

Adhesion of Stone, Brick Slips and Tiles onto Vertical Waterproofing

Introduction

Due to the porous nature of many commonly used exterior wall cladding products such as various types of stone; brick slips and tiles, it is becoming more, and more common to see the specification of a waterproofing membrane behind these products in order to meet building code and council requirements. There are of course a number of products available to meet the required criteria, but because of the ultimate limitations imposed by the use of either 'torch-on', or 'sheet' membrane products, the selection is largely narrowed to the use of a liquid applied material. While the comments contained within this document relate in a more general sense towards various types of liquid applied product, allowances for the fact that actual measurements and technical results will vary from product to product should be made.

The adhesion of the cladding, and the system as a whole, to the substrate will be dependent on a number of factors such as: type of substrate and substrate preparation, type of adhesive used, adhesive application, climatic conditions, and the overall weight per unit area of the cladding material. (This last factor can change significantly with the absorption or entrapment of rainwater, and this needs to be taken into consideration). An example is brick which gains 8% in weight when wet.

Substrate

Comparisons reveal some interesting points when adhering liquid membranes to various substrates. As would be expected, the adhesion reduces on timber substrates when exposed to high humidity, presumably due to the softening of the substrate surface. In concrete substrates the reverse is true, this time presumably due to the improvement in the cure of the surface after 30 days of exposure to moisture. This was particularly evident in the case of concrete.

James Hardie do not recommend their board as a substrate to adhere stone or brick slip to. The PBS Group do however recommend their Ventclad system.

Substrate Preparation

Under normal circumstances because of the relatively high weight of the various cladding materials we are talking about; the limiting factor will usually be the adhesive and cohesive capabilities of the liquid membrane to the substrate, rather than how well the stone can be adhered to the membrane itself. For this reason it is imperative that the surface of the substrate be prepared in such a way as to maximize this adhesion.

Substrate surfaces must always be clean, and free of any form of contamination that could inhibit adhesion, including dust, paint (or other surface coatings), and any oily residues. The use of a penetrating primer is recommended on any absorbent substrate.

Adhesion of stone should always commence from a solid foundation, L angle or lintel. Furthermore L angles or grout line pins should be employed at regular horizontal intervals to accommodate the severe reduction of allowable weight onto a liquid membrane. This becomes even more applicable when stone is quite thick and sits out from the wall creating a "fulcrum" effect". Allowable weights vary from membrane to membrane and substrate to substrate, and therefore consultation with the membrane and substrate manufacturer is advised.

Adhesive Selection and Application

As discussed above; the adhesive bond to a liquid membrane will seldom be the limiting factor in the system; however the selection of adhesive and its application will impact on the performance of the system.

Variability in moisture content of stone due to changing ambient conditions, and temperature fluctuations themselves independently of this, will cause expansion and contraction. This process places stress on the adhesive bond of the stone to the membrane, and in turn upon the adhesion of the membrane to the substrate. In order to limit the stress in the system, an adhesive that has some ability to 'flex', and take up some of this movement, should always be used.

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