



**香港試驗有限公司**

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**Method Statement for Pull-off Test of Mortar**  
**(In-House Method : MTS-PHY-0102)**

**1 Apparatus and Accessories**

- 1.1 Saw-cutting machine
- 1.2 Adhesive, quick-hardening two-component epoxy adhesive or equivalent.
- 1.3 50 x 50mm Aluminium dolly with thickness of at least 30mm.
- 1.4 The pull-off tester. (0-50kN with 0.01kN/DIV)
- 1.5 Vernier calipers with a reading inaccuracy of not more than 0.1mm.

**2 Procedure**

**2.1 Execution of the test.**

- 2.1.1 Cut the mortar / render using the saw cutting machine to the depth of 10-15mm in the concrete substrate, with an inaccuracy of not more than 5mm. Care should be taken not to damage the test specimen during the process.

- 2.1.2 Applying the dolly

Clean, degrease and dry the side of the dolly onto which the adhesive is to be applied. Apply a thin layer of adhesive to the surface of the test specimen in such a way that the adhesive forms a completely filled layer between the dolly and the substrate. No adhesive shall penetrate into the clearance made by the saw-cutting. Place the dolly onto the face of the test section in such a way that the centre of the dolly coincides with the centre of the cored section. Press the dolly down slightly to fix it in position, being careful to avoid any movement. Allow the adhesive to harden in accordance with the manufacturer's instruction.

- 2.1.3 Setting up the pulling equipment.

The pulling equipment and its accessories shall be used in accordance with the manufacturer's instructions. Place the pulling equipment perpendicularly to the test surface and concentrically over the dolly. Position the instrument in such a way that its position will not change during the test. Take all action necessary to ensure that the test results will not be influenced by the weight of the pulling tool.



#### 2.1.4 Applying the load

Increase the load continuously and evenly in time at a rate of  $0.05 \pm 0.01 \text{ N/mm}^2$  per second until failure occurs.

Determine the sectional area of the test specimen at the rupture face as the average result of two measurements each of the length and width using the vernier caliper.

#### 2.2 Determination of the type of failure

On the basis of a visual assessment, determine the mode of failure of the test specimen.

The following modes of failure are distinguished :

- adhesive layer failure : failure in the adhesive layer;
- adhesive/mortar failure : failure in the interface between adhesive layer and mortar;
- mortar failure : failure in the mortar layer;
- interface failure : failure in the interface between mortar layer and concrete substrate;
- substrate failure : failure in the concrete substrate

If there is a mix of these types of failure, make a visual assessment of the rupture face to estimate the surface area percentage per type of failure.

#### 2.3 Validity of the test result

A test is not valid if one or more of the following cases apply:

- There is an adhesive layer failure in the whole or part of the rupture face;
- The specimen surface appears to have been cut or cored askew with a deviation of  $10^\circ$  or more relative to the surface of the mortar / render layer.

#### 2.4 Calculation

Calculate the bond strength, rounded off to 0.01MPa, with the following formula:

$$f_h = F_h / A$$

Where :

$f_h$  is the bond strength of the test specimen, to the nearest 0.01 MPa;

$F_h$  is the failure load, to the nearest 0.01 kN;

$A$  is the sectional area of the test specimen, to the nearest  $\text{mm}^2$ .



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## 3 Report

The report should contain the following data and information:

- a) Report serial No
- b) Customer
- c) Location
- d) Works Instruction No
- e) Sample No
- f) Date received
- g) Date test started
- h) Date test completed
- i) The calculated bond strength
- j) The failure load
- k) The type of failure
- l) The type of mortar
- m) The age of the mortar at the time of testing (if known)
- n) Pulling equipment information
- o) The sectional area of the test specimen