

Viblock

# Paving Selection and Installation Guide.

Selecting your pavers

Preparation

Wet Cast Paving Installation

Dry Cast Paving Installation

Sealing, Maintenance and Notes

[viblock.co.nz](http://viblock.co.nz)



# Selecting Your Paving.

We think Concrete Paving is a great way to enhance your outdoor area!

There are many different colours, textures, formats and sizes that can fit your architectural style, and unique needs.

Follow our paving guide to select the right paving, install it correctly and care for it. Add real value to your property,

## Did you know...

There are two different options of Concrete Paving to choose from?

Each type has different benefits, and installation requirements!

## Dry Cast Paving

### Stocked Paving sizes

230 x 190 x 45mm	22.8/m <sup>2</sup>
300 x 300 x 50mm	11.11/m <sup>2</sup>
400 x 400 x 60mm	6.25/m <sup>2</sup>

Other sizes and formats available on special request. Refer to our separate stock sheet list.

### Features and Benefits:

- This paving can be laid on sand, making it easy to install.
- Pavers can be 'buted' together, allowing for dry jointing sand to swept in between pavers.
- This type of paving is generally very uniform in colour.

### Great for:

- Patios, and walkways.
- Quick, easy installation.
- Thicker units can be used for driveways (Available on special order).

### Installation Method:

Flexible Method (Page 5)

## Wet Cast Paving

### Stocked Paving sizes

400 x 400 x 40mm	6.25/m <sup>2</sup>
500 x 500 x 40mm	4.00/m <sup>2</sup>
600 x 600 x 40mm	2.80/m <sup>2</sup>

Other sizes and formats available on special request. Refer to our separate stock sheet list.

### Features and Benefits:

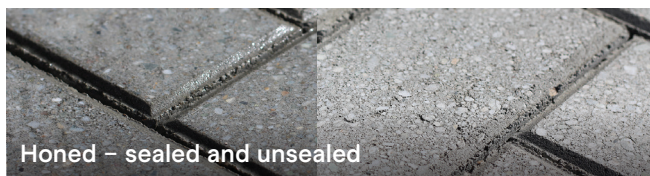
- This paving can be installed on mortar, creating a long lasting impact.
- Pavers can be solid-grouted, achieving a 'high end' paving aesthetic.
- This type of paving has subtle colour variations, showcasing its handmade nature.

### Great for:

- Pool areas, outdoor dining.
- Making an impact.
- Long lasting, durable and hard wearing surface and installation.

### Installation Method:

Rigid Method (Page 3)



# Preparation. What do you need?

## Tools

- Tape Measure
- String Line
- Spade
- Spirit Level
- Yard Broom
- Barrow
- Float
- Rubber Mallet
- Screeding Rail (30mm diameter, x 2-3m long)
- Hired Plate Compactor
- Screeding Board (100 x 25 x 1800mm)
- Block Splitter/Cutter

## Terminology

<b>Subgrade:</b>	The natural soil that is exposed at the excavated level.
<b>Basecourse:</b>	The layer of compacted granular material placed on top of the natural soil. Typically AP20.
<b>Bedding Sand:</b>	The sand layer (nominally 30mm thick) that the pavers are bedded on. (Dry Cast)
<b>Jointing Sand:</b>	The sand that is placed in the vertical joints between the pavers. (Dry Cast)
<b>Mortar bed:</b>	A semi-wet bed of sand and cement mortar on which the pavers are laid. (WetCast)
<b>NZ Standard:</b>	Reference NZS 3116:2002 Concrete segmental paving.

## Calculations and notes

### Square Metre and Cubic Metre

$m^2 = \text{Length (m)} \times \text{Width (m)}$

$m^3 = m^2 \times \text{Depth (m)}$

### Excavation

Excavation Quantity ( $m^3$ ) = Area ( $m^2$ ) x Depth (m) x 1.5 (bulking factor for clay type soils).

**Tip:** add an extra 0.2m width to the proposed paving dimensions where applicable to allow for additional excavation required for edge restraints such as haunching and kerbs.

