



General Information

On delivery, the product should be inspected. If there are **any** issues, please report them immediately and do not commence installation.

Before installation commences a certain amount of sorting of the product may be required to ensure consistency of colour, texture and dimensional tolerance.

We recommend that, when purchasing materials, especially in the case of larger quantities, they all come from the same batch and that the products are thoroughly mixed on site by drawing from a minimum of three packs.



Health and Safety Information

Safe working practices should be employed at all times during the construction process and all necessary Personal Protective Equipment (PPE) should be worn.

Handling

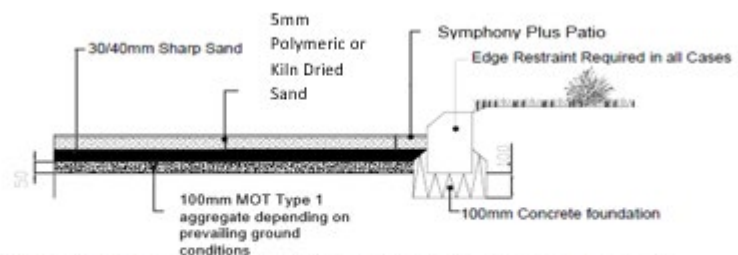
Pallets should be stored on stable and level ground, with the units being checked for stability before the securing straps are cut. Care should be taken when stacking these units to prevent damage to the porcelain element of the unit.

Due to the size and weight of these units, carry out a risk assessment. Mechanical lifting and handling is strongly advised. Probst Handling Equipment will advise on the correct methods and can be contacted on 01952 292733.



Pavement Design

For most domestic applications, a sub-base of minimum 100mm should prove to be sufficient. However, the paving design must be based upon the prevalent ground conditions i.e. existing ground permeability and type and frequency of anticipated loads.

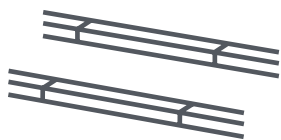


15 Typical section through a patio constructed in accordance with Marshall's Register Installation Procedures
D02 Scale 1:20 @ A3



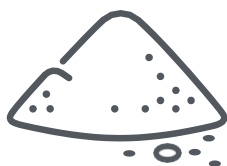
Excavation

To allow the paving to be installed correctly, a certain amount of excavation is usually required. The depth of this excavation will be the thickness of the required sub-base plus the laying course sand and the blocks. An extremely important factor to consider when working out the depth of excavation is that the finished surface level of the blocks must be a minimum of 150mm below the DPC (damp proof course) to prevent problems with rising damp.



Edge Restraints

Edge restraints should be sufficiently robust to resist the lateral displacement from imposed loadings placed upon the paving surface and are installed prior to the installation of the sub-base. The restraint must provide a consistent vertical face to a level below the laying course material.

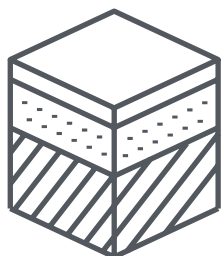


Sub-base - Material Selection

If you are unsure or have any doubts about the existing quality of the sub-base, we recommend the use of a Geo-Textile membrane.

Granular sub-base material should be well graded (40mm to dust) Type 1 quality stone material. Inferior quality material may be liable to failure under loading and be susceptible to frost or moisture movement.

Recycled materials such as crushed masonry or concrete can be considered, provided it is well graded and compacts to give a close textured finish. Materials containing organic matter should not be used.



Sub-base - Construction

Sub-base material should be placed in layers not exceeding twice the nominal maximum aggregate size. Each layer should be fully compacted before the next layer is placed. Sub-base tolerance to be +5 -10mm from specified levels. The surface should be clean and suitably close textured to prevent migration of finer material through the construction.

A minimum longitudinal fall of 1.25% (1 in 80) and cross fall of 2.5% (1 in 40) should be incorporated in the sub-layer construction to provide adequate surface water runoff from the wearing course.



Laying Course Materials Selection

Laying course material should consist of well-graded 'grit' sand (not building sand). The material should have uniform moisture content, being moist without being saturated. Under no account must any cementitious material be present in the laying course material.

Laying Course - Construction

Final compacted target thickness for the laying course should be 30mm and no more than 40mm. A consistent thickness of bedding material should be maintained with gradients and falls being formed in the sub-base construction, not the laying course material. Under no circumstances should the bedding sand be used as a levelling course. Tolerances for laying course material are +10 -5mm.

