

4. Fixing the Rafters

- Cut 9 rafters at 2.7 metres from the remaining 150 x 50mm.
- Shape ends if desired, ensuring same limit of 150mm in from ends, unless longer rafters have been selected for use.
- Nail rafters in place. Start with two end rafters. Line up outside edge of posts with outside of rafters, and have 150mm overhang at each end. Skew nail to all four bearers with 75mm nails. Space evenly at about 300mm centres and nail remaining seven rafters between end rafters (see [Illustration 3](#)).

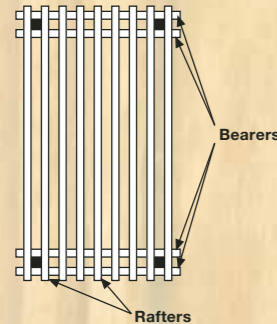


Illustration 3: Free Standing Pergola Layout

Option 2 Pergola Fixed to the House

Instead of two posts on each side, one side of this pergola is supported by a single bearer screwed to the wall of the house.

1. Fixing the Bearer

- Cut a bearer to 2.7 metres
- Determine where on the house you want to position your pergola, and set the bearer there, on the ground against the wall.
- Measure 150mm in from each end of the bearer, and mark those two positions on the wall. That's the outside line of the posts.
- Using a spirit level, plumb 2.3 metres up the wall from each end of the bearer, and mark those points. The line between them, marks the top edge of the wall fixed bearer (see [Illustration 4](#)).

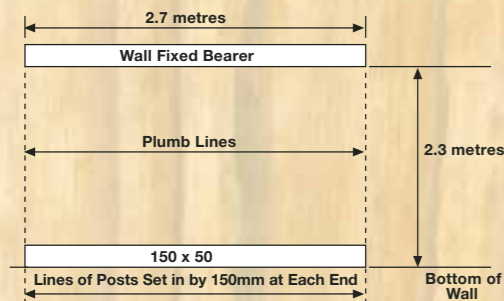


Illustration 4: Setting Out on a Wall

- Hold the bearer on the line between the two end points, or use a spirit level and a straight edge, and check it is levelled. If it's not, lift the lower end until it is. Remark the height on the wall at that end.
- Fix the bearer to the wall between the two finished heights.

a) For Timber Framed Walls:

Temporarily nail bearer to wall after checking it is level, then drill and fix with coach screws. Screw into studs. Locate studs by finding cladding nails or by thumping until solid sound is obtained from stud behind. In most modern homes, studs are at 600mm centres. If the bearer is fixed close to the top of a window or doorway, there is likely to be a horizontal beam to fix to. Pack beam off the wall with 20mm thick packers cut from H3.2 treated timber around each bolt. Shape packers if necessary to fit weatherboard (see [Illustration 5](#)).

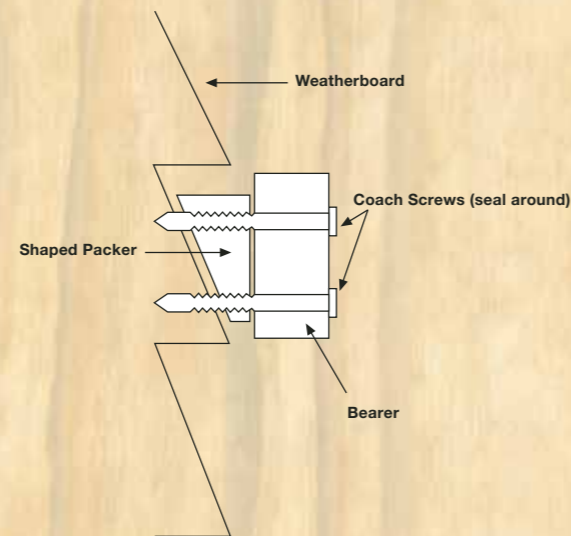


Illustration 5: Fixing the Bearer

Seal around screws with weatherproof silicone sealant.

b) For Solid Masonry Walls:

- Fix with Dyna bolts. Drill the end holes in the bearer while on the ground.
- Hold in position on the wall and mark through the holes onto the wall.
- Remove the bearer and drill appropriately sized holes into the masonry.
- Tack a series of 10mm H3 packers to the back of the bearer to ensure a full 10mm gap is achieved, and leave a reasonable gap between packers to allow rainwater to drain away.
- Place the bearer in position on the wall, insert the bolts and tighten.
- Drill two intermediate holes, insert the bolts and tighten.

2. Setting Out the Post Holes

- Take four lengths of 150 x 50mm H3.2 timber. Mark lines 2.4 metres apart on two of them.
- Square one end of both of the other pieces and mark lines 2.45 metres from those.
- Temporarily nail the boards in a rectangle (see [Illustration 6](#)). Set against the wall and check for square by measuring the diagonals. The post positions are inside the outer corners of the rectangle. Mark these on the ground. Dismantle and remove timber.