### Bedding Sand

Quantity ( $m^3$ ) = Area ( $m^2$ ) x Nominated Bedding Sand Depth (m) - typically 30mm (or 0.03m)

**Tip:** add an extra 0.1m width to the finished paving dimensions where applicable to allow for overscreeding of the bedding sand.

### Paving

Number of Paving Units Required = Area ( $m^2$ ) x Number of units per square metre (see page 1).

**Tip:** Add 3% extra to the number of paving units required to allow for wastage and cutting.

### Edge Restraints (Dry Cast, Flexible Method)

Determined by the specific requirements of your project. Can be a timber edge, existing edge, or allow for concrete to haunch Dry Cast pavers.

**Tip:** 1 barrow of concrete haunching will cover approx. 5 metres of edging.

### Basecourse (AP20, AP40, GAP20)

Quantity ( $m^3$ ) = Area ( $m^2$ ) x Nominated Basecourse Depth (m) x 1.25 (compaction factor).

The quantity above is the "loose measure", or the quantity required to be delivered in a loose state. This material will reduce down when compacted by up to 25%.

### Jointing Sand (Dry Cast, Flexible Method)

Joint Filling Material (Brick Sand, or Cemix Pavetight Sand). One 40kg bag of sand will do between 12m<sup>2</sup> to 20m<sup>2</sup> of paving depending on size of paver used, joint width spacing (between 2mm to 4mm recommended) and paver thickness (45, 50 or 60mm).

### Mortar (Wet Cast, Rigid Method)

Mortar can be supplied premixed (Cemix mortar mix) or mixed on site, using 5 parts Sharp Sand and 1 part Cement, mixed with water to create a 'snowball' type consistency. Best method - add a Plasterciser.

### Solid Grout

Solid grout is a semi-dry mix of 3 parts fine sand (Brick Sand), 1 part cement, with just enough water to hold a shape when squeezed in the hand.

### Did you know...

There are installation guidelines, helpful tips, and notes to get the best out of your paving on every pallet.

# Installing Wet Cast Paving (Rigid Method)

## 1. Setting Out & Drainage

Set a string line to a height to correspond to the finished level of the pavers, making due allowance for the various depths of the concrete or aggregate base, mortar bed, and pavers.

The top surface of the paving needs to have slope or fall so that rainwater runs off and does not pond or collect on the surface. Allow for a fall of at least 10mm per metre (1 in 100) and ensure any paved area falls away from buildings.

Also, a paved area must have a sufficient number of drainage collection points such as channels, kerbs and rainwater sumps to collect rainwater and direct it to a suitable stormwater disposal system.

## 2. Excavation & Subgrade

All organic material (lawn, topsoil etc) should be removed and the soil excavated down to a depth allowing for the thickness of the aggregate base, mortar bed and pavers. At this level, otherwise known as the subgrade, the soil needs to be assessed for strength. It is important that the subgrade is of uniform strength, so if any soft, loose or fill areas exist, the fill will need to be excavated, removed and replaced with dense compacted, granular material.

Measure down from the string lines using a tape measure to check the correct level of the subgrade has been reached. The subgrade will need to be shaped and trimmed fairly accurately and it is desirable that the subgrade has fall to prevent ponding of water at that level. If the soil is wet, then a perforated drain may be needed that is directed to a suitable discharge point.

## 3. Base Preparation

The thickness of aggregate base will depend on the strength of the subgrade soil and the type of loading anticipated on the pavers. Generally 100mm thickness is sufficient for courtyard areas, paths and patios.

**Note:** The dimensions on the following page.

Paving can be installed on mortar, on a solid concrete base, if you choose. It can offer better strength, but can also be more expensive.

The aggregate base shall consist of a well-graded, granular material with hard durable particles; free from organic material. AP20 aggregate is a suitable material. Spread, shape and thoroughly compact the aggregate base to a uniform dense condition using a vibrating plate compactor and plenty of water. Water will help move the fines of in the aggregate to create a denser, more compact base.

It is VERY important to get the top surface of the aggregate base to the right height and within tight tolerances for level and falls etc. and to not rely on varying the mortar bed to compensate for levels.

