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Technical Advice Note 6

THE FIXING OF CERAMIC WALL TILES TO GYPSUM PLASTER SURFACES ON MASONRY BACKGROUNDS.

1. Although ceramic tiles can be fixed to a wide variety of backgrounds with appropriate adhesives, most tiling is fixed onto cement-sand rendering, gypsum plaster systems or onto plasterboard.
2. Cement-sand rendering is the preferred background for tiling and detailed guidance is provided in British Standard Code of Practice BS5385 Wall Tiling (BS5385-1, BS5385-2 and BS5385-4). Less information is provided about gypsum plaster backgrounds and this joint statement has been prepared in order to emphasise the conditions under which gypsum plaster can be safely used as a suitable background for ceramic tiles.

The essential points to note are:-

3. It is very important that the masonry background is thoroughly dry. A minimum of six weeks should have been allowed between the construction of the masonry background and plastering. The presence of moisture in the background will not always be visually evident.
4. This is particularly important where gypsum plastering is to be applied onto concrete walls especially if of lightweight or aircrete (aerated concrete) blocks or onto insitu concrete walls or onto cement-sand rendering.
5. *Caution:* Cement-sand rendering dries gradually with shrinkage taking place. If a cement-sand undercoat is not cured and dried prior to plastering and tiling, the subsequent drying shrinkage of the rendering can break the adhesion between the undercoat and finish coat of gypsum or between the finish and tile adhesive causing failure. New concrete walls require a longer drying time to allow shrinkage to take place, otherwise similar problems will occur. The same is true of existing concrete walls which have become saturated in use.
6. If plastered or rendered walls are to be tiled, this should be decided in advance of plastering, and should be given as a separate item in the Bill of Quantities and contract specification. See item 19.
7. Plastering should be done in accordance with the recommendations given in BS5492 and modified in BS 5385-1 section 3.4. The plasterwork should be firmly adhered to its background and be sufficiently strong to support the specified tiling.

8. The maximum weight of tiling which can be supported by a dry, well-adhered plaster background is 20kg/m², generally equivalent to ceramic tiles with a thickness of 8mm or natural stone tiles with a thickness of 7mm. When fixing directly to unskimmed paper-faced plasterboard surfaces the maximum permissible weight is increased to 32 kg/m². These weights include adhesive and grout.
9. Proprietary gypsum based systems are recommended because both the undercoat and finish are designed to work together. Advice on which finish coats work with which undercoats is available from the manufacturers.
10. Gypsum plaster must be thoroughly dry before tiling. New plasterwork consisting of undercoat and finish coat should have been completed at least 4 weeks before tiling is commenced. **Tiles should never be fixed to plaster which is not dry throughout.** Where drying is assisted by space heating or dehumidifying, care should be taken to ensure that the plaster is not just dry at the surface. The heater or dehumidifier must not be directed at the plasterwork.
11. It is important to understand that some gypsum plasters may appear dry on the surface whilst still containing moisture within.
12. Use of non-invasive radio frequency moisture meters will be of help in determining moisture levels still within rendering/plastering and/or the background.
13. When it is known in advance that tiles are to be fixed to a plastered wall, it is essential that there should be good adhesion between the undercoat and the plaster finish coat. Tiles should only be fixed to the finish coat and must not be fixed directly to a gypsum undercoat.
14. The finish plaster should be specified and applied to provide a matt finish. **Excessive trowelling of the plaster to 'improve' its appearance must be discouraged, since this practice may result in a dusty or shiny surface which is not suitable for tiling.** If the finish plaster is hard and sound but has dusty or friable residues on its surface, the surface should be thoroughly brushed down. If trowelling of the surface has produced a shiny and smooth surface, this must be removed by vigorous brushing. Where the use of a primer is recommended before the tiles are fixed the recommended primer should be applied strictly in accordance with the manufacturer's instructions.
15. Every plaster surface should be examined carefully by the tile fixer before any tiling work is undertaken, paying particular attention to surface finish. In addition, it is important to sound the whole area carefully for any evidence of hollows or lack of complete adhesion in the backing. Any such defects must be remedied by cutting out and replastering before tiling. The repair must also be allowed to fully dry out.
16. On old plastered surfaces any decaying or loose areas must be cut out and made good.
17. Sometime painted plaster surfaces are encountered. Hard gloss paint if well bonded is usually a satisfactory base for tiling, but any paint showing signs of flaking should be removed. Emulsion paint or distempers can break down after tiling and must be removed mechanically prior to tiling.

18. The surface to receive the tiles must be clean, sound and dry.
19. Since thin-bed adhesives not exceeding 3mm bed thickness are generally specified for fixing tiles to plaster, the plaster surface should be plumb, true and level. Trueness of surface should be such that when checked with a 2m straightedge, any gap between points of contact should not exceed 3mm.

Note: However such close tolerances of the trueness of a plastered surface will not have been attained unless the surface was specified to be tiled prior to plastering and the appropriate specification for plasterwork defined. Explanation a plastered surface, which is not to be tiled, is not required to meet such tolerances.
20. Generally, ready mixed adhesives conforming to Types D1 or D2 of BS EN 12004 are appropriate for fixing ceramic tiles to properly prepared plaster backgrounds. Where fully vitrified large format tiles (under 20kg/m²) are to be fixed the recommendations from the adhesive manufacturer regarding adhesive and surface preparation should be sought.
21. Plaster is not a satisfactory base for tiling in wet areas e.g. showers compartments. Reference should be made to BS5385-4 for tiling in wet areas. If the backing consists of existing gypsum plaster seek the adhesive manufacturers advice on suitable waterproofing systems.

The Tile Association wishes to acknowledge the assistance provided by British Gypsum and the Federation of Plastering & Drywall Contractors in the drafting of this advice note.

1 Footnote. This paper deals with tiling onto internal plastered surfaces. Those made with 'gypsum plaster' are often simply referred to as 'plaster' whereas those made with a 'cement based plaster' are referred to as a 'cement-sand render'.