

Cladding

Cladding means a facing or architectural decoration additional to the external walls of building: e.g. aluminium or metal cladding, polished granite slabs, limestone cladding, marble facing and the like. It should comply with the performance requirements stipulated in the Building (Construction) Regulation 39 in respect of material type, fixings, strength and durability.

2. Cladding shall be provided with sufficient permanently flexible joints horizontally and vertically to cater for differential movement in the cladding and in the structure to which it is attached. All external anchors, dowels and fixings should be of stainless steel or other corrosion resistant materials. Any metal dowels and fixings securing the cladding panels should be suitable, permanent and adequately protected from corrosion. For testing of anchors and cladding panels, see paragraphs 4 to 10 below.

3. Where cladding is to be affixed to any part of the exterior of a building, details such as the location and material should be shown in the general building plan for approval by the Building Authority. When the cladding to be installed is above 6 metres from street level, in addition to the building plans, details such as the thickness, strength, durability, and type of the cladding, material of fixings and sequence of support should also be shown in the structural plans. Failure to do so may result in delay or refusal to give approval to the cladding submission. As regards the fixings of stone cladding, sand/cement bedding and/or epoxy bonding alone is not considered a suitable and permanent fixing.

Tests on Anchors

4. On-site strength tests should be carried out on a representative number of each type and size of drilled-in anchors for those parts of cladding above 6 metres from street level. Such tests are necessary to verify the performance and workmanship of the anchors installed and should be carried out under the direction of the registered structural engineer or authorized person.

5. Each representative anchor should be tested by means of either :-

- (a) pull-out test; or
- (b) equivalent tightening torque test,

to demonstrate that its pull-out capacity is not less than 1.5 times the recommended tensile load as specified by the anchor manufacturer. The tested anchor should be considered satisfactory if it does not show any signs of separation, plastic deformation or deleterious effect during the test.

/Tests

Tests on Stone Cladding Panels

6. Stone cladding is a natural material. The mechanical properties, physical properties and chemical properties can vary considerably between different types and grades of stones. Tests on stone cladding panels are required to be carried out to verify the characteristic strengths adopted in the design and to form part of quality assurance during construction. The characteristic strengths shall be not less than three times that of the designed strengths used.

7. When stone cladding is to be used, the following tests are required to be carried out for each type of stone :

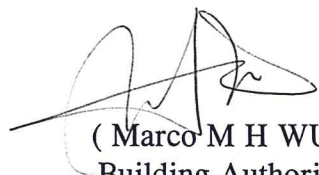
- (a) flexural strength test of dimension stone to ASTM C880 – Standard Test Method for Flexural Strength of Dimension Stone or to BS EN12372 – Natural Stone Test Methods, Determination of Flexural Strength under Concentrated Load or to other appropriate equivalent standards; and
- (b) strength test of individual stone anchorage to ASTM C1354 – Standard Test Method for Strength of Individual Stone Anchorages in Dimension Stone or to other appropriate equivalent standards.

8. As limestone is highly susceptible to acid rain and may deteriorate quickly when being used as exterior cladding material, in addition to paragraph 7 above, aged strength testing to simulate weathering due to extreme temperature change and extreme moisture content change should be carried out for limestone cladding to demonstrate that the residual flexural and anchorage capacities are not less than 80% of those obtained in the standard tests specified in paragraph 7. The aim of aged strength testing is to simulate the conditions in which limestone panels are fully saturated and return to their driest conditions and to simulate the critical temperature changes during their intended design life.

9. At least 4 test specimens are selected at random from batches of stone delivered to site for each of the test specified in paragraphs 7 and 8.

10. The test should be carried out by or under the direction and supervision of a testing agency independent of the supplier of the stone cladding. The test results should be certified by the testing agency, and endorsed by the authorized person or registered structural engineer to confirm that the test results have reached the required characteristic strengths adopted in the design. No consent for the commencement of the stone cladding works will be given until the test reports specified in paragraphs 7(a), 7(b) and 8 for each type and grade of stone, selected randomly either from the first batch of stone delivered to site or from the blocks of stones at the quarry that are to be used on the proposed project, have been submitted and found to be satisfactory by the Building Authority.

11. For curtain wall systems, reference should be made to PNAP 106.



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