Prior to commencing laying the pavers, a thin layer of granular fines (Crusher Dust, Blinding Sand) can be spread and compacted to fill in any open-textured areas and assist with final levels of the top surface of the aggregate base.

## 4. Mortar Bed

A proprietary bagged product may be used, like Cemix Masonry Mortar Mix, or mortar mixed on site comprising 1 part cement to 5 parts sand (typically, Plaster Sand, or Sharp Sand).

Various proprietary additives are available to enhance the workability and properties of mortar materials, such as Cemix Cemplus.

Add water until you have the consistency that allows you to make a 'snowball' of mortar. Wet enough to form a shape, dry enough that it holds its shape.

The mortar will flatten down as the pavers are bedded into the mortar using a rubber mallet.

## 5. Laying the pavers

Once you have selected a laying pattern, start placing the pavers from a corner or along a straight edge such as the face of a building or foundation. The coverage of mortar should allow for maximum support beneath each paver, with a little bit of free space, so the paver can be tapped down using a rubber mallet. Try a full coverage under the paver, and using the tip of the trowel, scrap out an 'x' in the bed to allow for a little movement as the paver is bedded in.

Spot mortar is not recommended. It is best that mortar be placed individually for each paver rather than screeded in sections. Mortar should be trowelled all around the edges of the paver after it is laid, so any gaps between the mortar and paver are filled.

Remove excess mortar from the sides of the bed, so the next paver bed has room to move when the new paver is tapped down. Work on top of the aggregate base and check for line and level at regular intervals visually and/or using a string line.

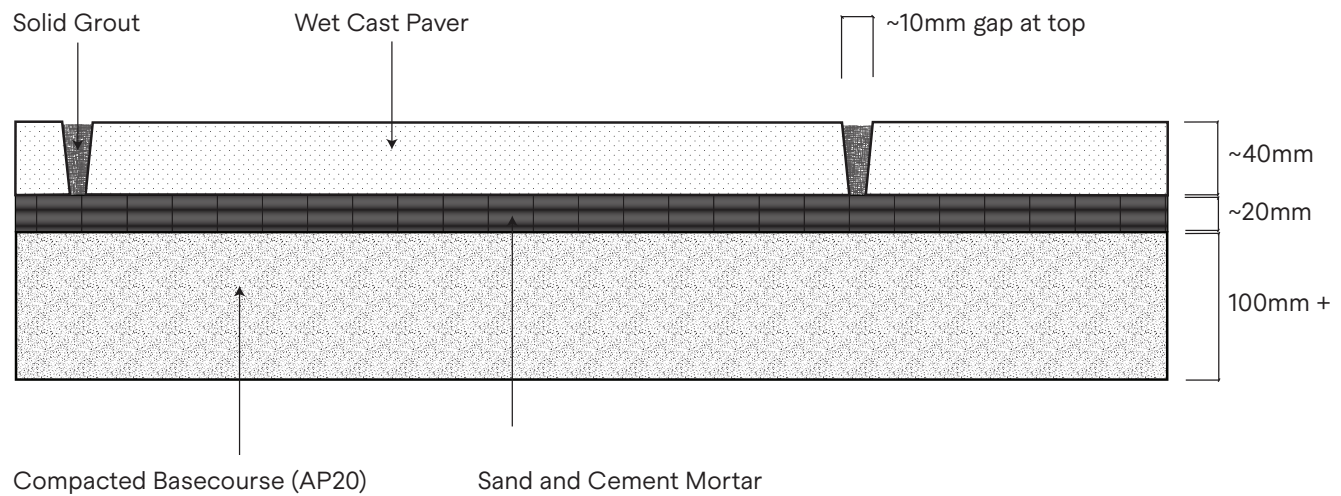
**Tip:** Keeping the string line sitting a few mm above the paver height will allow it to maintain a straight, unwavering line.

## 6. Cutting the Pavers

Cutting pavers for infills is best left to last and done with a diamond/carborundum concrete table saw. Make sure protective glasses, earmuffs and gloves are worn. To avoid staining; it is important that pavers are washed with clean water immediately after the cut has been made.

