English

Elcometer 3000

Clemen Unit

Operating Instructions

elcometer®

CE The Elcometer 3000/3 Motorised Clemen Unit has been tested in accordance with EU regulations governing Electro-magnetic compliance and it meets the required directives.

Doc.No. TMA-0326 Issue 02
Text with Cover No: 19438

CONTENTS

Section **Page**

1 About your tester 2

2 Getting started 4
2.1 Installation 4
2.2 The parts of your tester 4
2.3 Power input 4
2.4 Control panel 5
2.5 Caution 5

3 Testing a sample - Manual Clemen Unit 6
3.1 Adjusting the tool 6
3.2 Test procedure 7

4 Testing a sample - Motorised Clemen Unit 8
4.1 Adjusting the tool 8
4.2 Test procedure 9

5 Testing thick samples 10

6 Tool accessories 12
6.1 Cutting tool - for scratch testing 12
6.2 Rubber tool - for drying time assessment 12

7 Maintenance 12

8 Technical specification 13
8.1 Manual model 13
8.2 Motorised model 13
8.3 Sample size 13
8.4 Packaging 13

9 Spares 14

10 Related equipment 14

Thank you for your purchase of this Elcometer 3000 Clemen Unit. 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 3000 Clemen Unit 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 3000 Clemen Unit is a robust and simple-to-use instrument for evaluation of the resistance to scratching of a coated surface. The sample can be metal, wood, glass, plastic or other hard materials.

A tool fitted with a hemispherical ball is lowered gradually onto the surface of the sample and moved in a straight line a distance of 60 mm (2.4"). The downward force exerted by the tool onto the surface is adjustable by means of a sliding weight.

Depending on the purpose of the test and the force applied, varying degrees of penetration of the tool into the coating are observed, from a superficial trace to total destruction.

The Elcometer 3000 is available in two versions; the original Manual Clemen Unit and the Motorised Clemen Unit.

- *Elcometer 3000/1 Manual Clemen Unit.* The sample is clamped to a sliding platform which is moved manually.
- *Elcometer 3000/3 Motorised Clemen Unit.* The sample is clamped to a fixed platform. At the press of a button, the tool is moved across the sample and stops automatically at the end of its travel. Contact between the tool and a metallic sample is indicated by a lamp and voltmeter.

1.1 Standards

The Elcometer 3000 Clemen Unit can be used in accordance with the following National and International Standards:

AS/NZS 1580.403.1 EN13523-12 *supersedes ECCA T12*

ISO 1518 *supersedes DIN 53799, BS 3900-E2*

1.2 These instructions

These instructions describe the operation of the following Elcometer Clemen Units:

- Elcometer 3000/1 Manual Clemen Unit
- Elcometer 3000/3 Motorised Clemen Unit

1.3 What the box contains

- Elcometer 3000/1 Clemen Unit or
  Elcometer 3000/3 Motorised Clemen Unit
- 1000 g weight x 4 (*Elcometer 3000/3 models only*)
- 1 mm (0.04") Ball Tool
- Operating Instructions

To maximise the benefits of your new Elcometer 3000 Clemen Unit 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 GETTING STARTED

This section of the instructions is intended for first-time users of the Elcometer 3000 Clemen Unit. It describes the steps you must take before you can start using the unit and offers advice on safe operation.

2.1 Installation

Place the Elcometer 3000 Clemen Unit onto a rigid table. The motorised model includes adjustable feet which can be used to level the unit.

