

Measuring coating adhesion on concrete - Elcometer 506, 510, 106

1. Choosing the dolly

As the coating adhesion values on a concrete substrate tend to be considerably lower than those on metal substrates, a 50mm diameter dolly is most commonly used. As the dolly diameter is larger, either the gauge used or the actuator skirt will be different. Gauges such as Elcometer 506, Elcometer 510 and Elcometer 106 are specially designed for use with 50mm dollies.



2. Making a circular cut in the coating



As coatings on concrete have a lateral bond strength that can produce misleadingly high values, if the coating is thicker than 500 microns (or 20 mils), **the coating must be cut down to the substrate** before adhering the dolly to the substrate.

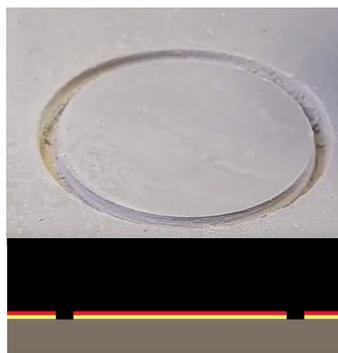
Before cutting the coating lightly pass sandpaper back and forth across the test area. Take care not to damage the coating or cause a significant loss of coating thickness.



The cutter can have a tendency to skip across the coating. To avoid this, it is often wise to use a guide template made of plywood, which has been securely clamped down. Alternatively use a drill stand.



Coating must be cut down to the substrate (and into the substrate in some cases).



Coatings less than 500 microns (or 20 mils) thick may also require cutting at the request of the client or contractor.

It is important to record what you have done to ensure all adhesion tests are carried out in the same way.

3. Glueing the dolly

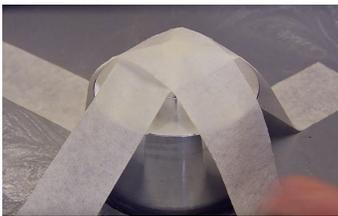


Once the coating is cut, abrade the dolly on a flat surface. Do not do this in your hand as this may damage or round the edges of the dolly.

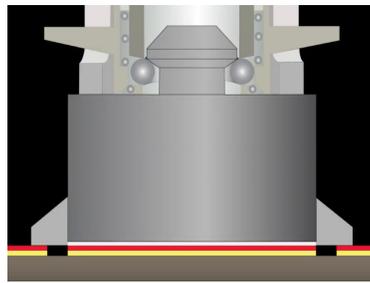
Clean both the dolly and the coating of any dust or grease using a suitable solvent. Mix the adhesive according to the manufacturer's instructions, and apply a thin film of adhesive over the entire dolly face.



Press the dolly carefully down onto the prepared test surface, applying an even pressure to the dolly, to ensure that the dolly face is parallel to the test surface. Remove any excess adhesive from around the dolly, making sure that no adhesive has flowed into the groove made from cutting.

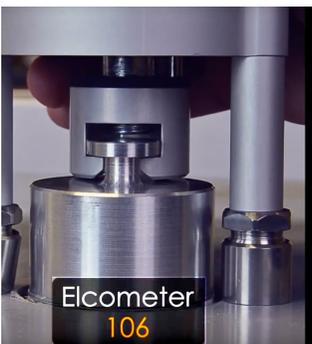


To keep the dolly secure during the curing process, tape the dolly in place with masking tape, and allow the adhesive to cure for the manufacturer's recommended duration. Once fully cured, remove the masking tape, reset or rewind the gauge or actuator head to its start position, and attach it to the dolly.



Dolly should be placed away from any bumps or edges, and there should be enough space around it for the gauge or actuator head to be attached - so that a uniform, perpendicular, tensile pull can be achieved. Leave space for the support ring, which is required for some adhesion gauges.

4. Pulling the dolly



Apply a uniform increase in force in accordance with your test method or standard - typically this would be a rate of pull of 0.2 MPa/s or 30 psi/s for coatings on concrete.

Uniform, perpendicular, tensile pull should be achieved

4. Pulling the dolly



Whilst the rate of pull is controlled manually for most pull-off adhesion testers, the Elcometer 510 Automatic Pull-Off Adhesion tester allows the rate of pull to be selected, and when the start button is pressed, the gauge applies the pre-selected rate of pull automatically.

During the pull-off adhesion test, and in addition to the pull-off force, the failure mode is also recorded.

To determine the failure mode, you will need to inspect both the dolly face and the substrate's surface, where the result could be:

- A glue failure, where the glue fails before the coating or substrate;
- An adhesive failure, where there is a failure between two layers of coating, or between the coating and the substrate;
- A cohesive failure, where the coating fails within a single layer, or the substrate fails.



- A- 80% cohesive failure of the substrate
- A/B- 20% adhesive failure between the substrate and the 1st layer of coating