It is very important to cut concrete wet, which inhibits dust particulates in the air.

**Fig. 1 Wet Cast Paving Installation Profile**



**Did you know...**

It is possible to install Wet-Cast pavers on sand (The Flexible Method)?

Just bear in mind that Wet Cast pavers are handmade, and some variation in thickness may occur.

It may take a little more time to get the levels just right on sand.

When they are installed on mortar, the mortar bed compensates for any thickness variation.

## 7. Grouting of Joints

After laying the pavers, the joints are filled using a sand-cement grout. Pigments or oxides can be added to the grout to compliment the colour of the pavers. Grouting can occur when the mortar bed has set adequately and the newly laid pavers can be walked on without dislodging them.

The most common method of grouting is the Semi-Dry Mix grouting method whereby a mix of 3 parts sand (Fine Sand, Brick Sand) to 1 part cement is placed in the joints, then pointed (pressed in) to fully fill and compact the grout and finished as required. The ideal consistency is just wet enough to hold its shape, but dry enough that it leaves minimal wetness on your hands.

A pointing tool can be used to achieve a nice shape and smooth texture to the grout.

Any spillage of the grout on the pavers needs to be cleaned off immediately with a wet sponge to avoid staining.

Under some weather conditions e.g. (hot and windy, high evaporation) the grouted joints must be protected from drying too rapidly e.g. (by lightly spray-wetting and/or wet covering) in order to minimize the potential for grout cracking. If the pavers are too dry and have not been moistened after grouting, moisture may be drawn out of the grout into the pavers, leading to cracking of the grout.

# Installing Dry Cast Paving (Flexible Method)

## 1. Setting Out & Drainage

Set a string line to a height to correspond to the finished level of the pavers, making due allowance for the various depths of the basecourse, bedding sand and paver thickness.

The top surface of the paving needs to have slope or fall so that rainwater runs off and does not pond on the surface. Allow for a fall of at least 25mm per 1.0 metre and ensure any paved area falls away from buildings. Also, a paved area must have a sufficient number of drainage collection points i.e. (channels, kerbs and cesspit sumps) to collect the rainwater and discharge it to a suitable stormwater disposal system.

## 2. Excavation & Subgrade

All organic material (lawn, topsoil etc) should be removed and the soil excavated down to a depth allowing for the thickness of basecourse, bedding layer and pavers. At this level, otherwise known as the subgrade, the soil needs to be assessed for strength. It is important that the subgrade is of uniform strength, so any soft, loose material or existing fill areas will need to be undercut, removed and replaced with dense compacted basecourse material.

Measure down from the string lines using a tape measure to check the correct level of the subgrade has been reached. The subgrade will need to be shaped and trimmed fairly accurately and it is desirable that the subgrade slopes to prevent ponding of water at that level. If the soil is wet, then a drain may be needed that is piped to a suitable discharge point.

## 3. Basecourse

The thickness of basecourse that is required will depend on both the strength of the subgrade soil and the type of loading anticipated on the pavers. Generally 150mm+ thick for residential driveways, and 100mm+ thick for patios and pathways.

**Note:** These thicknesses refer to the final compacted depth of basecourse, and are a guide only. For more comprehensive recommendations, refer NZS 3116:2002 Table 2.

The aggregate base shall consist of a well-graded, granular material with hard durable particles; free from organic material. AP20 aggregate is a suitable material. Spread, shape and thoroughly compact the aggregate base to a uniform dense condition using a vibrating plate compactor and plenty of water. Water will help move the fines of in the aggregate to create a denser, more compact base.

It is VERY important to get the top surface of the aggregate base to the right height and within tight tolerances for level and falls etc. and to not rely on varying the mortar bed to compensate for levels.

Prior to commencing laying the pavers, a thin layer of granular fines (Crusher Dust, Blinding Sand) can be spread and compacted to fill in any open-textured areas and assist with final levels of the top surface of the aggregate base.

