Natural Tiles Technical Data Sheet No. 1 Issue No. 1
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Planning and Preparation 1

General Considerations

When specifying a quarry tile floor, the most arduous conditions likely to be imposed during the service life of the floor should be used as the basis on which to design. This will enable the most appropriate tile and fixing method to be employed. Consideration should therefore be given at the design stage to various parameters likely to affect the performance and durability of the floor. These include:

• **Application:** Consideration should be given to the intended use of the floor. For example, if the floor may be required to provide extra slip resistance, then a Quarrundum tile should be selected, depending on the application. If contact with, or containment of, aggressive chemicals is envisaged, then a suitably resistant fixing method and chemically resistant grout will be required.

• **Load:** In situations where heavy static loads are to be imposed, or the tile is likely to be exposed to loaded vehicles with hard rimmed wheels, the strength and impact resistance of the installation can normally be improved by the use of a thicker quarry tile such as tiles from our Industrial range. Consideration should be given to specifying quarry tiles of different thicknesses, each appropriate to the traffic load likely in a given area. It is important to stress that, for most applications, a standard thickness quarry tile (14mm) will be suitable, provided it is solidly bedded, without voids.

• **Movement Joints:** The position and construction of movement joints should be decided at the design stage. Problems may arise if insufficient or badly constructed movement joints are included in the floor. Particular care should be exercised to ensure that movement joints are impervious and chemically resistant where they are exposed to water or corrosive liquids. This usually involves applying sealants based on silicone rubber or polysulphide rubber. Movement joint edges may require metal reinforcement to prevent damage if hard-wheeled traffic is to cross the joint. Further detailed information on movement joints is contained in Quarry Tile Technical Data Sheet No. 2.

• **Drying Times:** Sufficient time should be allowed for the floor to be constructed and account must be taken of curing times required for various materials. New concrete must be allowed to mature for at least six weeks before any quarry tiles are fixed to it. If a cement/sand mortar screed is to be used, a further 3 weeks must be allowed, during which time the screed must be protected form frost, rain, etc.

Whenever traditional fixing methods are employed, traffic should not be allowed on the floor for at least 4 days. It may then be used by light traffic only for the first 14 days and heavy traffic after 28 days. However, rapid-set cement-based or epoxy-based adhesives may be used to bring a floor into service within 24 hours. In such cases, the advice contained in Technical Data Sheets 7 & 8 should be followed.

• **Floor drainage:** Floors which have falls to facilitate free drainage should be designed so that traffic moves across rather than down the fall. The position of the drainage channels, etc. should be decided at the design stage and constructed before the floor is laid.

• **Damp-proofing:** Quarry tile floors may require a damp-proof membrane to be incorporated into the structure, depending on the floor's location. This detail may be included at various positions as detailed in Technical Data Sheets 5, 7 & 9.

• **Finish zone thickness:** The thickness of a quarry tile installation will depend on tile thickness and the bedding method used. As a general guide, the finished bedding thickness for cement-based adhesives is approximately 4 - 8mm, for cement/mortar 15mm and for semi-dry bed greater than 40mm.

• **Traffic:** Both the type and amount of traffic likely to use the floor should be assessed. Loadings on floors may arise from either moving or standing loads. If vehicular, the type of tyres (pneumatic or solid) used to transmit the load through the floor will influence the severity of the loading. Severe loadings are exerted by loads carried on small hard rimmed wheels, or when moving traffic is bouncing due to an uneven surface. To ensure adequate safety margins for a flooring installation subjected to vehicular traffic, it may be assumed that the maximum dynamic load is twice the static load.

Preparation for tiling

It is essential that the structural components of the floor installation are designed and constructed to a standard capable of withstanding the loads placed upon it. It is usual to incorporate any gradients that are required into the base material. Although some irregularities in the base's surface may be accommodated in the tiles' bedding layer, the base material must be of sufficient surface flatness to enable the quarry tiles to be laid to a finished surface tolerance of ± 3mm under a 2m straight edge. The degree of accuracy achieved will largely be determined by the method selected for fixing the tiles.

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Planning and Preparation 2

Screeds

Screeds are often used to achieve a higher degree of surface flatness, or to raise the floor's finished surface level. Screeding materials such as self-levelling latexes and epoxides, together with the more traditional cement/sand screeds, have all been used successfully with quarry tiles. It should be re-emphasised that a new concrete floor should be allowed to cure for at least 6 weeks before a screed is laid onto it. Cement /sand screeds should then be allowed a further 3 weeks to cure before the quarry tiles are fixed. Where traditional screeds are employed, the thickness of the screed should be as follows:

Where screeds are laid on and bonded to a set and hardened base, the minimum thickness should be 25mm. Variations in the screed thickness to compensate for base are acceptable and it is normal to allow a design thickness of up to 40mm.

Where screeds are laid on a damp-proof membrane, or a separating layer, or a base that either incorporates a waterproofing admixture or has been contained in any way, the minimum thickness should be 50mm.

Where screeds are laid on a compressible layer such as insulating board, the minimum thickness should be 75mm.

Where screeds are laid on step treads, the minimum thickness should be 20mm.

Where screeds are laid on step risers, the thickness should be between 12 and 15mm.

Screeds should be kept covered with waterproof sheeting for at least 7 days after laying to prevent drying out. Screeds should be subjected to continuous air drying for at least a further 2 weeks before the tiles are fixed. Longer periods may be necessary in wet weather or where the floor is to be heated.

It should be noted that badly cured screeds may be subject to curling or cracking.

Cracking is mainly due to drying shrinkage and curling due to differential drying throughout the screed.

Where screeds are laid in very hot weather, or without cover from the sun, this may increase the risk of curling and/ or cracking.

The bond between the bedding and the base depends largely on the condition of the surface at the time of laying the bedding. Where it is likely to be subjected to heavy traffic, or other rigorous service conditions, it is essential to have good adhesion between the bedding and the base. This may be ensured by providing a suitable mechanical key. A suitable bonding agent or admixture applied to the bedding material is frequently used to improve the physical adhesion properties of cement mortars.

A number of proprietary screeding materials are available, which can provide beneficial properties and/or overcome problems associated with the traditional cement/sand screed. Advice should be sought from the manufacturer.

Further information on the design and use of screeds is given in Appendix C in BS 5385: part 3.

Finished floor tolerances

Floors are usually required to be level or to be laid to given falls, which should be detailed in the specification. Some variation in the surface level can normally be allowed without detriment to the satisfactory use of the floor and it is important to bear in mind that insistence on very close limits may result in higher fixing costs.

Large floor areas can normally tolerate larger variations in level from the datum given on the drawings without causing inconvenience to the user.

Permissible variations will depend on the area involved and the purpose of the building, but tolerances up to ± 15mm compared with a specified datum may be acceptable. Greater accuracy may be required along the line of partition walls, in the vicinity of door openings and where machinery is to be installed directly onto the floor.

Local variations tend to be more exacting and it is generally accepted that a nominally flat floor would show less than ± 3mm under a 2m straight edge. This is best measured using a straight edge that has small feet at both ends so that the variations in the floor level can be measured and related to the underside of the straight edge.

It is important to note the accuracy of the finished floor may be limited by the dimensional tolerance of the tile.

There should be no appreciable difference in surface level across joints, especially in areas where heavy loads are likely to be moved.

Where tiles are fixed using an adhesive, there is only limited scope to make good any variation in the underlying floor level to produce a true finished level. Consequently, attention should be paid to the finished tolerances of the constructional base layers at each stage.