

# Specific Applications 1

**Note:** For all special applications please follow the recommendations of a reputable adhesive/grout manufacturer such as Ardex UK

## Fixing to timber floors

Quarry tiles may be fixed over timber floors providing the following criteria is adhered to:

- The floor must be sufficiently rigid to support the ultimate weight that it will have to bear without excessive deflection. Additional noggings should be installed between joists wherever possible. If necessary, existing floorboards should be covered with another suitable board before the quarry tiles are fixed.
- There are many proprietary tile backer boards that can be fixed over existing timber bases providing the ideal surface to receive tiling. Tile distributors can advise on these.



File: Backer Board

- If overlaying with timber boards BS 5385 PT 3 recommends that all boards applied be at least 15mm exterior grade plywood which should be screwed to the floor at 300mm intervals in both directions in order to ensure the surface is rigid and free from any tendency to flex.

The underside ventilation must remain adequate to prevent the creation of conditions that could lead to fungal attack. It is good practice to seal the underside and edges of the boards with polyurethane or other water-resistant bonding agent to prevent moisture absorption and possible movement at a later date.

It is also important to appreciate that certain types of timber flooring are more suitable to receive quarry tiles than others. In particular, chipboard products are not recommended for this type of application since they tend to be easiest to deflect and dimensionally unstable, particularly if they have absorbed moisture.

## Adhesives & Grouts

Deformable flexible adhesives and grouts specially formulated for fixing tiles over timber substrates should be used in order to counter the effects of possible deflection. These should be mixed and applied in accordance with manufacturer's recommendations.

- Timber boards should firstly be primed with one or more coats of a suitable bonding agent. Tiles should be fixed using a notched trowel of at least 8 x 8mm ensuring all tiles are solidly bedded. (Technical Data sheet No 2 refers)
- Consideration should be given to the provision of adequate movement joints. (Technical Data sheet No 2 refers)

## Fixing to asphalt surfaces

Great care should be taken when considering fixing quarry tiles directly to asphalt surfaces. Where feasible it is usually better to remove the asphalt and create a suitable rigid substrate for tiling.

- Asphalt should be laid on a rigid base, e.g. concrete or levelling screed, in accordance with BS 8204-5 for internal floors and BS 8218 for external locations. The specifier should be satisfied that it is suitable for the anticipated load and conditions and that the surface finish is clean and suitably primed following adhesive manufacturers recommendations.
- Tiles may also be fixed using the separating layer technique. (Technical Data Sheet No 7 refers)
- In external locations falls should be not less than 1:60.
- Fixing should be carried out using a suitable flexible adhesive. Subsequent grouting should not be carried out until the fixing bed has properly set. The normal setting times of adhesives can be retarded by contact with asphalt and it is recommended that areas should not be trafficked for 48 hours as a general rule.

## Under-floor Heating

Under-floor heating systems are based on the transmission of heat from heating cables or hot water pipes to the tile surface which can be expected to reach a temperature around 25—28°C. Such systems are best suited to light duty installations, although heavy duty systems can be designed.



Whatever the installation, it is essential that either:-

- The tiles and their bedding are isolated from the screed containing the heating medium, or
- A flexible fixing method is employed

Although manufacturers of electric cable & matting systems claim that tile adhesive can be applied directly over these, it is advisable to avoid this as potential damage to the cables can occur. It is recommended to cover such systems with a suitable levelling compound (preferably latex) prior to fixing tiles. The heating system can then be commissioned and tested prior to tile installation.

Underfloor heating usually consists of hot water pipes contained in a heat storage screed. Tiles should be fixed appropriately either using flexible adhesives & grouts or by the separating layer technique where the tiles and their bedding are isolated from the underlying screed.

# Specific Applications 2

## Floor tiling in corrosive environments

A corrosive environment is one in which conventional sand/cement mortars are attacked through chemical reaction. In industrial applications there are many situations where floor and wall surfaces will be in either intermittent or continuous contact with a wide range of chemicals. Full details of tiling under such conditions can be found in BS 5385: Part 4 "British Standard Code of Practice for ceramic tiling and mosaics in specific conditions".