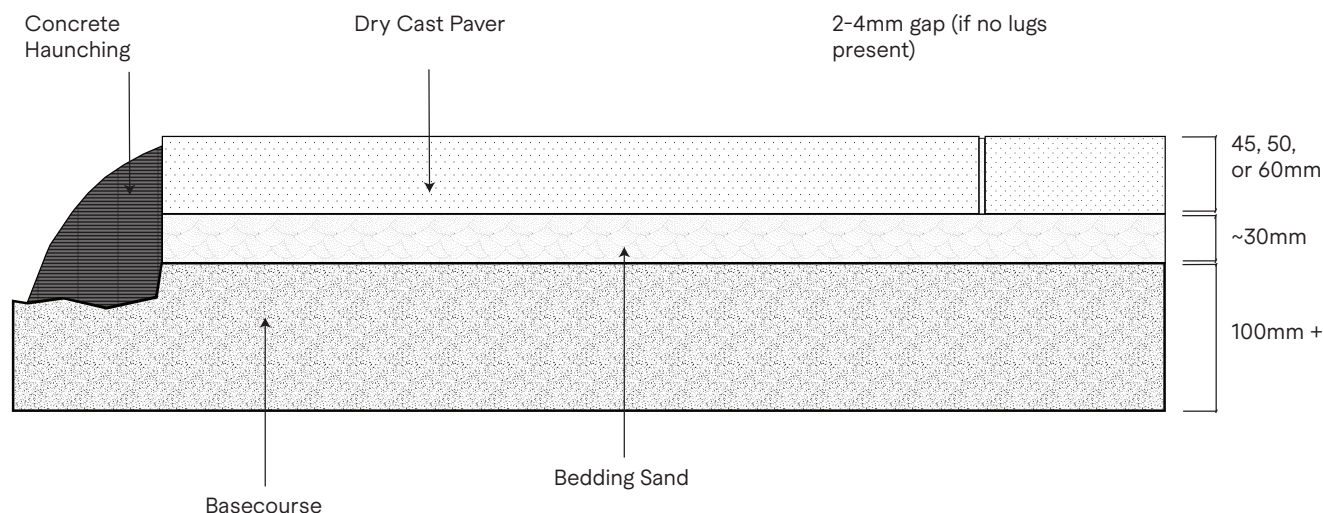
## 4. Bedding Sand

The bedding sand shall be a well-graded, granular material with hard durable particles, free from organic material.

Lay screed rails on the compacted basecourse approximately 1.0m apart. Loosely spread the bedding sand over the area and screed off across the screed rails. It is important to lay bedding sand with uniform thickness/density/looseness and consistent moisture content. Remove the rails, fill in and trowel smooth the gaps left behind.



Fig. 2 Dry Cast Paving Installation Profile



## 5. Laying Pavers

Once you have selected a laying pattern, start placing the pavers from a corner or along a straight edge or at the bottom of a slope and lay upslope. Using the lugs, or spacers moulded into the sides of the paver, butt the pavers together loosely in the pattern you want to create.

**Note:** If the paver do not have lugs (typically, 230×190mm cobblestones) then it is best to maintain a small 2-4mm gap between the pavers, to avoid surface and edge spalling.

By working on top of the already laid pavers you can avoid walking on the screeded bedding sand. Check for line and level at regular intervals visually or using a string line.

Cutting pavers for the infills is best left to last and can be done with a bolster & hammer, block splitter or diamond/carborundum saw. Make sure protective glasses, earmuffs and gloves are worn.

It is very important to cut concrete wet, which inhibits dust particulates in the air.

## 6. Edge Restraints

Edge restraints must be provided at the perimeter of the paved area to confine the paving and prevent outward migration of pavers. Interlocking border block, kerbs, kerb and channel, simple treated timber peg and rail, paver on edge (cobblestones) and concrete haunching are some of the common means of providing edge restraints.

Edge restraints should extend at least 50mm below the bedding sand and with the exception of haunching, should be constructed prior to laying the pavers.

If haunching is required, use a spade to remove the excess bedding sand to protrudes from the side of the header course (the last row of paving) and dig into the base course 50mm below.

