

Deck Master[®] Construction Standard - Explanatory Notes

Additional information provided as explanation for some of the recommendations outlined in the **Deck Master Construction Standard**.

[1] F17 in hardwood is preferred for weather exposed applications as timber graded to F17 generally includes a lesser number and size of natural characteristics, which can be a source of accelerated deterioration when exposed to the weather.

[2] AS 5604 – 2003 provides a classification of durability for different timber species for outside above ground and in-ground conditions with species invariably having an equal or higher classification (and hence longer expected life) outside above ground than in-ground.

- *Where the underside of the structure is greater than 400mm above the ground, and conditions are not extreme, this should be considered an above-ground application and subframe timbers shall be: selected durability class 1 hardwoods (outside above ground classification) with sapwood treated to H3 (hazard level 3); or structural softwoods treated to H3.*
- *Where the underside of the structure is less than 400mm above the ground, this should be considered an in-ground application and subframe timbers, shall be selected termite resistant durability class 1 hardwoods (in ground contact classification) with sapwood treated to H5; or structural softwoods treated to H5.*
- *Where the structure is weather exposed and subjected to regular rainfall and high humidity, such as in tropical areas, use durability class 1 hardwoods (in ground contact classification).*

Posts extending into footings shall be durability class 1 hardwoods (in ground contact classification) with sapwood H5 treated or H5 treated round softwood posts.

The sapwood in round softwood posts provides an envelope of protection around the low durability heartwood. Exposed heartwood in sawn softwood posts, in contact with or embedded in the ground, may decay rapidly or suffer from termite attack, depending on moisture and temperature conditions. Note that “peeler cores”, the centres of softwood logs used for ply production, are primarily heartwood, cannot be treated and are unsuitable for external or structural use.

[3] Ideally, a single species shall be used, or mixed species with similar characteristics to ensure that similar shrinkage occurs in all the structural members.

High shrinkage species (tangential shrinkage greater than 10%) of unseasoned hardwood structural timber are sometimes supplied for the decking subframe. High shrinkage species are subject to collapse, distortion and excessive reduction in section size during on-site seasoning. High shrinkage and widely varying differential shrinkage between species, over time can result in unevenness in the decking surface, unsatisfactory appearance and even structural problems.

If using unseasoned hardwood, confirm that low shrinkage species will be supplied by your timber supplier.

[4] The use of wider joists (ie 50mm unseasoned hardwood, 42mm seasoned hardwood & 45mm softwood) allows fixings to be placed in a formal staggered alignment/pattern, thereby reducing the likelihood of split joists. Wider joists are also better for joining of decking boards over the joist as the fixings can be placed further from the end of the board, thereby reducing the likelihood of the fixing splitting the end of the board. 38/35mm structural timber is available but is not recommended as joists.

[5] Retained humidity under the deck increases the risk of decking distortion, termite attack and accelerated decay.

[6] Note the use of no-fines concrete which allows any water which collects during wet weather to drain away and the post to dry out during dry weather. Standard concrete can hold moisture around the post and cause accelerated deterioration. No-fines concrete at the base of embedded posts provide a suitable bearing area which also allows water to drain away.

[7] In the case of a structure to be painted, particular care is to be given to the sealing of timber-to-timber interfaces *during construction*.

For pressure treated structural timber which is not to be later painted, a heavy bodied timber preservative such as CN Emulsion is an appropriate sealer. However, CN Emulsion will be noticeable as a darker coloured oily area around the joint. This darker coloured area may not be suitable for appearance and will stop paint adhering.

Alternatively, a liberal application of an oil-based primer/undercoat is a suitable sealer, coloured if required for appearance. An oil-based primer/undercoat is also suitable for sealing structural timber which is to be painted.

For detailed timberwork, such as handrail timbers or balustrading, any cut-ends, and the abutting surfaces shall be sealed during construction.

[8] Clear film building surface coatings are a common and popular finish for decking although likely to be more slippery than penetrating finishes. If a clear surface finish is preferred, and any issues regarding slipperiness can be overcome, ensure that the application instructions on the product or obtained from the supplier are read carefully and understood and application instructions carefully followed. Careful attention to surface preparation and application can make a significant difference to the performance and longevity of the finish eg preparation may require leaving the deck exposed to the weather or washing the tannins from the decking by hosing over a period of time before applying any finish. Preparation may also require the application of a prime coat as part of the system. In this case, application of the finish prior to laying would result in poor performance.

Raw linseed oil will encourage the growth of mould, which requires removal with commercial timber cleaning agents before recoating. Mould growth in raw linseed oil is particularly likely in warm humid conditions.

[9] Nails should not be used to create the space between decking boards as the nail point will penetrate the top of the joist, reducing the benefit of sealing, by allowing moisture entry.

[10] *Small* differences between the moisture content of the decking as supplied and the local Equilibrium Moisture Content (EMC) can be allowed for by applying a gap at the lower end of the range if the decking is likely to shrink, or at the upper end of the range if the decking is likely to swell. Confirm the moisture content by accurate measurement of the decking boards supplied.

If decking is to be installed in areas of consistent *extreme* low humidity, eg in drier far western areas or in areas of consistent *extreme* high humidity, eg in rainforest areas, then decking with an appropriate moisture content shall be ordered, or standard decking acclimatised to the local EMC (equilibrium moisture content) by strip-stacking before installation.

