or seasoned; well ventilated; not used in conditions of regular rainfall, high humidity or termite activity and used in combination with other good building practices, particularly the sealing of cut ends and sealing of the tops of joists with a waterproof membrane to shed water away from the joist. For structural timber of durability class 2, these requirements would be necessary to satisfy the performance requirements of the BCA.

Structural timber in softwood, shall be seasoned, minimum F7 stress grade, preservative treated to H3 for above ground use or H4/H5 for close to or in-ground contact [2].

Softwood structural timber also should be well ventilated; and used in combination with other good building practices, particularly the sealing of cut ends and sealing of the tops of joists with a waterproof membrane to shed water away from the joist. Check with your supplier whether any limitations on use, or particular construction techniques, are appropriate for conditions of regular high rainfall and humidity. Softwoods treated with a water repellent in the treatment chemical, or with an oil-based treatment, will provide superior performance however are not readily available as yet.

High shrinkage unseasoned timbers and/or timbers of low durability and/or timbers with untreated or untreatable sapwood are not suitable for structural timbers in weather exposed conditions.

- **Joist width shall be 50mm unseasoned hardwood, 42mm seasoned hardwood or 45mm seasoned softwood [4].**
- **Ensure the area which will be under a completed deck is adequately graded, drained and ventilated so that the area is dry in normal conditions and dries quickly after wet weather without water pooling [5].**
- **Decking timber should be:**
 - **seasoned** (less than 15% moisture content to avoid excessive shrinking on the job)
 - **highly durable** – for above ground applications use minimum durability 1 (*outside above ground classification*) treated to H3 - for close to ground applications, or in conditions of regular rainfall and high humidity use durability 1 (*in ground contact classification*) treated to H5, and
 - **stable** (not swelling and shrinking excessively or distorting from the effects of moisture changes or heat).

Good decking timber for exposed conditions combines both high durability and stability ie it will last a long time and will be relatively stable, performing well over its life.

Examples of species suitable for above ground applications include:

• **Spotted Gum**, • **Ironbark (red and grey)**, • **Grey Gum (not Mountain Grey Gum)**, • **Gympie Messmate**, • **White Mahogany**, • **Tallowwood** and • **Kwila (Merbau)**. Ironbark, Gympie Messmate and Tallowwood are durability 1 (in ground contact classification) species and would be suitable for close to ground applications.

Other decking timbers available in your area may be suitable, however shall be seasoned, highly durable, stable and treated to the appropriate hazard level – refer to your local timber supplier for recommendations to suit your application ensuring you advise whether the deck will be exposed to or protected from the weather.

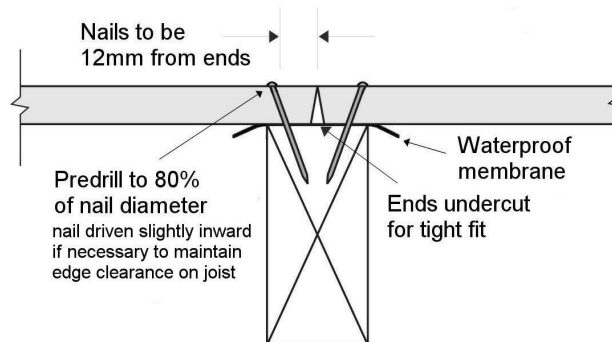
- Decking shall be protected from exposure to moisture and excessive heat, and packed up off dry ground to allow a free airflow, while stored on site prior to installation.
- All bolts, screws, nails, brackets, framing anchors and other hardware shall be hot-dipped galvanized or stainless steel (depending on severity of conditions). In corrosive environments such as in coastal areas or around pools, all fixings, including connector nails, shall be stainless steel.
- Timber posts shall be installed on commercial quality brackets cast into engineered concrete footings or, extended into the footings if necessary eg to gain a bracing effect.

Timber posts extending into the footings shall be sealed below ground with CN Emulsion and set into “no-fines” concrete with a layer of “no-fines” concrete at the base, to allow water to drain, in accordance with the engineering design but a minimum of 100mm [6]. The top of the no-fines concrete shall be sealed with mortar and sloped away from the post to shed water.