2.2 The parts of your tester

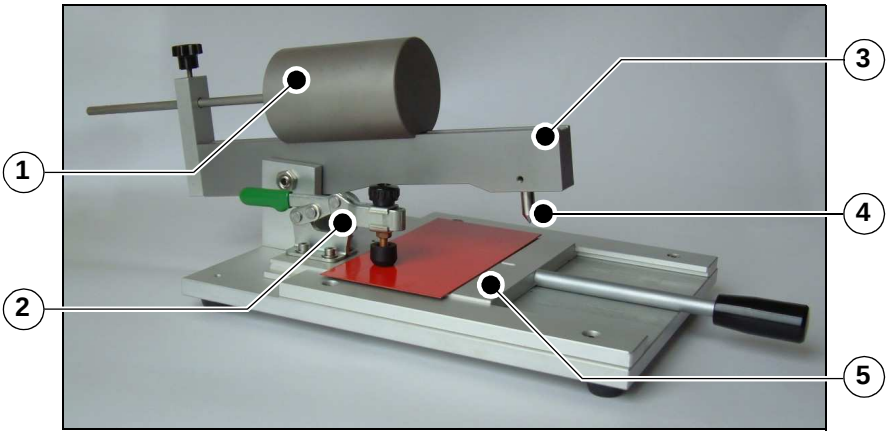


Figure 1. The parts of your tester (manual model shown)

1. Weight
2. Clamp
3. Load beam
4. Tool
5. Sample platform

2.3 Power input

(These instructions apply to motorised models only)

The power input panel is protected by two fuses - see “Technical specification” on page 14 for fuse rating.

2.4 Control panel

(These instructions apply to motorised models only)

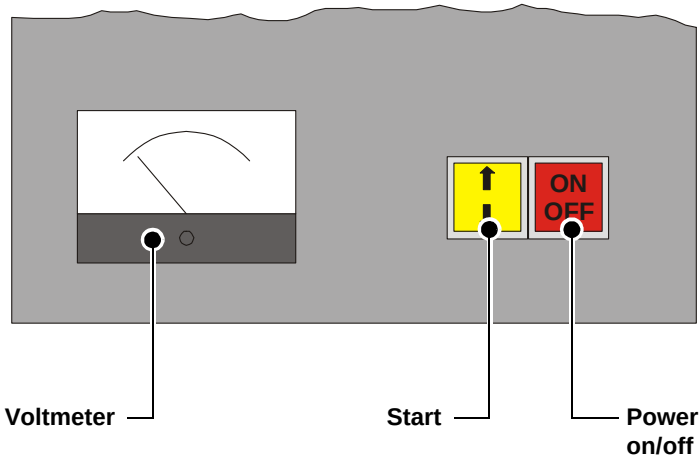


Figure 2. Control panel

- *To switch on the Clemen Unit,* press the Power On/Off button. The button will illuminate when the Clemen Unit is switched on. Press again to switch the tester off.
- *To start the tool movement,* press the Start button. The tool will stop automatically at the end of its stroke. To stop the movement at any time, press the Power On/Off button. The light in the Start button will flash when coating has been removed completely from a metallic sample - see page 9.

2.5 Caution

The Elcometer 3000 Clemen Unit has been manufactured with your safety in mind. However, improper use can result in damage to the tester.

Please observe the precautions discussed in these operating instructions.

To reduce the risk of electric shock, do not open the housing of the Elcometer 3000/3 Motorised Clemen Unit. There are no user-serviceable parts inside.

To reduce the risk of fire or electric shock, do not expose the Elcometer 3000/3 Motorised Clemen Unit to rain or excess moisture.

The mains plug on your Elcometer 3000/3 Motorised Clemen Unit may be fitted with a fuse. When replacing this fuse, ensure a fuse of the correct rating is used.

3 TESTING A SAMPLE - MANUAL CLEMEN UNIT

Before the sample can be tested, adjust the height of the tool:

3.1 Adjusting the tool

1. Place the sample onto the sample platform and fix in position by rotating the clamp handle.
2. Lift and hold the load beam in its raised position and slide the sample platform until the centre of the sample is underneath the tool (Figure 3).
3. Insert the metal shim between the nylon wheel (1) and the load beam and then lower the load beam.

