

The addition of a patio to your garden will greatly increase your enjoyment of the summer months. This **How-to** guide will show you how to build a patio from making a plan and estimating materials to laying and cutting paving slabs.

MATERIALS

- Hardcore – broken and compacted rubble
- Sharp sand – must be 'screeding' or 'concreting' sand for 'blinding' (filling gaps and levelling) hardcore bedding mortar for pointing (filling) joints between slabs
- Soft building sand – mixed with sharp sand and portland cement for bedding slabs
- Portland cement – binds aggregates (sand or ballast) to make mortars and concrete
- Water proofing agent – added to mortar mixes to make them less permeable
- Paving slabs – a good range is available from Homebase
- Nails – 152 mm
- 10 – 20 homemade marker pegs cut from 50mm x 50mm timber
- Spacing blocks – homemade from 10mm thick timber

TOOLS YOU MAY NEED

- Pickaxe
 - Spade
 - Shovel
 - Wheelbarrow
 - Club hammer
 - Bolster chisel – 100mm
 - Screeding float trowel – wood or plastic
 - Trowel – pointing
 - Old dust pan brush
 - Spirit levels – 600mm, 1500mm
 - Measuring tape
 - Builder's square
 - Straight edge, a long thin plank of wood 25mm x 100mm
 - Builder's bucket
 - String
 - Chalk
 - Goggles
 - Gloves
 - Stout, hard-toed boots
 - Mask
 - Tamping board (for levelling concrete) 50mm x 100mm x shortest side of patio
- The following specialist tools may be hired when necessary:
- Plate vibrator, for very large areas requiring a hardcore base.
 - Hydraulic slab cutter
 - Electric angle grinder with stone-cutting discs.
 - Earth rammer
 - Garden roller
 - Cement mixer
- Please note: always wear goggles, mask and gloves when using machinery or hand cutting tools.

BEFORE YOU START

Before building a patio, you will need to consider the following points:

SUN AND SHADE

Locate the patio in a warm sunny spot – a site facing south or west is usually best. If shade is important, then part of the patio must provide for this.

PRIVACY

Trellis, climbing plants, small trees and shrubs are ideal for providing some degree of privacy from neighbours and to protect the patio from wind.

COST

The cost is related to the size of the patio and the level of effort involved. Ensure that there is enough time and money to complete the patio.

MATERIALS

Choose paving that will blend with the surroundings. Large slabs are heavy, so use smaller ones unless you have help. Allow up to 10mm between each slab for mortar when calculating the number required. To avoid having to cut slabs, opt for a 'chessboard' layout or choose from a range of Homebase paving that feature half-slabs. Staggering paving (like brickwork) or laying a pattern of different sized slabs usually means that slabs must be cut to get a straight border. Areas of gravel or stone chippings will have a softening effect and provide space for growing small plants.

HINT

Always buy all the slabs at the same time to prevent variations in colour and texture.

MAKING A PLAN

1. Decide on the size of the patio and draw a detailed plan to scale on squared paper. Mark all permanent fixtures: the house, walls, fencing, manhole covers (which must be paved around and can affect the level of the patio), as well as trees or large plants. For comfort, the patio should be at least 2.5m wide and the length should make it look like a natural extension to the house. A change of level or steps adds interest, but can be complicated to construct.
2. Planting around the house softens the change from the vertical to the horizontal, but flower beds should make it look like a natural extension to the house.
3. The surface patio must be at least 150mm below the damp-proof course in the wall of the house in order to stop rain bouncing off and hitting the wall above. However, a 300mm wide strip of gravel between the wall and patio will allow the patio to be only 100mm below the damp-proof course if necessary and still prevent rain splashing the wall above the damp-proof course.

ESTIMATING MATERIALS

CONCRETE

Concrete is a mixture of all-in-ballast, cement and water. All-in-ballast is sold by Homebase in 25kg bags. On average, a cubic metre weighs around 1680kg, which is 67 x 25kg bags.

CEMENT

Buy 1 x 25kg bag of cement for every 6 25kg bags of all-in-ballast. It is advisable to buy one-third of the amount extra all-in-ballast than appears to be needed, because all-in-ballast compacts when it is mixed with cement and poured into place. It is also almost impossible to accurately measure a hole in the ground.

