



Better Exteriors.

LIMESTONE PAVING INSTALLATION GUIDE

INSTALLATION TIPS

Successful installation can be divided into two parts. Firstly, having the correct installation system, and secondly, having the correct execution of that system. Both parts are critical for the successful completion of any project.

These 'tips' seek to raise the sorts of questions that should be considered when planning a project. Ultimately, the 'project manager' should make the final decision on what is the most appropriate system for their specific site (in conjunction with the relevant Australian Standards and correct trade practices).

Installation will vary from site to site with varying conditions experienced on that site (i.e.: soil conditions, pool surrounds, driveways, wet areas etc.). A site sample of the proposed method of installation should be completed to ensure that this method is appropriate for the site conditions.

These 'tips' are general in nature and given in good faith and to the best of our knowledge and experience at the time of printing. In no way do these 'tips' replace the services of professional contractors and/or consultants.

Material Considerations

Natural stone wears the markings of thousands of years of formation, through extreme weather and climate conditions with sands, oxides and minerals from the earth and the sea. Materials vary in appearance from original sample and from piece to piece upon installation. As with any natural material, no two pieces of natural stone will be exactly alike. Colour & texture, as well as percentage, size, and shape of markings, will vary. Variation is not a material flaw. It's not that we accept imperfections, the imperfection is the point.

Our goal is to minimize surprises and help set realistic expectations with specifiers, contractors, and end users. Prior to ordering, ensure that consideration has been made to understand what variation you might expect when this material is delivered and installed.

Ideally store crates indoors away from direct sunlight and rain and on a level surface. Do not stack crates on top of one another. When laying, the material will need to be dry and free from dust and other contaminants.

It is highly recommended to blend tiles from all pallets delivered whilst laying.

Acceptable Characteristics

Stone tiles are made from naturally occurring materials and a variation in colour and/or surface finish will occur. It is the responsibility of the user to inspect tiles prior to laying. Minor marks and small chipping are not structural and therefore not considered defects. Any tile with excessive chipping or variation in thickness and dimension prior to laying, may be subject to a warranty claim.

Some Typical Installation Methods are:

Suspended Floors

We do not have a recommended installation method for suspended floors. Consulting with relevant engineers, architects, and building consultants is recommended to ensure a suitable system.

Foundations/Substrates

For an area to be successfully tiled, the substrate or foundation preparation is very important and is the first element to influence the end quality of the flooring. This is because the sub-base or 'laying support' carries out several functions in protecting the surface layer of the Stone. For these stones we recommend the following:

Depending on the age or construction of the slab, it may be necessary to prime prior to membrane.

Pedestrian traffic only: reinforced concrete 75mm thick

Vehicle Traffic: Reinforced (F72 mesh) concrete base 100mm thick min. 25MPA

** Engineer's advice should be sought in the design of all concrete. Contractors should also consider drainage and/or waterproofing/moisture barriers to minimise the risk of rising humidity, which can bring salts contained in the soil or in the bedding layers to the surface of the substrate.

Control / Movement Joints

Control joints are recommended for the substrate (concrete sub-base). The joints in the concrete base should be continued through the mortar bed and grout joint. Control joints help absorb variations in the flooring caused by temperature swings and other movement in the sub grade, concrete base, mortar, or the actual tile itself. In addition to structural concrete joints, tiled surfaces should also include appropriate control joints every 20m² (or where movement is expected) that penetrate through tile and the bedding mix, but not through the concrete substrate. Generally, the overall floor field is divided into compartments where technical expansion joints are set out in a crosswise and/or longitudinal direction (minimum 5mm joints every 4 ½ meters). Ensure movement joints are detailed as per manufacturer's recommendations.

Use of control joints are critical in reducing cracking and will greatly reduce the chance of unsightly surface cracks appearing.

Moisture Management

Limestone is a sedimentary material that can be susceptible to moisture and issues related to moisture. It is therefore essential to have an effective 'moisture management' plan incorporated into your 'installation system'. This should include (not exclusively) membranes, adhesives, falls, drainage, pre-sealing, consolidating and sealing as well as ongoing maintenance.

As a sedimentary material, limestones are composed mainly of calcium carbonate. Depending on the limestone, it can also contain iron carbonate, quartz, feldspar, clay, and pyrite, among others. Iron particles can bloom and discolour through reaction with oxygen and moisture. Correct pre-treatment and maintenance of the stone will minimise this occurrence.

Membranes & Crack Suppression

Drainage design and membranes are a critical element to a successful 'installation system'. This is to assist in dealing moisture related issues as well as helping to reduce minor cracking by neutralising inplane movement in the substrate. Examples are Mapelastic Smart & Mapeguard II (Mapei helpline 1800 652 666) or Hydro Ban (Laticrete helpline 1800 331 012). For site specific advice we recommend contacting the manufacturer directly.