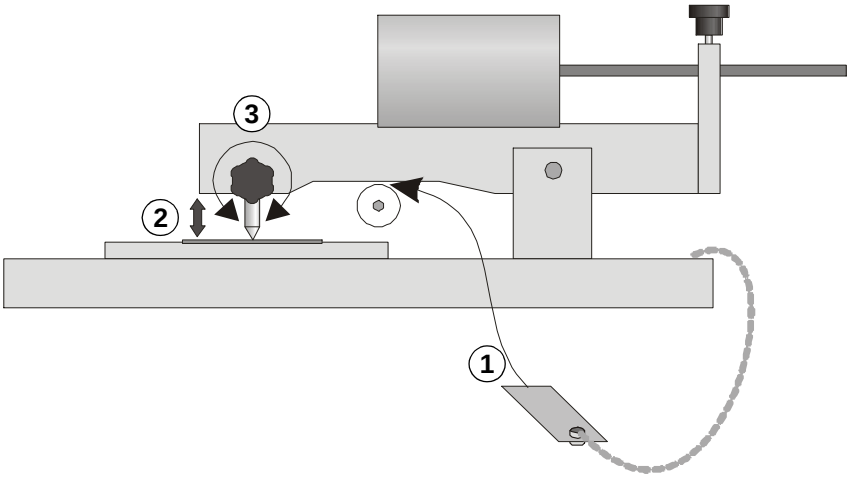


Figure 3. Adjusting the scratching tool

4. Adjust the height of the tool (2) until it is touching the surface of the sample and then tighten the knurled wheel (3) to lock the tool in position.
5. Raise the load beam, remove the metal shim and slide the sample platform back to its starting position.
6. Slide the weight along the load beam to the required load and lock in place by tightening the knurled wheel. The load can be set from 0 g to 2000 g (0 lb to 4.4 lb).

The instrument and sample are now ready for the test to be carried out (Figure 4).

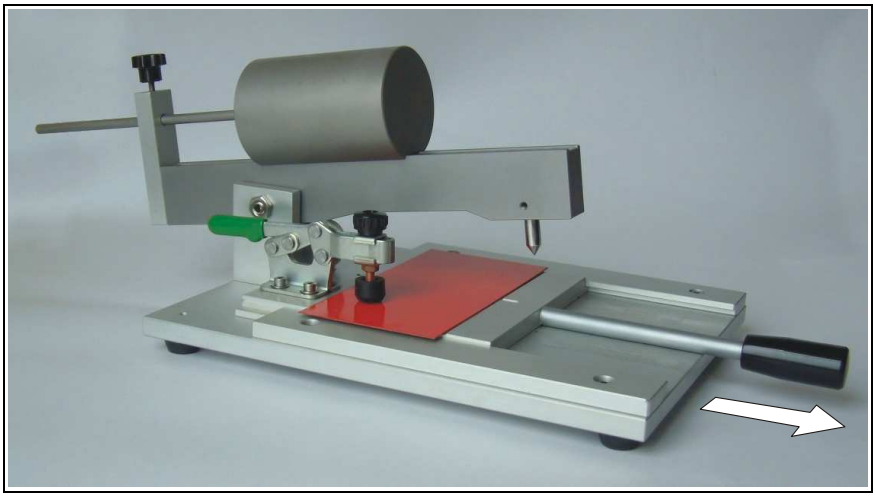


Figure 4. Manual Clemen Unit ready for test

3.2 Test procedure

1. Pull the sample platform towards you in a single smooth action (Figure 4); the standard speed of movement is approximately 30 mm/s (1.2"/s).

   The tool will lower down onto the sample at the start of the test and raise up at the end of the test.
2. Inspect the sample for damage in accordance with the requirements of the test standard. Repeat the test as necessary, increasing the loading between tests.

4 TESTING A SAMPLE - MOTORISED CLEMEN UNIT

Before the sample can be tested, adjust the height of the tool:

4.1 Adjusting the tool

1. Connect the unit to the mains supply and press the Power On/Off button.
2. Place the sample onto the sample platform and fix in position by rotating the clamp handle.
3. Lift and hold the load beam in its raised position.
4. Press the Start button (Figure 2). Wait until the tool is halfway through its travel and then press the Power On/Off button to stop the tool in this position.
5. Insert the metal shim between the nylon wheel (1) and the load beam and then lower the load beam.

