

Porcelain paving requires a bound construction method, this requires the paving to be installed on a rigid mortar bed with 6mm to 10mm mortar or grout filled joints. Thought should be provided for the use of thermal expansion joints which should be installed in both directions at centres of between 2.7 to 3.0m, or against adjoining structures.

Step 1: Ground Preparation:

- Determine the finished paving level, ensuring it is 150mm below the DPC (Damp Proof Course) level.
- Excavate the ground to a depth to accommodate the chosen Sub-base method, this can either be 225mm of MOT Type 1 or 100mm of C20/25 Concrete. If using a Type 1 base then excavate 285mm from finished paving level to allow for 225mm of base, 40mm of bedding and 20mm of porcelain. If using the Concrete base then excavate 160mm from finished paving level to allow for 100mm of C20/25 concrete, 40mm of bedding and 20mm of porcelain.
- Create falls in the sub-grade level with cross falls at 1.25% (1 in 80) and longitudinal falls at 1% (1 in 100). This will allow the water to run off and avoid ponding on the finished pavement.
- Compact the formation level to ensure a stable foundation.

Step 2: Sub-base Installation:

- If installing onto weak ground, such as clay, lay a geotextile directly on the ground below the sub-base to prevent material from being forced under compaction. (Note: a geogrid can be used instead of geotextile, this can perform the same function but will also provide better stability to the sub-base material).
- If using the Type 1 Sub-base a final compacted thickness of 225mm needs to be achieved, replicating the falls which have been constructed at the sub-grade level. (Note: Install the sub-base in 100mm layers and compact each layer for final levels) (Note: Think about the amount of surcharge required to achieve a compacted thickness of 100mm. If you are not familiar with a material, trial an area to see how much surcharge is required. As a rough guide, 125mm of uncompacted Type 1 will compact down to 100mm when fully compacted.)
- If using the C20/25 Concrete base has been chosen then a final thickness of 100mm needs to be achieved, replicating the falls which have been constructed at the sub-grade level. Generally the concrete should be left to cure for 28 days to achieve a 90% cure therefore mitigating any significant shrinkage of the concrete after this time.

Step 3: Edge Restraint:

- Securely install edge restraints around the perimeter of the patio area before laying the bedding course and paving units
- The restraints should be robust enough to withstand the desired traffic for the paving and should present a vertical face level with the underside of the bedding course and require haunching in concrete to the base and rear to mitigate lateral movement.

Step 4: Bedding Course Preparation:

- Create a stiff workable mix of 1-part cement to 3 parts sharp sand or grit sand. This mix is essential for frost resistance and to support the weight of the porcelain.
- Ensure a full contact mortar bed, with no bedding on dabs.
- Place enough mortar for the paving unit, and consider distressing the surface slightly to create ridges. This is sometimes known as 'creating valleys', 'rippling', 'slicing through', etc. This technique creates slightly higher ridges in the mortar so

that when the paving unit is placed and tapped down, the ridges collapse into each other to help achieve a full mortar bed without air-pockets.

- The final thickness of the mortar should be 40mm, so adjust the surcharge accordingly. (Note: Think about the amount of surcharge required to achieve the final thickness of 40mm. If you are not familiar with a mortar, trial an area to see how much surcharge is required. As a rough guide, 45 to 50mm of mortar will reduce down to 40mm.)
- The working time for the mortar is approximately 2 hours; after that, use fresh mortar.

Step 5: Placing Porcelain Paving:

- If installing more than one pack of paving, ensure that the batch codes on each pack correspond and select paving from a minimum of 3 packs when installing.
- Clean the backs of the slabs to remove any dust from the manufacturing process that could interfere with the bond between the bonding mortar, or primer, and paving unit. (Note: this dust contains magnesium oxide which is part of the releasing agent from the manufacturing process. This chemical compound can interrupt the bond.)
- Coat the back of each porcelain unit with a cementitious bonding mortar, or slurry primer. This is to increase the adhesion of the porcelain to the mortar bed for long-term performance. (Note: this is required due to the low water absorption characteristics of the porcelain. Slabs should not be wet prior to the bonding mortar, or slurry primer, being applied as this may negatively impact the bond between primer and paving unit).
- Immediately place the porcelain paving on the mortar bed and tamp it to ensure it is level. (Note: when tamping into final position, use a rubber maul and we would suggest using a lighter coloured maul for lighter paving colours, to avoid leaving any marks on the tamped paving).
- Use spacers between adjacent paving units to maintain a consistent 5 to 6mm joint width. (Note: never butt joint, this is when the adjacent units are in contact with each other).
- Clean off any mortar or slurry stains from the face of the paving as you work, rather than waiting until the end of the day.
- Allow at least 24 hours before walking on the surface.

Step 6: Cutting Porcelain Paving:

- Use a continuous diamond cutting blade on a bench-mounted saw with sufficient water being applied for cooling and dust suppression during cutting.
- Mark out the cuts on the face of the unit and cut on the top surface, starting with low RPM and increasing to 10,000 RPM for a clean-cut face.

Step 7: Jointing:

- Carefully fill and finish the joints according to the manufacturer's recommendations.
- Avoid leaving any jointing residue on the face of the paving, as it can compromise the final appearance. If in doubt, we would suggest seeking advice on how to apply from the manufacturer and carry out a trial in a discreet area before committing to the entire installation. Don't underestimate the effort that may be required to remove any residue!
- Consideration should be given to the working method (for any preferences you may have) and working times of the different jointing materials.

- Grouting – wide range of colour options are available, ensure a suitable product is used for external applications and any other features (e.g. swimming pools, etc.)
- Cementitious Jointing – various colour options from different suppliers. These products can be either slurry applied, or gun applied.