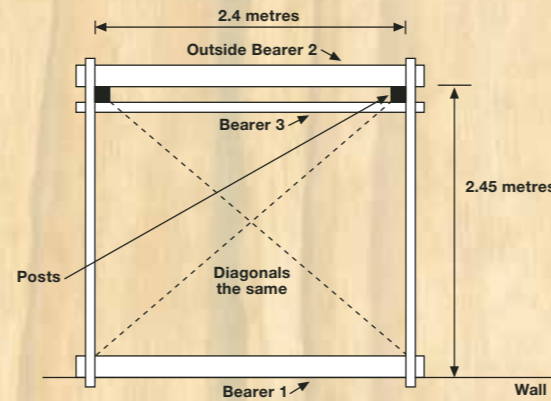


Illustration 6: Setting Out Posts

- Dig post holes, and set posts in place as for free-standing pergola.
- Using a spirit level and straight plank, or line level, level the line of the bottom edge of the wall fixed bearer onto the two posts. Measure down a further 50mm and mark. Square and cut posts to that lower height.
- Cut remaining two bearers to length and shape ends if desired.
- Nail outside bearer 2 to posts (see [Illustration 6](#)), so that top edge is flush with top of posts, and each end overhangs 150mm. Take care to avoid bolt hole positions with nails.
- Cut all rafters to length and shape one end.
- Nail two end rafters in place, on top of two bearers.
- Set third bearer 3 in place and push it up until it's hard against the bottom of the two rafters. Temporarily nail in place.
- Mark, drill and bolt bearers to posts.
- Mark out and nail the remaining rafters in place.

NOTE: Rafters slope down away from wall. If roofed in clear corrugate, no further allowance need be made for runoff, but noggins/dwangs must be fixed between joists for fixing. Ask your council if spouting is required.

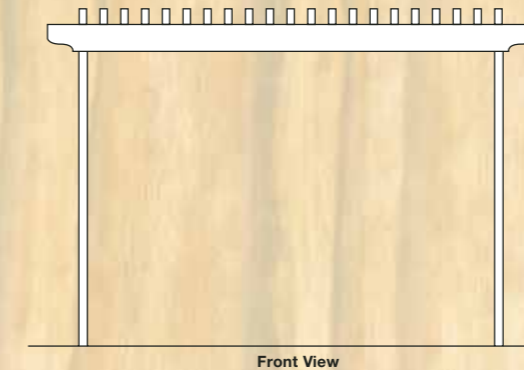


Illustration 7

Timber Selection Guide

Treatment Level	Application	Typical Uses
H3.2	For timber exposed to the weather but not in-ground contact	<ul style="list-style-type: none"> Decking/Rafters/Bearers (all deck components except decking posts, piles and veranda posts) Fence palings, fence rails and trellis Cladding
H4	For timber exposed to the weather and in-ground contact	<ul style="list-style-type: none"> Fence posts Pergola post Retaining wall TGV and lumber
H5	For timber exposed to the weather, ground and fresh water contact; and in high risk, loadbearing applications	<ul style="list-style-type: none"> Piles (house foundations, retaining walls, and in decking piles) Vineyard supports Veranda posts Poles
H6	For timber in marine use, for permanent salt water immersion	<ul style="list-style-type: none"> Marine piles Slipways

Consumer Information and Handling Guide for Treated Timber is available from your local PlaceMakers store.

BUILDING A PERGOLA

YOUR COMPLETE HOW TO GUIDE

PlaceMakers
Know how. Can do.

GETTING STARTED

Pergolas are a useful and attractive addition to any section.

- They provide support for climbing plants like roses, clematis, jasmine and honeysuckle.
- Pergolas offer a focus and architectural form in a flat garden; or on a plain building.
- Add a roof in clear corrugated material to provide shelter over a doorway or as a gazebo.

This brochure has instructions for a free-standing pergola, and one fixed to a building or a wall.

The Law

You should ask your council if you need a building consent and/or planning permission.

Ideas & Inspiration



Materials

1. Free Standing

- 100 x 100mm H5 posts – 4 @ 3 metres
- 150 x 50mm H3.2 bearers – 4 @ 2.7 metres
- 150 x 50mm H3.2 rafters – 9 @ 2.7 metres
- 10mm H3 Packers
- 8 x 210mm x 12mm diameter hot-dipped galvanised coach bolts, nuts and 50 x 50mm square washers or 55mm diameter round washers.
- Petroleum grease
- 75mm hot-dipped galvanised jolthead nails
- Cement
- Builders mix

2. Fixed to the House

- 100 x 100mm H5 posts – 2 @ 3 metres
- 150 x 50mm H3.2 bearers – 3 @ 2.7 metres
- 150 x 50mm H3.2 rafters – 9 @ 2.7 metres
- 4 x 210mm x 12mm diameter hot-dipped galvanised coach bolts, nuts and washers
- Petroleum grease
- 4 x 125mm x 12mm diameter hot-dipped galvanised coach screws and washers; or 4 x 125mm x 12mm Dyna bolts.
- 75mm hot-dipped galvanised jolthead nails
- Cement
- Builders mix

Note

Where corrosion levels are high, as in the case of a coastal environment subject to sea spray, stainless steel should be used for bolts, nails and fittings.