Falls/Slope

When dealing with outdoor stone flooring, special attention must be paid during planning to respond adequately to rainwater run-off. This is done by dividing the floor field into different drainage surfaces if necessary and giving them effective slope and perfect levelness. This will avoid trapping water and moisture on the floor surface since they cause undesirable and unsightly effects due to rings, saltpetre efflorescence, spalling, reverse water staining, and dirt build up. The following slopes are recommended in both the substrate and finish tiled surface:

Minimum flooring gradient > 1%

Sealing

Sealing is *essential* in protecting the longevity of any stone. Warning: failure to effectively seal and maintain your stone can lead to a variety of issues including degradation, spalling and discolouration.

Successful sealing can be broken into two parts. Firstly, having the correct combination of sealing products and secondly, having the correct application of the sealing products. The majority of projects will require a combination of sealers (such as pre-sealers, consolidating sealers and penetrative sealers), and these will need to work in conjunction to create an effective sealing system.

As most successful sealing systems will incorporate a pre-sealing treatment (consolidating sealers &/or pre-sealers on all six sides) it is critical to plan your sealing prior to the first tile being laid. In environments that are exposed to increased moisture, such as pool surrounds, bathrooms, kitchens and wet areas, it is critical to use pre-sealers and/or consolidating sealers as well as penetrative sealers.

For project specific direction on the appropriate sealing system, please contact us directly and always use cleaning & sealing applicators that are accredited by the sealing manufacturer.

Examples of reputable sealing manufacturers are Chemforce & Drytreat

Weather Consideration

Avoid laying stone in extreme weather conditions, or if rain is expected. Laying stone on very hot days (above 30C degrees) can cause delamination issues between stone and adhesive bedding layer.

Selection of adhesive for bedding tiles

We do not recommend wet mortar bedding to lay limestone.

1. In general terms we recommend using *Fast-setting Cement based adhesives* however there are instances where an Epoxy adhesive or a Polyurethane adhesive may be needed.

For project specific direction on the appropriate adhesive, you should contact the adhesive manufacturers directly. There are many reputable companies with a wide range of products available. Examples are

1. Mapei <https://www.mapei.com/>
2. Laticrete <https://au.laticrete.com/>
3. Kerakoll <https://www.kerakoll.com.au/>

Anti-Slip Treatment

You should consider anti-slip treatments depending on where your tiles are being installed and other site considerations.

Laying

General tips in working with adhesives are as follows:

1. Prepare a sub floor (screed) that is perfectly flat to make it easy to keep the stone elements level with each other, since only a thin (3-10mm) layer of adhesive is used (therefore offering very little laying tolerances).
2. Clean the laying surface (remove debris, dust oil etc), once the screed is completely dry.
3. Prepare a uniform layer of adhesive using a suitable sized notch trowel, and back butter the base of the tile as well.
4. Lay stone elements so the timing corresponds to the drying time required for the adhesive used, without letting the glue create a skin due to prolonged exposure to air. The stone pieces are then compacted evenly on the adhesive with a rubber mallet to ensure consistent contact with the glue. Consistent open joints should be allowed for at 4-6mm spacing

For site specific requirements we suggest you contact Mapei, Laticrete or Kerakoll. For all laying techniques, we recommend that after an area is laid it should not be loaded for a period of time to enable the bedding layer to strengthen. Pedestrian traffic: 2 days Vehicle Traffic: 2-3 weeks.

Cutting

Ideally it is recommended that cutting be done using a bench saw with a wet diamond blade. The stone should be washed immediately after it is cut to avoid cutting paste drying and staining the surface of the product.

Crystalline silica (or silica dust) is a common mineral found in soil, sand and stone. It is also used in the construction of materials such as bricks, tiles, concrete and artificial stone. Silica exposure can cause a range of health issues, so protective equipment should be worn whilst using power tools to cut, grind and drill such products. Appropriate safety guidelines relating to silica exposure should be adhered to on the worksite.

Grouting Compound

Grout composed of sand and cement can contain elements that will react adversely with natural stone tiles. It is therefore recommended to use a high-grade proprietary grouting compound that is suitable for the application.

Grouting Methods

1. Dampen grout joints and stone with a sponge
2. Place grout into joints, ensuring no voids, to the full depth of the paving stones
3. Remove any excess grout with a trowel
4. Sponge clean the paving surface with water, ensuring all excess grout has been removed.

Cleaning

It is important that no acidic cleaners are used.

Stone should be cleaned when grouting material has set. Always use accredited Cleaning & Sealing professionals.

Post Installation Cleaning, Maintenance and Care

All natural stone will require maintenance. Environmental factors will affect your stone's appearance and sealers will become less effective over time. These effects can be minimized through ongoing cleaning, sealing & maintenance practices. For best results, always use accredited cleaning and sealing professionals.