MORTAR MIXES

This is a mixture of cement, sand and water. For bedding slabs (see page 5) mix 1 part cement with 4 parts sharp sand (screeding or concreting) and 1 part soft (building) sand or use 1 bag cement to 4 bags sharp sand and 1 bag soft (building) sand. For pointing (see page 7) use 1 part cement to 4 parts sharp sand. On average, 1 cubic metre of sand weighs about 1600kg which is 64 x 25kg bags.

Cement slurry is brushed onto the underside of the slabs to ensure good adhesion to the mortar bed. In a bucket, mix cement into a bucket of water until a creamy consistency is achieved.

The table below calculates the quantity of concrete you will require for the total area of your patio.

- Please note: owing to regional variations in the quality of sand, lime and aggregate, these figures are only guidelines.

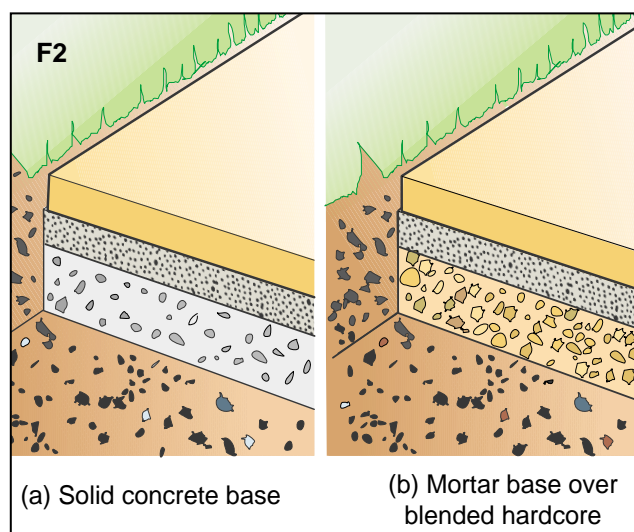
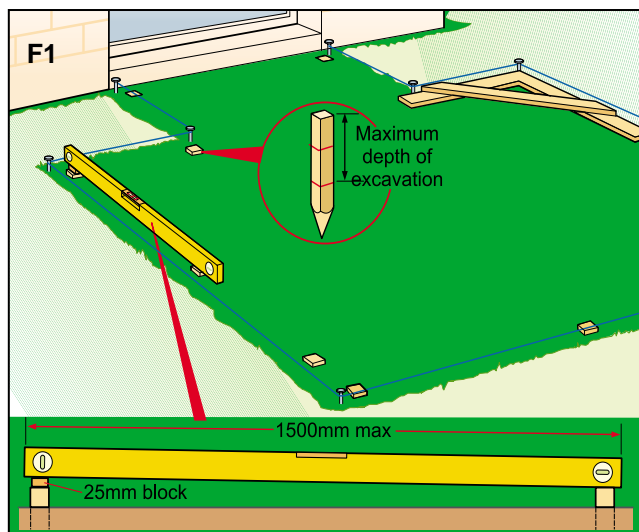
Thickness	25mm	38mm	50mm	75mm	100mm	125mm	150mm
10cm ² area	0.25m ³	0.38m ³	0.5m ³	0.75m ³	1.0m ³	1.25m ³	1.5m ³
20cm ² area	0.5m ³	0.76m ³	1.0m ³	1.5m ³	2.0m ³	2.5m ³	3.0m ³

ESTIMATING BEDDING MORTAR AND CONCRETE

This table indicates the correct thickness of material for different ground types.

Type of ground	Sub base compacted hardcore	Concrete base thickness	Minimum mortar bed thickness	Total depth excluding slab thickness
Firm topsoil not subject to shrinkage/settlement and not recently disturbed	–	75mm	25mm	100mm
Clay or peaty soil	100mm	75mm	25mm	200mm
Chalk with thin topsoil removed	–	–	38mm	25mm
Light sandy soil	100mm	75mm	25mm	200mm
Recently disturbed soil, eg: existing flower/vegetable bed or building sites	150mm	75mm	25mm	250mm

- Please note: if paving is to be used for vehicular traffic then 100mm of concrete reinforced with 100mm square steel mesh is advised. The mesh should be placed just below the centre of the concrete thickness.