Tools

✓	Spade or post hole borer	✓	2 G or F clamps
✓	Circular saw	✓	Spirit level or line level
✓	Electric drill, 12mm auger bit & either 9mm twist bit or masonry bit (check requirements for Dyna bolts)	✓	Tape measure, square and pencil
		✓	Sandpaper
✓	Adjustable spanner (250mm)	✓	Jigsaw if cutting curves on ends of rafters (optional)

Instructions

Option 1 Free Standing Pergola

1. Setting out the holes:

- Take two lengths of 150 x 50mm timber, and mark two lines, 2.4 metres apart, across both.
- Take two more pieces and mark two lines 2.3 metres apart

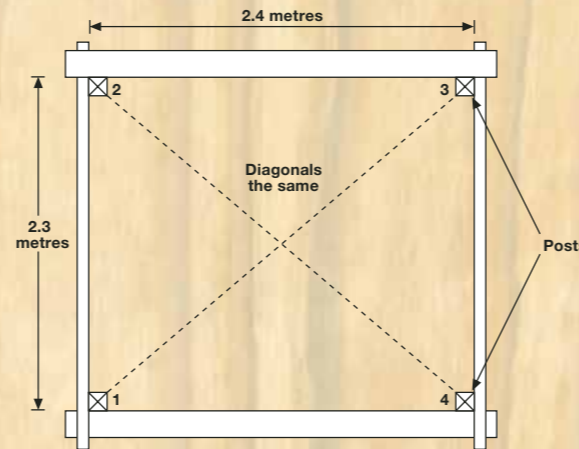


Illustration 1: Laying out post holes

- Lay planks together in a rectangle so the inside of each plank rests on the lines of planks beneath it. (The planks can be temporarily tacked at the corners).
- Position rectangle where you want your pergola.
- Square the corners by checking that diagonals are the same length (see Illustration 1).
- The inside of each corner of the rectangle, marks the outside corner of each post.
- Mark post positions on the ground, dismantle and remove rectangle. Dig four 300mm diameter holes at least 900mm deep.

2. Installing the Posts

- Place 100mm concrete in the bottom of each hole and set the posts in place on top. Make sure uncut treated ends go into the hole.
- Check for plumb levels (vertical) in both directions and brace securely.
- Pour concrete to 150mm below ground level. Check for plumb again and rebrace if necessary.

- Leave the concrete to set for at least 24 hours. When the concrete is set, top up hole with soil, then measure 2.3 metres from ground level on one post.
- Level that mark around onto each of the others. Level using a string level and string line, or a spirit level on a plank. Check accuracy of all marks by levelling between fourth and first post.
- Square and cut posts to height(s).

NOTE: If you intend to cover your pergola with clear corrugate, allow a fall of 50mm in the direction you want it to drain. E.G. on Post 2 mark 50mm below level line. Level that lower mark across to Post 3. Then level the original height from Post 1 to 4.

3. Fixing the Bearers

- Cut four bearers from 150 x 50mm at 2.7metres long. Check dimensions at post top before cutting. Shape ends of bearers if desired, remembering that no part of the shaping should extend more than 150mm from end of bearer (see Illustration 2), unless you wish to use bearers longer than 2.7metres.

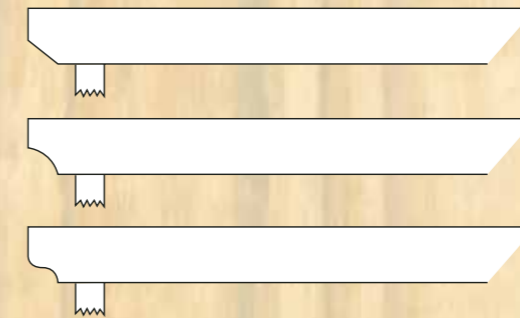


Illustration 2: Bearer and joist end shape option

- Temporarily nail bearers to Posts 1 and 4 and Posts 2 and 3. Top edge of bearers should be flush with tops of posts. Sandwich post between bearers (see Illustration 3). Bearers should overhang posts by 150mm at each end. Ensure that temporary nails are in the middle of each bearer as bolt holes have to be bored above and below that.
- Mark points 40mm from the bottom and top edges of the bearers, in the centre of the posts. Bore two 12mm holes through the bearers and posts on those points. If your auger bit is less than 200mm long, measure and bore from both sides, ensuring that you maintain holes level and square to the face of the bearer, so the holes from each side meet up.
- Grease the bolts liberally, bolt through holes and tighten.



“The most renewable natural resource” for more information visit our website www.nzwood.co.nz

Produced in association with



The Building Research Association of New Zealand

Please Note:

While the advice and recommendations contained in this brochure have been produced with proper care, they are offered only with the objective of assisting those interested in home improvement projects. PlaceMakers does not accept responsibility for the advice, recommendations, etc. contained herein.

Updated: December 2008 (FM1002 12/08)

www.placemakers.co.nz

PlaceMakers
Know how. Can do.