- Seal all cut ends, checked joints and timber-to-timber interfaces in structural timber or detailed timberwork to reduce the absorption of trapped moisture, which may lead to accelerated deterioration [7].
- Our suggestion for the bearer post connection is a checked/housed joint suitably sealed to prevent moisture absorption or face fixing with a stainless steel bolt (which has high corrosion resistance). Modern detailing tends to avoid the use of checked/housed joints at the point where the bearer is attached to the post to avoid premature deterioration of the timber from trapped moisture, with a preference for the bearer to be bolted to the face of the post. However, the poor performance of imported hot-dipped galvanised bolts in weather exposed conditions may lead to failure, over time, of the bolt supporting the bearer.
- Before fixing the decking, seal the top edge of each joist with either CN emulsion (which may show on exposed surface over time), a primer plus finish coat or, for a more effective seal which will also reduce water entry around the fixing and shed water from the joist, **we strongly recommend using a waterproof membrane (such as Malthoid, a bituminous dampcourse, or Joistrip a flexible rubber joist sealer) between the joist and decking** – refer to the figure.

- Timber, rather than threaded rod, for bracing of columns will provide a more rigid bracing effect and will not “sing” in windy conditions.

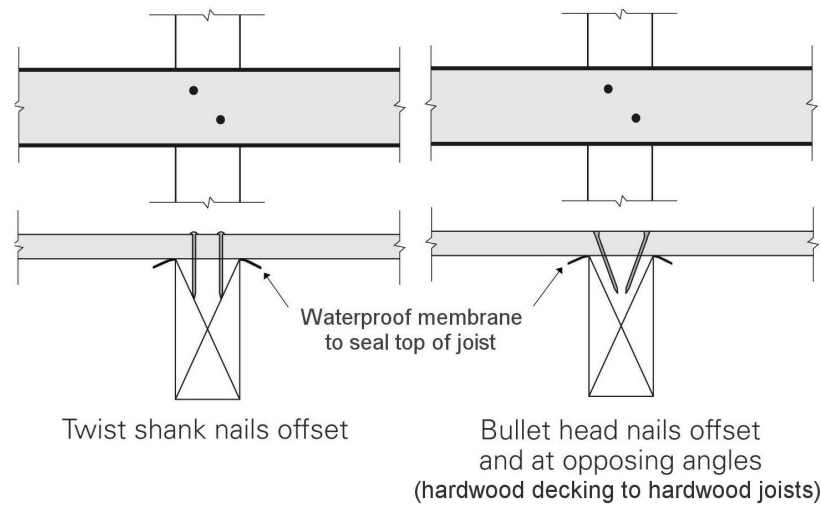
- Penetrating oils or stain finishes are commonly used to protect decking from weathering. One coat of an intended penetrating finish, applied to all surfaces, before laying will provide an effective seal and greater weather protection [8]. If using a stain finish, be careful not to overload the surface and to brush out any excess stain. Raw linseed oil, or mixtures containing raw linseed oil, shall not be used as a natural finish unless contained in a commercial product containing mould inhibitors [8].



Apply the finish *liberally* to the end grain of cut ends before laying the decking. An exterior polyurethane will provide a more effective and longer lasting end grain seal – applied carefully so as not to coat the faces of the board.

Film building clear decking finishes can also be used to protect decking from weathering, however be careful to read, understand and adhere to the directions particularly in relation to any requirements for initial weathering, washing of decking surface and use of preparatory coats. Film building finishes, properly prepared, applied and maintained, as an integrated system, can give good service over a long life. Applying film building finishes without attention to the whole system may result in unsatisfactory performance and reduced life.

➤ Lay the decking boards, using spacer blocks (not nails) [9] to create a 3 to 5 mm gap between adjacent boards to allow for swelling and shrinking in response to wetting and drying [10].



Stagger butt joints so that they do not occur on adjacent boards.

Butt ends can be cut with a slight backward undercut to assist in achieving a tight fit and to reduce water absorption into the end grain – refer to the figure on previous page [11].

