TECHNICAL BULLETIN – TB185

Wet Mortar Bedding of Dense Pavers

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INTRODUCTION & SCOPE

While paving materials may vary in composition, the majority are very durable, generally with high density and a low rate of water absorption. These pavers include unreinforced concrete elements, clay bricks and tiles as well as natural stone pieces. All dimensions of these pavers may vary and these variations impact on the fixing method employed for the installation. The natural stone pavers may be guillotine cut so the pieces may be irregular in size and thickness, or saw cut so that the dimensions are more uniform. It is possible to have a paver that is saw cut to a constant thickness and then guillotine cut to an approximate size as required for the project. This may include random shaped pieces or pieces that are generally of similar shape and roughly of similar size.

The determinant as to which fixing method to use is principally the thickness of the pavers. Variations in thickness are most common with guillotine cut natural stone where variations may commonly be in the order of 30 to 40mm between the thinnest and the thickest piece. The wet bedding method will ensure the finished exposed surface is flat with minimal projecting pieces. The minor irregularities in the exposed stone form a more slip resistant and flatter surface than could be achieved when adhesive fixing the different thickness stone pieces.

The fixing of paving pieces, whether they are natural stone, clay tiles or concrete tiles, is generally either by using the same adhesives used to fix ceramic tiles, or by the wet mortar bedding method. Tile adhesives are designed to perform best when the adhesive layer is maintained at a relatively uniform bed thickness (typically from 3mm and up to 10mm thick). Thus, when the thickness variation between the pavers exceeds the recommended thickness of the adhesive layer, this method of fixing the pavers is not suitable. In other words, tile adhesives are best used when there is little variation in the thickness of the pavers being installed.

This leaves the wet bed (or wet fixing) method as the preferred system for the installation of pavers with considerable variation in thickness.

WHAT IS THE WET BED METHOD?

Simply, this method involves using wet mortar over a wet bonding slurry coat and each part is applied while the previously applied component is still wet and uncured. This method applies only where the pavers are to be installed over a structurally sound and prepared reinforced concrete substrate and is suitable for all trafficable areas such as roadways, shopping mall entries and the like.

Surface preparation includes ensuring the structural concrete substrate has achieved the recommended (AS3958-2007) curing & drying period (4 -6 weeks) as the installation is a fully bonded installation. The surface should be dry and free of all contaminants such as concrete curing compounds, debris from other trades, waxy or oily residues, paint over-spray and/or excessive laitance. Contaminants are best removed by mechanical methods such as diamond grinding, high pressure water blasting, shot blasting, abrasive blasting or similar treatments. Ensure all surfaces are vacuumed to remove any residual dust prior to proceeding.

INSTALLATION BY THE WET BED METHOD

Wet bedding mortars are based on sand + cement + Ardex Abacrete or Ardex WPM405 liquid polymer additives as described below:

The installation commences with the application of the bonding slurry consisting of 2 parts (by volume) of Ardex Abacrete liquid polymers mixed with 3 parts cement. Broom the slurry thoroughly into the surface of the concrete in small areas at a time.

Alternatively: Ardex WPM405 additive may be used when mixed 1 volume of Ardex WPM405 liquid with 1 volume of water and 4 volumes of cement.

To the **still wet** bonding slurry, apply the mortar consisting of 1 part cement (by weight) to 3 parts (max 4 parts) sand mixed with a solution of 1 part Ardex Abacrete in 3 parts water.

Alternatively: To the still wet bonding slurry, apply a mortar consisting of 1 part cement (by weight) to 3 parts (max. 4 parts) sand mixed with a solution of 1 volume of Ardex WPM405 liquid in 4 volumes of water

Spread the mortar over the wet bonding slurry equal to only two or three rows of paving at a time and screed to the approximate thickness required.

To the surface of the screed, or preferably to the back and sides of each paver, apply the bonding slurry. Immediately place the paver into the screeded mortar bed and push it down so that mortar rises up the sides of each piece to within approximately 10 - 15mm of the top. This effectively locks each paver in place, particularly where the sides of the paver are irregular. Each paver should also be placed with 12-15mm gap to adjacent pavers. This is normally sufficient to accommodate most irregularly sized pavers, although wide gaps may be used if necessary.

Note: a variation of this wet bedding method when fixing large uniform thickness pavers is to screed the mixed mortar to levels as required in panels/bays approx.40 sqm in size. Ardex Abaflex adhesive is mixed as per the product data sheet sand applied over the wet mortar using a notched trowel (minimum 12mm notch) immediately prior to placing the pavers into the wet adhesive.

Ensure the mortar gaps comprise a smaller surface area than the actual pavers as it is the pavers that provide the durable surface, particularly in trafficable areas such as roadways.

The bonding slurry/ adhesive coat provide additional adhesion between the pavers and the mortar because dense pavers with low water absorption do not form strong bonds with standard cement mortars. Similarly, the slurry improves the bond of the mortar to the substrate. In addition, the mortar additive improves the resistance to water migration through the mortar and hence reduces the occurrence of efflorescence as well as improving the bond strength within the mortar bed.

Once the pavers have been laid, a vibrating flat plate compactor should be used to ensure the pavers are fully bedded and the bedding mortar is fully compacted especially when the completed work will be subjected to vehicular traffic.

Let the mortar bed dry and cure for a minimum of 24 hours prior to grouting with Ardex Wide Joint cement based grout mixed with Ardex Grout Booster diluted with an equal part of water.

MOVEMENT JOINTS

Movement joints are to be formed during the installation of the paving. This is preferred as the joint must be maintained to full depth of the mortar bedding and there are many proprietary joint systems with metal sides that are suitable for this application.

Movement joints are to be placed in accordance with the recommendations of AS3958-2007. These recommendations include that the joints are to be at least 6mm wide and located over all existing joints in the substrate, at all changes in direction of the plane of the substrate, at between 4 – 6m spacing in both directions of a grid pattern, around columns and/or brackets penetrating the paving finish, and along all perimeter restraints such as walls.

Movement joints should not be cut-in after the paving installation is complete as the cutting blade width is generally less than 6mm wide and cannot complete the cut into internal corners such as at floor to wall junctions. These joints are to be filled with a suitable proprietary flexible sealant (e.g. Ardex SE or ST silicone or Ardex CA-20P) over a suitable backing rod, and not left unfilled.

The purpose of the joint is to accommodate any dimension change in the paved work such as due to drying shrinkage of the slab being more than the drying shrinkage of the mortar bedding, any temperature related expansion or contraction movement, and any moisture related expansion/contraction movement.

Access to the completed work shall be carefully controlled. Polymer fortified cement based mortars are slower to dry initially, yet are much stronger than standard sand: cement mortars.

Hence we recommend that general access to the completed work for light foot traffic is allowed after a minimum of seven (7) days drying after completion of grouting. Heavy foot traffic has access after another seven days (14 days after grouting).

Access to vehicular traffic can be allowed after twenty-eight (28) days drying.

Adequate time allowance for curing and drying of the mortar ensures maximum bonding is achieved between the substrate and the mortar as well as between the mortar and the paving pieces.

Reason for Bulletin
Update to include WPM405

Review Period
24 months from issue

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