

**Elcometer
107 • 1542**

en

Cross Hatch Cutter

Operating Instructions



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A copy of this Instruction Manual is available for download on our Website via www.elcometer.com.

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Thank you for your purchase of this Elcometer Cross Hatch Cutter. 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.

This Elcometer Cross Hatch Cutter 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 THIS INSTRUMENT

The Elcometer Cross Hatch Cutter is a simple but effective instrument for assessing the adhesion or resistance to separation of coatings from substrates.

The instrument is ideal for smooth coatings on flat surfaces.

The cutter scores through the coating down to the substrate. Two cuts are made at right angles to each other resulting in a grid of small squares. Adhesion is then assessed visually by comparing the grid of squares against Standards.



A range of cutting blades is available for different thicknesses and types of coating.

1.1 STANDARDS

The Elcometer Cross Hatch Cutter can be used in accordance with the following International Standards: AS 1580.408.4, AS 3894.9, ASTM D3359-B, EN 13523-6 *supersedes ECCA T6*, ISO 2409 *supersedes BS 3900-E6 & NF T30-038*, ISO 16276-2, JIS K 5600-5-6.

1.2 WHAT THE BOX CONTAINS

The box contains either an Elcometer 107 or an Elcometer 1542

Kit	Elcometer 107 	Elcometer 1542 
Basic	<ul style="list-style-type: none"> • Cross Hatch Cutter handle • Cutter blade • Hexagonal wrench • Carrying case • Operating instructions 	<ul style="list-style-type: none"> • Elcometer 1542 Cross Hatch Cutter • Thickness gauge for setting cutting blades • Hexagonal wrench • Operating instructions
Full	Everything in the basic kit plus: <ul style="list-style-type: none"> • Brush • Eye Glass • Adhesive Tape (ISO/JIS or ASTM) 	Everything in the basic kit plus: <ul style="list-style-type: none"> • Brush • Eye glass • Carrying case

The Elcometer Cross Hatch Cutter 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 Elcometer Cross Hatch Cutter 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 SELECTING THE CORRECT CUTTER BLADE

Measure the coating thickness and then use the table below to select the correct blade.

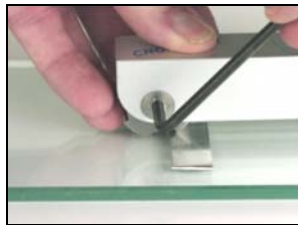
Coating Thickness		Cutter blade - Number of cuts		
(μm)	(mils)	ASTM - Metal substrates	ISO/JIS - Hard substrates (metal)	ISO/JIS - Soft substrates (wood, plaster)
0 to 50	0 to 2	1 mm - 11 cuts		
50 to 125	2 to 5	2 mm - 6 cuts		
> 125	> 5	x		
0 to 60			1 mm - 6 cuts	2 mm - 6 cuts
61 to 120			2 mm - 6 cuts	2 mm - 6 cuts
121 to 250			3 mm - 6 cuts	3 mm - 6 cuts

3 ADJUSTING THE CUTTER BLADES

3.1 ELCOMETER 1542

ADJUSTING THE CUTTING BLADES

1. Place the adjustment gauge supplied with your cutter on a smooth flat surface.
2. Use the hexagonal wrench supplied with your cutter to loosen the blade securing screw by 1/4 turn.
3. Position the cutter on the surface with the front edge of the cutting blades resting on the adjustment gauge.
4. Hold the assembly and tighten the blade securing screw.



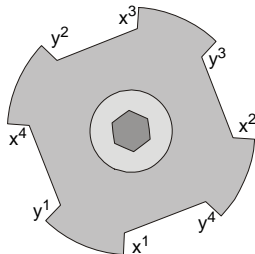
REPLACING THE CUTTING EDGE

Your instrument includes a total of 8 sets of cutting edges:

When the cutting edge of the blades becomes worn, rotate the blades through 90° to use the next set of cutting edges. Repeat as necessary until all cutting edges have been used (x^1 , x^2 , x^3 , x^4).

Once all these cutting edges are worn, remove the cutting blades, turn them over and replace. In this way cutting edges y^1 , y^2 , y^3 and y^4 can be used.

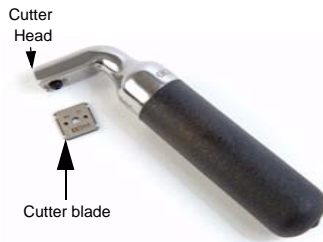
Note: The ISO/JIS standard recommends that the cutting tool is replaced when the top of the blades has flattened to 0.1 mm.