➤ In weather exposed domestic applications subject to light foot traffic, decking shall be screwed or hand nailed with two fixings per board at each joist. Nails shall be domed head (DH), twist shank (TS) nails in stainless steel (SS) (preferred) or hot-dipped galvanised (HDG) (depending on severity of exposure conditions) [12]. Screws will provide improved hold down, corrosion resistance and resistance to working out than nails.

If Screwing

Use 50 x 10G SS Decking Screws
(refer Product and Services Directory for details)

If nailing

For hardwood joists, use 50x2.8mm DHTS nails (as above)
For softwood joists, use 65x3.15mm DHTS nails (as above)

Note: Although hot-dipped galvanised nails may be suitable for fixing decking in the intended exposure conditions, stainless steel nails are recommended, as they allow light machine sanding of raised grain, in the future, without the danger of damaging the nail head and removing the protective coating.

T-Nails (50x2.2 Finishing Nails or 50x2.5 Flooring Nails), plain steel or zinc plated nails shall *not* be used to fix decking or in any external application [13].

Decking should be drilled with a small pilot hole to avoid splitting (test on off cuts).

If a pilot hole is required in hardwood joists, it should be of minimum width and depth to allow the screw or nail to be driven without shearing off the screw or bending the nail and without damaging the nail head, while ensuring the maximum hold-down force is maintained to hold any movement of the decking. [14]

Drilling a pilot hole that is wider or deeper than necessary will make screwing and nailing easier but will result in reduced hold-down and potentially movement of the decking boards and working out of the fixing.

To reduce the possibility of splitting the joist, the screw or nail fixings shall be placed in a formal and controlled staggered alignment. Refer to screw installation recommendations for required screw edge clearance and stagger. Nails shall be fixed with a 10 to 12mm stagger, with a minimum of 12mm edge clearance [15].

Where decking boards terminate or are joined at a joist, domed head nails should be 12mm from the end of each board, with the board predrilled to approximately 80% of the nail diameter to avoid splitting (test on off cuts) - refer to figure on previous page.

Adjacent fixings at the board end should be driven at slightly different angles to reduce the possibility of splitting the joist between the fixings.

Nails shall be driven only so that the head pulls the board down tight onto the joist. Nails shall not be punched into or below the decking surface [16].

➤ **Once the decking has been laid, apply another coat of the chosen penetrating oil or stain finish to the exposed surface, as recommended by the manufacturer [17].** Refer to the manufacturers recommendations as to the application of a third coat.

Decking which may be subject to foot traffic when wet should not be coated with any finish which leaves a slippery gloss coating on the surface. If a gloss coating is preferred or has been applied, access should be restricted when the deck is wet to reduce the chance of slipping.

➤ **The performance and longevity of timber decking will be significantly improved by performing regular maintenance including reapplying the decking finish at appropriate intervals and while the timber retains some water repellency [18].**

In “average” conditions, protection should be expected for 9 to 12 months from oils and 12 to 18 months from stains. In severe conditions, such as around pools, recoating is likely to be necessary at shorter intervals.

Some raising of the timber grain may be experienced on the exposed face from weather exposure. If this occurs, the raised grain can be removed by a moderate hand or machine sand in the affected areas, taking care not to damage the protective coating on the fixings.

➤ **Provide an access point to the underside of the deck to undertake regular inspections (eg six monthly); for signs of deterioration of the timberwork and of termite activity, such as termite tunnels or trails, or to re-treat where a chemical treatment has been used.** If any evidence of termite activity is found, do not disturb any tunnels or trails and contact your pest treatment professional for urgent treatment.

➤ **Ensure safe site management and working practices and compliance with all Workplace Health and Safety requirements [19].**

Please note that the information contained herein has been prepared with due care for the purpose of assisting in the delivery of timber decking projects which perform well over a long life. Whilst every effort has been made to ensure the accuracy of this information and its consistency with current best practice, no responsibility, liability or claim is accepted, for errors in or omissions from, this information, or for work done or omitted to be done, in reliance on this information.