The laying course material is completely compacted prior to installing the paving units and the surface levelled by screeding. A small trial area of laying course material can be compacted prior to the commencement of installation, to establish its compaction properties. As a guide, the material when squeezed in the hand should show no free water and bind together when the pressure is released.

Only sufficient laying course material should be placed within the current working period. Any disturbance of the screeded laying course material should result in rescreeding, with screeding rails being removed on completion, taking care to make good any voids.

On completion of the day's work, no more than 1m of laying course material should be exposed, without cover by the paving units.

All areas of exposed laying course material should be covered overnight, and during inclement weather to prevent saturation or frost action.

Wearing Course - Laying

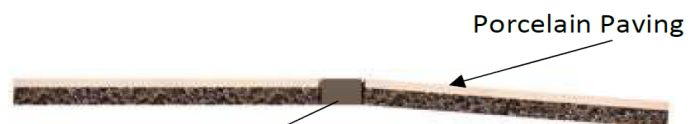
Paving units should be laid on the laying course material so that the final level is within the permitted surface tolerances. String lines should be utilised as often as required, this is necessary to ensure the bond pattern is maintained and straight lines are achieved in the finished paving. The manufacturing tolerances of the paving units, profile of the site and frequency of string lines used should be taken into consideration during installation. These factors may have a bearing on the straightness of line achievable.

Paving units should be laid with a joint width of 5mm using packers and incorporated nibs where required. Joint widths may be varied slightly in order to achieve straight lines or maintain bond but should never exceed this size range.

Lay whole paving units first, followed by cut units around obstacles or at edges. No units should be cut down to less than one quarter of its original size to prevent looseness or dislodgement at a later date.

Where slopes, gradients or ramps are being constructed, placement of the units should commence at the lowest point i.e. the bottom of the slope, working upwards. Where there is a risk of lateral movement of the paving units due to the gradient encountered, the provision of additional intermediate restraint should be considered.

The diagrams below shows how a dividing break, using block paving, setts or slot drains, can be used to adapt to gradients or ramps.

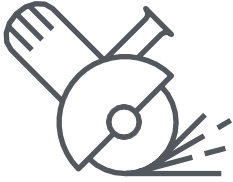


Dividing break using blocks, setts or drainage channels

Wearing Course - Compaction

Initially use a rubber maul to gain level to the adjoining units and if required make the necessary adjustments.

Prior to final compaction of the paving ensure that the surface is free of debris. A rubber or neoprene sole plate must be used with the vibrating plate to avoid impact damage to the surface of the units, with care being undertaken not to scratch the surface of the paving.



Cutting

Cutting should be carried out using water fed (blade cooling) dust suppression equipment and appropriate diamond blade with either a petrol power saw or bench power saw, this is to control the dust and cool the blade.

It must, however, be noted that the final aesthetic finish achieved will depend greatly upon the choice of cutting mechanism and level of skill applied by the operator. Equipment and blades specifically for the cutting of porcelain paving should be used. Never cut porcelain paving with a fibre blade.

Please note that high quality diamond blades (sometimes called Ceramic blades) should be utilised at all times. If a blunt or worn diamond blade is used, shelling or oystering of the unit will occur. For installers unfamiliar with the practice of cutting porcelain paving, it is recommended to practice their cutting technique before the final installation.

Cut flags should be inserted prior to completion of the working period or before the onset of inclement weather.

Units should be cut such that the resultant joint width remains within the 5mm tolerance and no less than $\frac{1}{4}$ of the paving unit in size. After cutting, use a 5mm packer to create the perfect joint width.



Jointing

All the joints should be fully filled with polymeric or kiln dried sand with the surface being completely cleaned to remove any remaining jointing compound.

All joints should remain full of jointing material at all times, with periodic checking and re-applying being carried out where necessary. Particular attention should be taken in the first 3 months and should be part of a regular maintenance program.



Inclement Weather

Installation should be discontinued (and any open work face covered) if weather conditions are such that the performance of the paving may be jeopardised. In adverse weather conditions, units should not be laid on saturated laying course material. The filling of joints is not possible in damp conditions and should be topped up at the earliest opportunity. All unfinished areas and stockpiles of materials should be covered in the advent of inclement weather to prevent saturation.



For more information

Please contact Marshalls Group Technical Services on 0370 411 2233 or email grouptechnicalservices@marshalls.co.uk