MAKING THE PATIO

PREPARATION

Transfer the plan to the ground using nails, builder's square and string (**F1**). Measure accurately to ensure adequate space for the slabs.

EXCAVATING THE GROUND

Draw the lines on the pegs to indicate depths for working (**F1**). Using levelling pegs and string, remove topsoil together with all plant matter to the calculated depth plus the thickness of the slabs to produce a roughly level surface. Work to approx 50mm outside the patio perimeter. Ensure that the top of the slabs will be a minimum of 150mm below the level of the damp-proof course. Allow for slab thickness when calculating levels. To ensure adequate crossfall for drainage, the patio must slope away from the house. A fall of 1 in 60 or 25mm in 1.5m is acceptable and won't affect the stability of garden furniture.

ENSURING GOOD DRAINAGE

Rearrange pegs to achieve an accurate slope for drainage. To ensure the crossfall, put 25mm blocks on two pegs – they should be 1.5m away from the row nearest the house (**F1**). Place a baton on top of the first peg, across to the second. Use a spirit level to make sure the baton is horizontal. If it is, the first peg will be 25mm lower than the other. Repeat for every 1.5m width to maintain the fall.

THE BASE

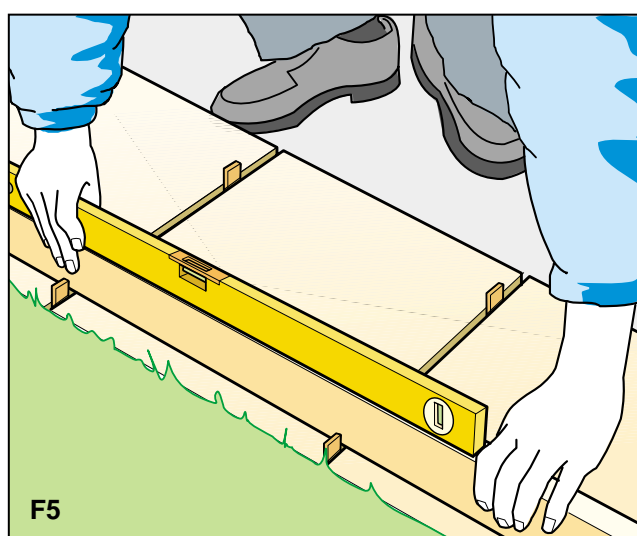
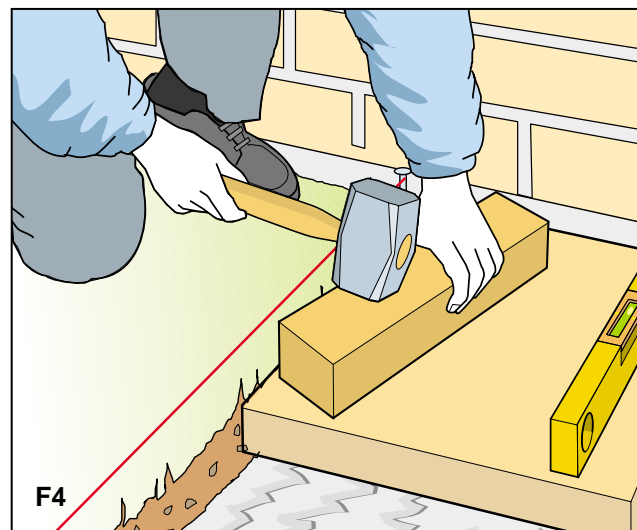
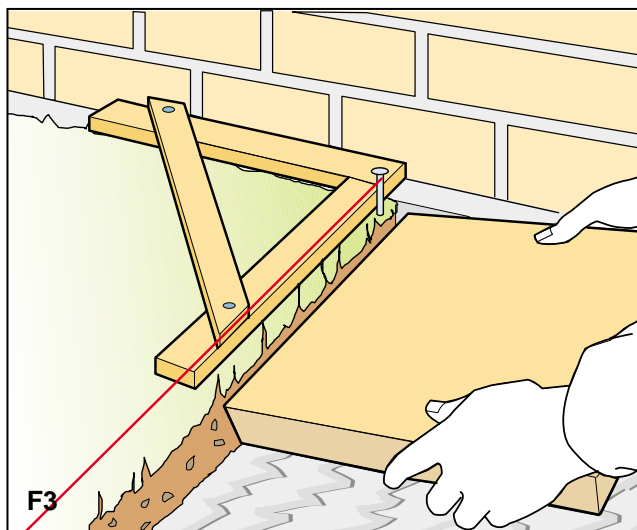
Compact the excavated ground with a rammer. If the digging is so deep that hardcore is needed, compact again. Then cover the hardcore with sharp sand and compact it with a plate vibrator or heavy roller. Never re-use soil to make up ground height.