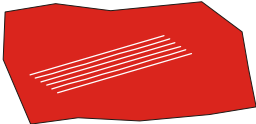
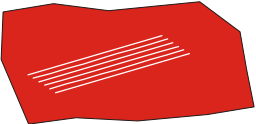
3.2 ELCOMETER 107

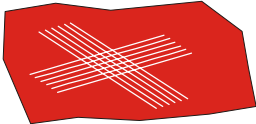
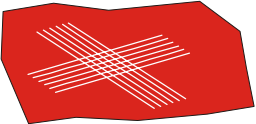
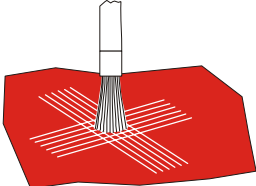
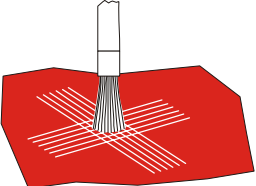
Each cutter blade has 4 cutting edges, labelled 1, 2, 3 and 4. To change the cutting edge, use the hexagonal wrench to loosen the cutter blade. Then rotate it or turn it over to a new edge.


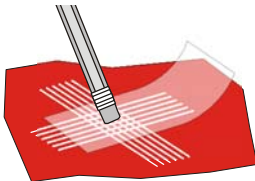
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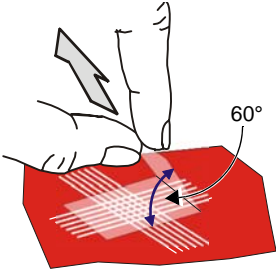
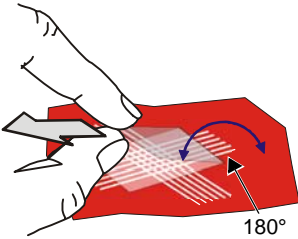


4 TEST PROCEDURE

Step	ISO/JIS	ASTM
1	<p data-bbox="161 277 752 477">Place the cutting tool on the sample, press down gently and pull the tool towards you in one steady movement to make a series of parallel cuts approximately 20 mm long. Apply sufficient pressure to ensure that you cut right through the coating to the surface of the substrate.</p> <p data-bbox="161 495 762 557">Note: <i>If the substrate is wood or similar, make cuts at 45° to the direction of the grain.</i></p> 	<p data-bbox="773 277 1364 477">Place the cutting tool on the sample, press down gently and pull the tool towards you in one steady movement to make a series of parallel cuts approximately 20 mm long. Apply sufficient pressure to ensure that you cut through the coating to the substrate.</p> 

Step	ISO/JIS	ASTM
2	<p data-bbox="161 151 758 249">Place the cutting tool on the sample at 90° to the first cut and repeat step (1) to create a lattice pattern on the coating.</p> 	<p data-bbox="773 151 1364 249">Place the cutting tool on the sample at 90° to the first cut and repeat step (1) to create a lattice pattern on the coating.</p> 
3	<p data-bbox="161 462 758 560">Brush lightly several times forwards and several times backwards along the diagonals of the lattice to remove debris.</p> 	<p data-bbox="773 462 1364 560">Brush lightly to remove detached flakes or ribbons of coating.</p> 
4	<p data-bbox="161 855 1364 881">Inspect to ensure the cuts have penetrated all the way through the coating.</p>	

Step	ISO/JIS	ASTM
5	If the substrate is soft, jump to step (10). If the substrate is hard or wood, proceed to the next step (6)	-
6	Select the correct adhesive tape (see “Spares” on page 14). Remove and discard two complete turns of adhesive tape. Remove an additional length of tape at a steady rate and cut a piece approximately 75 mm from this length.	Select the correct adhesive tape (see “Spares” on page 14). Remove and discard two complete turns of adhesive tape. Remove an additional length of tape at a steady rate and cut a piece approximately 75 mm from this length.
7	<p data-bbox="151 442 762 615">Centre the cut piece of tape over the lattice and smooth into place using a finger. Rub the tape firmly using a finger nail or finger tip to ensure good adhesion between the tape and the coating.</p> 	<p data-bbox="762 442 1370 615">Centre the cut piece of tape over the lattice and smooth into place using a finger. Rub the tape firmly using the eraser on the end of a pencil to ensure good adhesion between the tape and the coating.</p> 



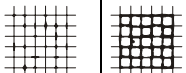
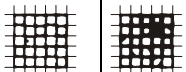
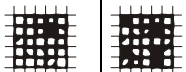