[11] A slight backward undercut will assist in achieving a tight fit and will also reduce the potential for accelerated deterioration of the board ends by reducing trapped moisture and improving ventilation of the board ends. End grain absorbs moisture much more readily than face grain and absorption of moisture into the end grain is a major source of unsightly end cracking and accelerated deterioration over time.

[12] 50x2.5 stainless steel domed head gun nails are readily available and commonly used for fixing decking. Hand nailing with 50x2.8 twist shank nails for hardwood joists and 65x3.15 twist shank nails for softwood joists provides greater initial hold-down and has sufficient history of use to be confident of long term performance. Your nail supplier may be able to provide additional information on gun nails for decking and a recommendation as to suitability.

Domestic decking used in light-duty commercial applications subject to medium volumes of foot traffic shall be fixed with screws eg **50x10G** countersunk head stainless steel decking screws (joists pre-drilled if required to ensure the screw does not break off) or as determined by the designer – refer to the Product and Services Directory for details and supplier information.

For commercial applications, use commercial standard decking and fixings.

[13] T-Nails (eg 50x2.2 Finishing Nails or 50x2.5 Flooring Nails) are unsuitable for fixing decking as the zinc plating may deteriorate rapidly and the shank diameter is insufficient to provide suitable hold-down, resulting in boards moving or 'rocking' and nails working up.

Plain steel or zinc plated nails are unsuitable for fixing decking or in any external application, as they are likely to rust, causing staining and gradual deterioration of the nail and the timber around it.

[14] The size of the pilot hole needed will vary between species, depending on hardness and the pilot hole may not need to be drilled full depth. Determine the correct size and depth of pilot hole for your materials by testing with off-cuts of decking and joists.

It is important that the head of galvanised nails not be damaged as this may reduce the integrity of the sacrificial galvanised coating leading to premature rusting.

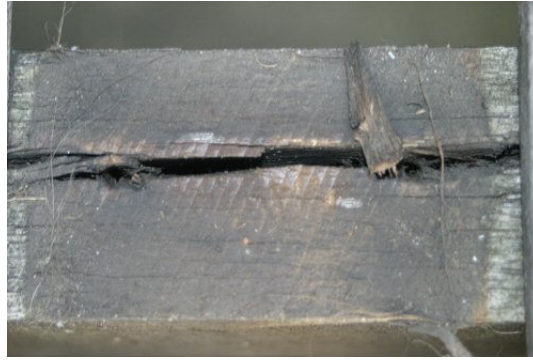
[15] Decking fixings placed in a straight line are likely to split a hardwood joist (we are seeking information as to the effect on softwood joists – until further information is available our recommendation would be to stagger the nails whether using hardwood or softwood joists). Split joists are likely to result in:

- a reduction or total loss of hold-down forces, allowing movement and distortion in the decking;
- nails "walking-out" of the deck as the decking moves under foot traffic;
- accelerated deterioration of the joist as water enters the split and is not able to dry out readily.

These images show what can happen from placing fixings in a straight line.



Split joist from stainless steel gun-nails driven in line



Split joist after 8 to 10 years of weather exposure in South-east Queensland

[16] “Punching” of nails will leave a depression in which water can pool, accelerating deterioration.

“Punching” of domed head nails will severely damage the timber around the head of the nail.

[17] The penetrating oil or stain finish should be applied to a run of three to four adjacent boards along the full length of the deck, and not across the width. The gap between the boards can then be used to separate each run, so as to avoid an overlap of finish, which would result in a variation of colour density. Only apply as much finish as the timber will absorb. Do not load the applicator too heavily and push the finish well out along the timber. “Back brush” the coated area to push the finish into the surface. After allowing a short time for the finish to absorb, but while it is still wet, “dry brush” the coated area to even out any patchiness resulting from irregular application or variations in the rate of absorption into the timber. If more finish has been applied than the timber will absorb, brush any excess onto unpainted sections or remove by wiping with a soft cloth.

[18] Vacuum pressure impregnation (VPI) treatment of decking does not provide protection against the damaging effects of weathering.

Decking is particularly susceptible to weathering damage and particular care should be taken in its finishing and maintenance to ensure performance and longevity.

Decking in weather-exposed conditions will require reapplication of the decking finish at shorter intervals than in protected conditions. In “average” conditions, you should expect protection 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. Although decking oils and stains require recoating at relatively short intervals, the recoating process is relatively simple and speedy. Finishes should be re-applied in the period before the most severe weathering conditions.

The colour of decking timber which has begun to turn a silver grey can be restored by the application of a coloured decking stain, which is best applied before a strong grey colour develops.

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

Suitable safety equipment shall be worn when appropriate eg snug fitting work gloves, eye protection, ear protection and a dust mask. Particular attention shall be given to safe practices and the safety advice provided on the product or in the product manual when using ladders, grinders and power saws. Working from solid surfaces and maintain good control of any tool.

Be careful to use good lifting and placing techniques when lifting and placing loads - keep your back straight and crouch and push up with your legs. Be straight on to the load when lifting – do not twist as you lift carry and place load as this will put excessive strain on your back.

The work area shall be kept tidy, free of waste or excess materials which could be a tripping hazard. Building materials shall be stacked securely and access to the area by unauthorised persons, in particular unsupervised children, shall be prevented.

Treated off-cuts shall not be burned as this may create toxic vapours. Dispose of any treated off-cuts in landfill. Use a high standard of hygiene practices and wash hands before eating, drinking or smoking.

Anticipate what could go wrong in each situation and make appropriate changes to undertake each activity safely.

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.