SOLID CONCRETE BASE

Pour the concrete and compact with a short heavy plank, tamping board (**F2a**). Level off to the mark on the pegs, keeping the crossfall of 25mm in 1500mm to allow for drain-off. Remove the pegs as used. To keep off rain and prevent too-quick drying out, cover the concrete with polythene sheeting and allow it to set for a minimum of 48 hours. An easy concrete mix is 6 parts 20mm ballast to 1 part cement.

MORTAR BASE

If a concrete base is not required, mortar and slabs can be laid directly on to the compacted earth or onto compacted hardcore and sand (**F2b**).

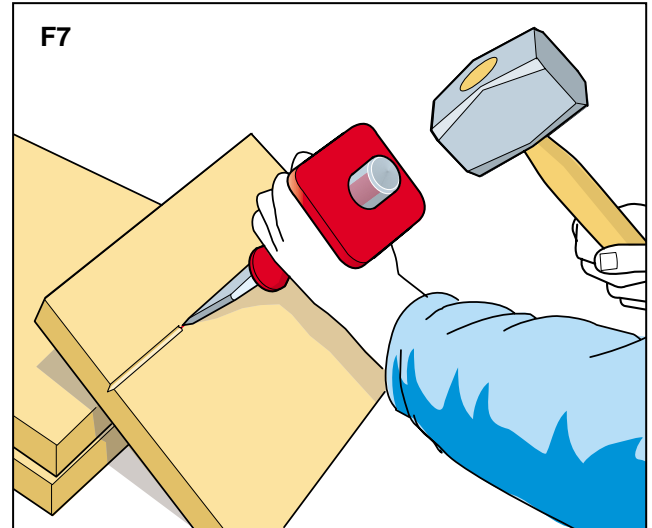
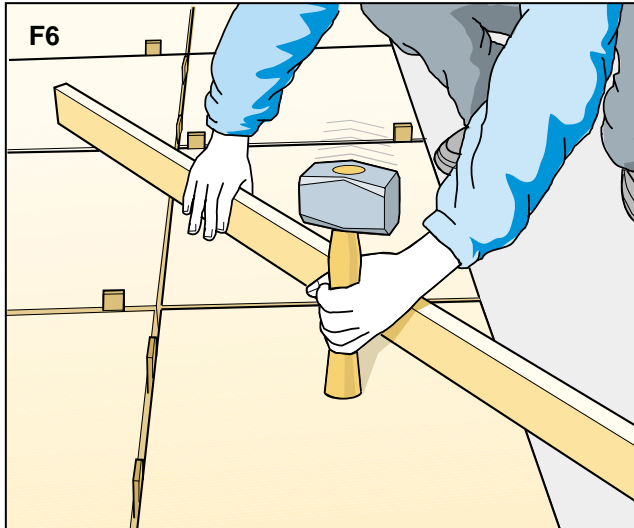


IMPORTANT

Air Bricks must never be covered.