Step	ISO/JIS	ASTM
8	<p data-bbox="161 151 762 285">Within 5 minutes of applying the tape, remove the tape by pulling in a single smooth action taking approximately 0.5 to 1 seconds at an angle of 60° to the coating surface.</p> 	<p data-bbox="773 151 1362 285">Within 90 seconds (± 30 seconds) of applying the tape, remove the tape by pulling in a single smooth action at an angle of 180° to the coating surface.</p> 
9	<p data-bbox="161 676 762 743">To maintain a permanent record of the test, retain the tape by applying it to a transparent film</p>	-

Step	ISO/JIS	ASTM
10	<p>Assess the coating adhesion by viewing the lattice of cuts in good light. If agreed, use an eye glass to aid viewing.</p> <p>Compare the lattice of cuts with the ISO/JIS and ASTM standards shown in “ISO/JIS and ASTM standards” on page 12.</p>	<p>Assess the coating adhesion by viewing the lattice of cuts using an illuminated magnifier.</p> <p>Compare the lattice of cuts with the ISO/JIS and ASTM standards shown in “ISO/JIS and ASTM standards” on page 12.</p>
11	Repeat the test at two other positions	

Note: For full details of the test method, consult the standard.

5 ISO/JIS AND ASTM STANDARDS

The ISO/JIS and ASTM Standards are reproduced below. We advise obtaining a copy of the latest version of these Standards.

Surface	Description	ISO/JIS	ASTM
	The edges of the cuts are completely smooth; none of the squares of the lattice is detached.	0	5B
	Detachment of flakes of the coating at the intersections of the cuts. A cross cut area not significantly greater than 5% is affected.	1	4B
	The coating has flaked along the edges and/or at the intersections of the cuts. A cross cut area significantly greater than 5%, but not significantly greater than 15% is affected.	2	3B
	The coating has flaked along the edges of the cuts partly or wholly in large ribbons, and/or it has flaked partly or wholly on different parts of the squares. A cross cut area significantly greater than 15%, but not significantly greater than 35%, is affected.	3	2B
	The coating has flaked along the edges of the cuts in large ribbons and/or some squares have detached partly or wholly. A cross cut area significantly greater than 35%, but not significantly greater than 65%, is affected.	4	1B
	Any degree of flaking that cannot be classified even by classification 4 (1B).	5	0B

6 STORAGE

Always store the instrument in its case when it is not being used.

7 MAINTENANCE

The Elcometer Cross Hatch Cutter is designed to give many years reliable service under normal operating and storage conditions. Special maintenance will not normally be required under these conditions.

Replacement cutting blades are available from Elcometer or your local supplier.

The Elcometer Cross Hatch Cutter 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.

8 TECHNICAL SPECIFICATION

	Elcometer 107	Elcometer 1542
Material:	Stainless steel/aluminium	Anodised aluminium handle
Dimensions:	165 mm x 30 mm x 45 mm (6.5" x 1.2" x 1.8")	150 mm x 25 mm x 35 mm (6" x 1" x 1.25")
Weight:	370 g (13 oz)	200 g (7 oz)

9 SPARES

The following spare parts and optional accessories are available from your Elcometer supplier or direct from Elcometer:

Model	Description	Part Number
Elcometer 107	Cutting blade, 6 x 1 mm	T99913700-1
	Cutting blade 11 x 1 mm	T99913700-2
	Cutting blade 11x 1.5 mm	T99913700-3
	Cutting blade, 6 x 2 mm	T99913700-4
	Cutting blade, 6 x 3 mm	T99913700-5
	Hexagonal wrench	T9996287-
	Eye Glass	T10713356
	Brush	T10713357
	Presentation Case	T10713349
Elcometer 1542	Cutting blade, 6 x 1 mm	KT001542P001
	Cutting blade, 6 x 2 mm	KT001542P002
	Cutting blade, 6 x 3 mm	KT001542P003
	Adjustment gauge	KT001542F006
Adhesive tape	Adhesive tape, ASTM3359 1 Roll	K0001539M001
	Adhesive tape, ASTM3359 2 Rolls	T9998894-
	Adhesive tape, ISO2409 1 Roll	K0001539M002
	Adhesive tape, ISO2409 2 Rolls	T9999358-

10 RELATED EQUIPMENT

In addition to the Elcometer Cross Hatch Cutter, Elcometer produces a wide range of other coating testing equipment. Users of the Elcometer Cross Hatch Cutter may also benefit from the following Elcometer product ranges:

- Elasticity and Resistance Deformation Testers
- Paint Inspection Gauges
- Coatings Thickness Gauges
- Appearance Testers
- Washability, Brushability and Abrasion Testers

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