English

Elcometer 109

Tensile Adhesion Tester

Operating Instructions

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English

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Doc.No. TMA-0215 Issue 03
Text with Cover No: 4874

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Thank you for your purchase of this Elcometer 109 Tensile Adhesion Tester. Welcome to Elcometer.

Elcometer are world leaders in the design, manufacture and supply of inspection equipment for coatings and concrete. Our products cover all aspects of coating inspection, from development through application to post application inspection.

The Elcometer 109 Tensile Adhesion Tester is a world beating product. With the purchase of this product you now have access to the worldwide service and support network of Elcometer. For more information visit our website at www.elcometer.com

1 ABOUT YOUR TESTER

The Elcometer 109 Tensile Adhesion Tester provides a pass/fail assessment of the bond strength of applied coatings.

A dolly which breaks at a predetermined force is glued to the coating. The pull-off tool is attached to the dolly and applies a tensile force on the dolly.

- If the dolly breaks, leaving part of the dolly adhered to the coating, the bond between the coating and the substrate has passed the test criteria.
- If the dolly does not break and pulls the coating off the substrate, the bond between the coating and the substrate has failed the test criteria.

A range of dollies is available, each having a different breaking rating; dollies are colour coded for ease of identification.

1.1 STANDARDS

Your Elcometer 109 Tensile Adhesion Tester can be used in accordance with the following National and International Standards: NORSD K M-501, NFT30-606

1.2 THESE INSTRUCTIONS

These instructions describe the operation of the following models of the Elcometer 109:

Elcometer 109/1:	5 MPa (725 PSI)
Elcometer 109/2:	7 MPa (1015 PSI)
Elcometer 109/3:	9 MPa (1304 PSI)

1.3 WHAT THE BOX CONTAINS

- Elcometer 109 Tensile Adhesion Tester Pull-off Tool
- 25 Dollies
- Pack of Araldite Adhesive
- Carrying Case
- Operating Instructions

The tester is packed in a cardboard and foam package. Please ensure that this packaging is disposed of in an environmentally sensitive manner. Consult your local Environmental Authority for further guidance.

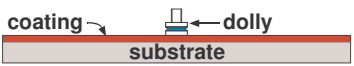
To maximise the benefits of your new tester please take some time to read these Operating Instructions. Do not hesitate to contact Elcometer or your Elcometer supplier if you have any questions.

2 USING YOUR TESTER

2.1 SECURING THE DOLLY

The surface of the dolly and the test area should be abraded and be free from oil, moisture and dust to ensure a good bond between the dolly face and the coating.

1. Prepare the surface of the dolly and the coating where the dolly is to be applied by roughening with an abrasive paper. Then de-grease these areas by using a suitable solvent to clean both surfaces.
2. Mix a small quantity of adhesive and apply an even film to the prepared surface of the dolly.
3. Place the dolly onto the prepared test surface and apply pressure to squeeze out excess adhesive which should then be removed. Allow the adhesive to cure.



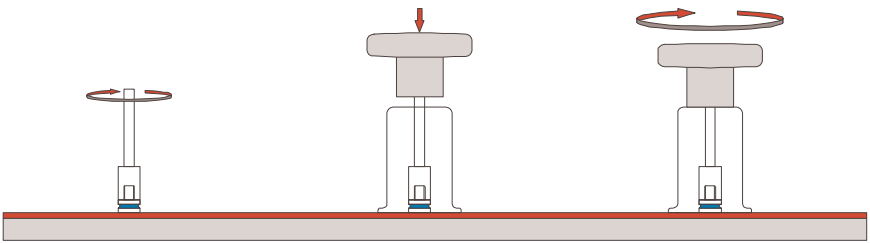
4. Cut around the base of the dolly very carefully if required. This is only necessary when lateral bonding in the coating is greater than adhesion, for example, elastomeric coatings.