## 7. Joint Sand & Compaction of Pavers

Sweep DRY jointing sand into all joints between pavers. The pavers themselves must be absolutely dry otherwise the sand will not fully make its way to the bottom of the joint.

Joint sand or stabilised jointing sand products are suitable joint filling materials.

**Note:** For stabilised jointing sand products it is important to carefully follow the manufacturers clean-up instructions otherwise discolouration marks may result on the surface of the pavers.

Once the joints are full, and the haunching has set, cured and gained sufficient strength, compact the pavers using a suitable vibrating plate compactor, with a 'carpet' or foam layer. A vibrating plate compactor must NOT be used on larger flagstones (400×400 and 450×450) instead use a rubber mallet on these flagstones.

During compaction, keep topping up the joints with sand as it settles until all joints are completely full. This procedure initially "locks up" the pavers. Sweep off any excess sand. At a later stage, once the pavers have had traffic on them, it may be necessary to return to the job to top up and completely fill the joints with sand.

# Sealing, Maintenance and Notes

## Sealing and Maintenance

The purpose of sealing pavers is to allow for easier maintenance, protect the surface from staining, and to maintain the pavers colour and appearance.

Not every paver needs to be sealed, but it may be worth sealing the concrete if; the pavers are used in a BBQ setting or area that is regularly used for entertaining, where the pavers may sit under trees/shrubs that can drop flowerheads, oils and tannins, or in an area that is dark and promotes moss and mould growth.

Before sealing, the pavers need to be cleaned with a mild acid wash (Spirit of Salts), 20 parts water to 1 part acid, and then rinsed off. Following the acid wash, the pavers need to be completely clean and dry before applying sealer. You can get specialist advice from chemical and sealer suppliers on the correct product to use.

There are many types of sealants out there, so please check the compatibility is correct before applying.

We recommend using a Penetrating (Dry Look) Sealer on both Wet Cast and Dry Cast Paving.

We recommend using a Solvent (Wet Look) Sealer on Wet Cast Paving only.

Routine cleaning and maintenance of pavers is recommended. Periodic cleaning and removal of organic materials such as moss, mould & algae etc using proprietary chlorine bleach based cleaning products and physical brushing with detergent flushed off with water is suggested to maintain the appearance of the product.

Please note that heavy use of a water blaster may alter the concrete surface.

## Notes

### Level

Keep the finished level of the paving a minimum of 100mm below the internal floor height of your home.

### Paver Thickness

Dry Cast pavers are machine pressed products, making them very uniform in thickness. Wet Cast pavers are handmade and some thickness variations may occur. This variation is absorbed by the mortar bed, allowing for a flush and level paving surface. Wet Cast pavers can be laid on sand - although it may take a little more preparation to get the surface just right.

### Haunching

Concrete haunching requires a setting (curing) period of 2-3 days before any traffic should be allowed on the paving. Avoid driving vehicles over the edge of the paving.

### Colour

It is best to use darker colours in driveways as tyre marks and oil stains will not be as visible. Sealing of your paving helps to prevent the absorption of oils and aids cleaning when necessary.

Wet Cast Paving is essentially handmade, colour variations do occur between batches, and sometimes in individual paving in the same batch. Please note this is completely normal and expected.

When laying from more than one pallet make sure to "mix & match" from different alternating pallets, to avoid subtle colour variations.

### Efflorescence

Efflorescence is a natural and unpredictable phenomenon that occurs with concrete and masonry products as a result of excess lime leaching from the cement and depositing on the surface of the product. It can appear as whitening and is more visible on coloured pavers. There are some things you can do to minimise efflorescence such as keep paving covered and the surface dry before and during laying, and provide good drainage to the subgrade and basecourse.

We take precautions to minimise the event of efflorescence occurring, please note that this is not a structural or manufacturing fault in the paving, & the likelihood of efflorescence occurring is subject to environmental conditions.

### Use an Experienced Contractor

Factory controls maintain consistency in the manufacturing process. Most variations in the appearance of concrete paving is caused by variables in the environment during, and immediately post installation. To get the best out of your product - we recommend the services of a highly experienced paving contractor or landscaper.

**Viblock**

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