

# Fixing Methods 1

## Specific Requirements

It is critical, when fixing quarry tiles by any method, that the following recommendations are observed:

- Ensure that reputable tile fixers are engaged for the project, preferably registered with The Tile Association.
- NTL quarry tiles should be fixed in accordance with BS 5385, which is the code of practice for installation of ceramic floor tiles
- Planning and preparation of surface to be tiled should be in accordance with NTL technical data sheets 1 and 2.
- The contents of several boxes should be thoroughly mixed before fixing to achieve the maximum benefit from the natural shade variations inherent in the product.
- The tiles should be fixed with the underside fixing ribs all facing the same direction to minimise the effect of allowable size differences which may exist and are characteristic of a natural clay product.

If contact with, or containment of, aggressive chemicals is envisaged, then a suitably resistant fixing method and chemically resistant grout will be required.

## Fixing using cement-based adhesives:

There are alternative methods of fixing such as traditional sand/cement mortar and semi-dry bed methods but these are generally inferior to modern day techniques and should only be undertaken by experienced fixers.

The most popular and generally recommended method of fixing floor tiles is by use of a good quality cement-based adhesive such as Ardex products.

These can be used to produce a finished bed thickness from 3mm up to 15mm depending on product type. The base surface to be tiled requires close surface tolerances as irregularities are more difficult to accommodate in the relatively small depth of bedding. Use of a suitable proprietary self-levelling compound is generally the best method of attaining a flat and level base for tiling.

Cement based adhesives are generally mixed with clean water to form a smooth paste, free from lumps, and are applied directly to the floor with an 8mm or 10mm notched trowel. The bed should be combed at a slight angle to produce a ribbed finish.



Tiles should be pressed firmly into position with a slight twisting action. It is essential to ensure each quarry tile is fixed on a solid bed and that the entire tile back is in full contact with the adhesive. Tiles should be lifted periodically as work progresses to check this. Any voids underneath tiles will be a potential point of weakness under load and in exterior situations water may accumulate giving rise to frost damage.



Tile spacers should not be used on natural quarry tiles and grout lines should be maintained to give a **minimum** joint width of 6mm for subsequent grouting.

Any surplus adhesive should be cleaned from tile faces before it begins to set.

Manufacturers instructions should be followed with regards to open times of adhesives. Once this time has expired any adhesive should be discarded and a fresh batch mixed.

With standard adhesives, tiles can generally be adjusted in position for up to 20 minutes and the floor will be ready for grouting after 24-36 hours depending on type of substrate and ambient temperature. During this period it is essential to protect the tiles and their bedding from foot traffic, the elements and any other potential disturbance.

## Rapid-set adhesives

These are used and applied as standard adhesives except they have reduced open times. They enable a floor to be quickly brought into service enabling grouting to be carried out as quickly as 3 hours after fixing.

## Flexible adhesives

These are used for more demanding applications requiring improved adhesion, waterproofing and/or elasticity to counter the effects of minor movements and deflections. They are commonly supplied with a built in admix and are simply mixed with water prior to use. Typical applications are under-floor and under-tile heating, fixing to existing tiling, smooth asphalt and fixing to suitably braced timber substrates. It is essential that a compatible flexible grout is used. Further details on such installations can be found in Technical Data Sheets 5, 9 and 12.

## Pourable adhesives

To achieve a solid bed usually requires the tiles to be buttered prior to placing onto the ribbed bed so no voids are left beneath tiles. Pourable adhesives such as Ardex S21 are specially formulated to ensure solid bedding without the need to butter the backs of tiles.

## Epoxy adhesives

A 2 part resin/hardener system for full chemical resistant bedding and for fixing to metal surfaces.

# Fixing Methods 2

## Fixing using sand/cement mortar

This is now a somewhat dated method of fixing quarry tiles and requires a high level of skill to obtain a good quality installation. There are three main methods of fixing:-

### Bedding directly in mortar

Only suitable where the base is completely mature, no risk of shrinkage exists and a damp-proof membrane has been incorporated during construction. It is not suitable for floors containing under-floor heating.