   Note: *If the test is to be non-destructive, the coating must not be cut.*

   Note: *Damage can be caused to the coating under the dolly by cutting through the coating. Consult the coating manufacturer if in doubt.*

2.2 APPLYING LOAD TO THE DOLLY

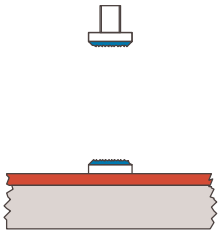
1. Attach the adaptor to the dolly thread.
2. Place the pull-off tool body over the adaptor and screw on the handle.
3. Apply the force by turning the handle clockwise slowly and evenly until either the dolly is detached or the dolly breaks.
4. Remove the threaded part from the adaptor.
5. Assess and record the result.



2.3 ASSESSING THE RESULTS

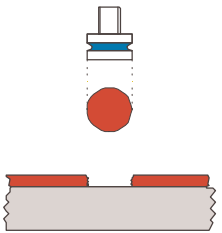
1. Disassemble the handle, adaptor and dolly thread.
2. Note the breaking force rating of the dolly.

3. Inspect the dolly, it will be either broken or intact.



Dolly broken[a]

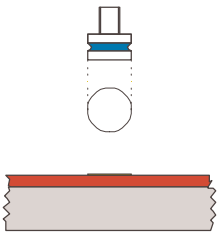
If the dolly has broken at the thin section then the force applied is not sufficient to pull the coating from the surface and the coating adhesion is within specification.



Dolly intact

Evidence of the coating on the flat surface of the tensile dolly:

The coating has failed.



Dolly intact

No evidence of the coating on the flat surface of the tensile dolly:

The adhesive has failed[b].

a. The broken portion of the tensile dolly left on the coating may be removed by applying heat to the dolly to breakdown the adhesive. In this case, the test is non-destructive. Care must be taken as damage to the coating may result from the application of excessive heat.

b. If adhesive failure occurs, the test should be repeated.

3 CALIBRATION

Calibration of the Elcometer 109 Tensile Adhesion Tester relates to the manufacture of the dollies. The dollies are manufactured to precise dimensions using a special process. Destructive tests, using equipment with traceable calibration, are carried out on 3% of each batch of dollies produced, and the batch breaking rating is determined from these tests. A batch of dollies consists of at least 500 items, so a minimum sample size of 15 dollies is tested to destruction for each manufacturing batch.

A certificate of test is available for each box of dollies. This document relates the dollies to the test results for the batch sample. The batch will be within 5% of the nominal breaking force.

The pull-off tool does not have any calibration associated with its manufacture or operation. This tool is a device for applying sufficient force to either break the dolly, or pull it and the coating away from the substrate.

4 MAINTENANCE

The Elcometer 109 Tensile Adhesion Tester is designed to give many years service under normal operating and storage conditions.

The instrument does not contain any user-serviceable components. In the unlikely event of a fault, the instrument should be returned to your local Elcometer supplier or directly to Elcometer. Contact details can be found on the outside cover of these instructions, or on the Elcometer website, www.elcometer.com

5 TECHNICAL SPECIFICATION

Weight (complete kit):	1.7 kg (3.75 lb)
Pull-off tool, height (assembled):	150 mm (6")
Pull-off tool, width (maximum):	80 mm (3.15")
Dolly breaking strength (Red):	5 MPa (700 PSI[a]) ±5%
Dolly breaking strength (Blue):	7 MPa (1000 PSI[a]) ±5%
Dolly breaking strength (Yellow):	9 MPa (1300 PSI[a]) ±5%

6 SPARE PARTS AND ACCESSORIES

The following spares and accessories are available from Elcometer, or your local supplier.

Adhesive	T99912906
Dollies, pack of 25, 5 MPa	T10913952
Dollies, pack of 25, 7 MPa	T10913953
Dollies, pack of 25, 9 MPa	T10913954

a. Approximate conversion from MPa

7 RELATED EQUIPMENT

Elcometer produces a wide range of adhesion gauges and associated inspection equipment. Elcometer 109 users may also benefit from the following Elcometer products:

- Elcometer 106 Adhesion Testers
- Elcometer 107 Cross Hatch Cutters
- Elcometer 1542 Cross Hatch Cutters
- Elcometer 456 Digital Coating Thickness Gauges

For further information contact Elcometer, your local supplier, or visit www.elcometer.com