Ruabon quarry tiles are very resistant to attack in most acidic and alkaline situations, although, in common with other ceramic materials, they would not normally be specified for environments where they would be in prolonged contact with fluoride chemicals, especially hydrofluoric acid.

In general, concentrated acids such as sulphuric, hydrochloric, acetic and lactic, and concentrated alkalis such as sodium and potassium hydroxides, attack Ruabon products extremely slowly at room temperatures. Corrosion, if any, would normally take place at such a slow rate that it would not significantly alter the life of the installation, although, particularly in the case of alkalis, there may be some discoloration.

Ruabon quarry tiles are also suitable for lining some of the reaction vessels and tanks found in the chemical industry. They must not be used where hydrofluoric acid or other fluoride chemicals are present, nor considered for vessels operating with alkaline solutions at elevated temperatures. It is normally considered that resistance to alkalis is reduced when the concentration exceeds 20%, or the temperature exceeds 50°C.

For grouting, a chemically resistant material, chosen to resist the particular environment, must be used. Additionally, it is advisable to bed tiles in a suitably resistant material, where corrosion is likely to be more severe or where contact is likely to be prolonged.

In general, for mildly corrosive situations, standard cement based adhesives are adequate when used with an appropriate epoxide grout. For highly corrosive applications there are a variety of corrosion-resistant materials available and it is essential that the correct one is used in each part of the installation. The table in BS 5385—4 gives full details of resistance of tile bed, grout and sealant materials to various liquids.

## Further details of resistance of Ruabon Quarry tiles to specific chemicals can be found in Technical Data Sheet No. 11

In general, a specification should be framed to meet the most exacting conditions that may be imposed on the installation during its life, even if these occur only infrequently. If an installation has a later change of use, it should be reassessed for continued stability.

Consideration should also be given to the chemicals used in the cleaning of process machinery, since these are often splashed onto the floor.

Adequate falls must be provided to prevent pools of corrosive liquid forming. Generally a fall of 1 in 60 is adequate, although if there is likely to be excessive spillage, a fall of up to 1 in 40 may be required.

Some of the many applications in which Dennis Ruabon quarry tiles have been successfully used include:

**Abattoirs, dairies and breweries** making products which have a degrading effect on cement-based mortars and concrete. The main requirement is for an impervious flooring finish, which will not harbour bacteria and can easily be cleaned.

Many such installations also have areas that are subject to impact and it is frequently necessary to use heavy-duty quarry tiles, such as the Dennis Ruabon 25mm range, to achieve both impact resistance and chemical resistance.

**Laboratories**, where the main requirement is for flooring installations, work-tops and fume cupboards to be able to withstand accidental spillage.

Many such installations also have areas that are subject to impact and it is frequently necessary to use heavy-duty quarry tiles, such as the Dennis Ruabon 25mm range, to achieve both impact resistance and chemical resistance.

**Sugar refineries, confectionery and soft drink plants**, where the effects of sugar degrade concrete and cement-based surfaces.

**Hospitals**, where the strict hygiene standards demand a surface finish which can be easily cleaned to prevent the build up of bacteria. Ruabon quarry tiles are particularly suited to kitchen and dining areas as well as to bathrooms and toilets.

**Swimming pool surrounds**, where there can be chemical attack from the cleaning agents and the pool water.

**Marine applications** such as galleys, dining areas and toilets on ships, oil rigs and other installations that are subject to the effects of sea water.

**Petrol stations, car showrooms and garages**, where it is necessary to provide a surface from which oil and grease can be easily cleaned and which must provide resistance against staining and the spillage of corrosive liquids.

All the above applications require the use of chemically resistant grouting. We particularly recommend the use of Ardex epoxy grouts for these types of application.