The substrate must be clean, sound and reasonably smooth. The bedding mix should be 1:3 to 1:4 cement/sand laid between wooden fillets 15—20mm thick. The mortar bed should be levelled by tamping across the supporting fillets which must be removed as work progresses. It is essential that there is no free surface water on the bed as this will inhibit adhesion. The quarry tiles should be firmly tapped into the mortar to produce the required level. The adhesion of the tiles may be improved by the application of a cement slurry immediately prior to fixing.

### Bedding in semi-dry sand/cement mortar (bonded method)

The substrate must be clean, sound and reasonably smooth. The bedding mix should be 1:3.5 to which water is added at the ratio of 0.55 to 0.6 by weight (about 27.5 litres water:50kg cement). The mix should be spread to a thickness of 10% to 15% greater than that required for the actual bed and thoroughly tamped and drawn off to the required level.

No greater area of mix should be spread than can be tamped and topped with slurry and tiles in one continuous operation. A cement slurry should be immediately spread and trowelled over the bed in an even layer about 2mm thick to which the tiles are placed and tapped firmly into the bed to the required level.

## Semi-dry using separating layer (unbonded method)

A separating layer should be used over suspended floors subject to significant deflection, e.g. made from thin-section beams, planks or slabs or if the condition of the subfloor prevents adhesion for any reason.

In this method a separating layer or membrane is interposed between the bed and the base. A layer of polyethylene sheet, bituminous felt or building paper should be laid over it and the joints taped and lapped at least 100mm. A semi-dry mix as described previously is laid over this at a minimum of 40mm and reinforced with steel fabric incorporated within the middle third of the bed thickness, lapped 100mm and wire tied.

A consistent bed thickness is important with unbonded floors.

## Application of tiles

The tiles should be placed on the slurried bed with care taken to avoid depressing one of the corners. Tiles should be tapped firmly into position using a rubber mallet. It is beneficial to butter the backs of tiles with a mortar of 1:2 cement/sand.

Alternatively traditional "beating in" can be carried out using a flat faced wooden block, which, dimensionally, is usually approximately 300 x 100 x 50mm. Some flooring contractors use vibrating machines for beating-in. During this operation the tile joints should be regulated (6-10mm) and an occasional check made to establish that full contact is being achieved between tiles and the slurried bed by lifting a tile out at random; any slurry or mortar disturbed should be made good before the tile is replaced.

It is important that there is no delay between spreading the slurry and fixing the tiles.

Thickness of tile bedding—as specified in BS 5385 Part 3			
Bedding method	Sub-floor surface regularity	Bed thickness	Comments
Adhesive bed (see 7.2.1)	SR 1	1mm to 6mm	Adhesive bed thickness should be within the range recommended by manufacturer
Bonded Cement:sand mortar bed (see 7.2.2)	SR 2	15mm to 20mm (tile thickness greater than 10mm)	For tiles thinner than 10mm a bed thickness of 10mm to 15mm is recommended
Unbonded semi-dry cement:sand mortar bed (see 7.2.3.3)	SR 3	40mm to 70mm	Steel fabric reinforcement might be required in the bed, e.g. on suspended floors. (see 7.2.3.2.)
Bonded semi-dry cement:sand mortar bed (see 7.2.3.4)	SR 3	40mm to 70mm	Maximum thickness 100mm where falls are formed within the bed
The bedding of tiles in a semi-dry mix permits the laying to be carried out to a much greater thickness in a single operation than can be achieved using a standard sand and cement mortar.			
It also allows for floors to be either bonded or laid over an isolation membrane.			
Where a floor is not to be isolated the preparation given in 7.2.3.4 is particularly important as the dryness of the mix described in 7.2.3.2 results in weak adhesion between the bed and the base. Cleavage can occur at the interface in the event of differential movement, to the detriment of the floor.			
Where a uniformly thick bed can be applied to achieve the required level of the tile surface, 70mm maximum thickness is usually the most practical. Where falls have to be formed entirely in the bed, its greatest thickness is 100mm. In all cases, the minimum thickness should be 40mm.			