LAYING THE SLABS

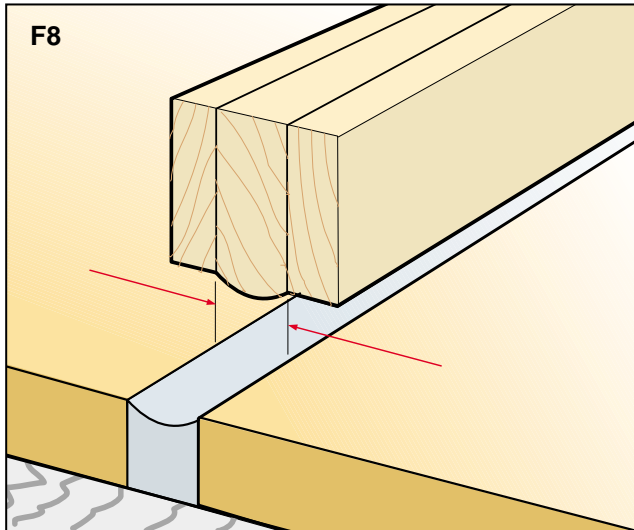
1. Before the first slab is laid, check that the string guideline is square to the house using the builder's square and re-align it if necessary (**F3**). Accuracy is vital for laying the slabs.
2. Mix the bedding mortar on a firm surface on plastic sheeting. Do this away from the site, using our suggested quantities for mortar mixes as a guide (see page 3). An approximate ratio of 4 shovels of sharp sand to 1 shovel of soft sand to 1 shovel of cement is about right. Mix it thoroughly. Water should then be added sparingly to a well in the centre and chopped and turned until mixed to a stiff consistency.
3. Test the mix by taking a handful and squeezing it. It should remain as a firm ball when the fingers are opened and should not crumble (too dry) or ooze water (too wet). To adjust the consistency, add water if it is too dry or if it is too wet add more builder's sand and cement (pre-mixed in the correct ratio).
4. Lay enough mortar bed (to the required thickness) to enable one complete line of slabs to be laid. The mortar must be compacted and levelled using a wooden or plastic screeding float trowel. The thickness should be even over the 'fall' of the ground or slab.
5. 'Butter' the back of the first slab with cement slurry (see page 3). Use an old soft dustpan brush for this. Do not allow any slurry to come into contact with the face of the slab.
6. Lay the first slab against the house at the corner of the patio, checking alignments with the string guideline (**F3**). It is very important that this first slab is positioned accurately.
7. Gently tap in the slab to the correct level, using the club hammer and a block of wood to protect the slab (**F4**).
8. Check alignment with the spirit level and remember to allow for the crossfall away from the house.



9. Lay a straight row of slabs at a right angle to the house along the string guideline. Allow a 10mm gap between each slab as a spacer. Check every slab for alignment, level and crossfall (**F5**).
10. Use a pointing trowel to underpin any gaps at the edges of the slabs and slope the mortar slightly away from the slabs. Give the slabs a final tap down with the club hammer and wood block.
11. Lay the next slabs adjacent to the house to form the width of the patio. Use spacing blocks to maintain even joints. Ensure that these slabs are level in one direction and maintain crossfall away from the house. Fill in the remaining slabs row by row across the width of the patio, maintaining the crossfall and a flat surface (**F6**).
When finished, leave undisturbed for at least two days to set.

CUTTING SLABS

1. To start cutting slabs by hand, use a straight edge and a pencil to mark the position of the cut on both sides of the slab.
2. Lay two slabs on a flat bed of sand, place the slab to be cut at an angle against them, with the cut line on the edge of the top slab (**F7**). Chisel a groove along the line using the bolster and club hammer. Always use gloves and goggles for protection from flying chips of stone.
3. Turn the slab over and repeat on reverse side. Keep tapping evenly along the line until the slab breaks. If many slabs have to be cut, hiring an electric angle-grinder with a stone-cutting disc will save time and effort. Follow the instructions carefully and always wear goggles, mask and gloves to protect eyes and hands.
4. An alternative to the electric-grinder, for a very large patio area, is the hydraulic slab cutter. This will take a lot of the hard work out of cutting and speed up the process.



IMPORTANT

Make sure that the correct safety equipment is on hand before attempting to cut slabs. Stout, hard-toed boots are a must.

POINTING

1. To provide a neat finish, fill the joints with a fairly dry mixture of mortar. Make this with 4 parts fine-washed rendering sand or silver sand to 1 part cement, plus a waterproofing agent. The mix must be barely wet to prevent shrinkage.

IMPORTANT

When using waterproofing mixes follow the manufacturer's instructions carefully.

2. Compact the mortar into the gaps with the edge of a trowel then with a homemade wooden rammer. Mortar will prevent the slabs moving and stop weeds growing.
3. Brush off the surplus mortar before it has completely dried using a semi-stiff brush. Then use a damp sponge and clean water to remove all traces of cement from the face of the slabs. Neaten as necessary. Do not allow mortar to dry out too quickly in hot weather and protect it from rain or frost using polythene sheeting. Leave for 24 hours or longer before using the patio.