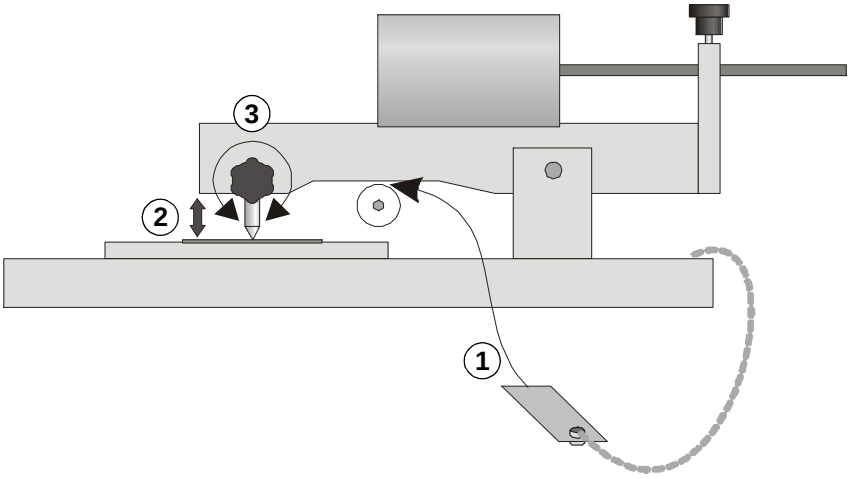


Figure 5. Adjusting the scratching tool

6. Adjust the height of the tool (2) until it is touching the surface of the sample and then tighten the knurled wheel (3) to lock the tool in position.
7. Raise the load beam, remove the metal shim and while supporting the beam, press the Power On/Off button and then the Start button to return the tool to the starting position.

   Supporting the load beam while the tool is moving to its starting position prevents damage to the sample surface, the tool or the sample platform.

8. Slide the weight along the load beam to the required load and lock in place by tightening the knurled wheel. The load can be set from 0 g to 1500 g using the sliding weight.

   For loads between 1500 g and 5000 g (3.3 lb and 11 lb), use the additional 1000 g weights supplied with your instrument; place the required number of these weights on the vertical rod on the load beam to obtain the correct load. For example, if a load of 3500 g (7.7 lb) is required, place 3 of the 1000 g weights on the vertical rod and slide the weight to the 500 g mark on the scale.

   The instrument and sample are now ready for the test to be carried out (Figure 6).

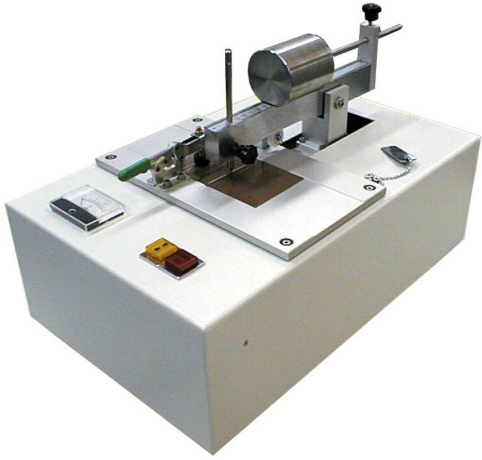
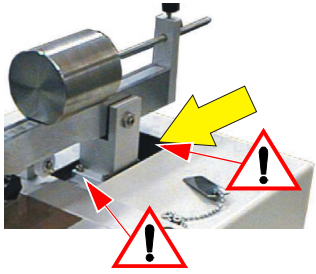


Figure 6. Motorised Clemen Unit ready for test

4.2 Test procedure

Keep fingers clear of the mechanism during use.



1. Press the Start button.

   The tool will start to move and will lower down onto the sample at the start of the test, raise up at the end of the test and then stop automatically.

2. Inspect the sample for damage in accordance with the requirements of the test standard. Repeat the test as necessary, increasing the loading between tests.

The complete destruction of a paint film on a metallic sample is observed when the voltmeter needle indicates 10 V to 12 V and when the light in the start button flashes (the electrical detection device operates only on metallic samples which are uncoated on the reverse side).

5 TESTING THICK SAMPLES

(These instructions apply only to the Elcometer 3000/3 Motorised Clemen Unit)

The standard Elcometer 3000/3 Motorised Clemen Unit will test samples up to a maximum thickness of 3 mm (0.12"). An optional adjustment kit is available which will allow testing of samples up to 20 mm (0.8") thick (see “Spares” on page 15).

The adjustment kit consists of the following parts:

Part	Description	Quantity
A	5 mm (0.2") spacer for load beam base	3
B	12 mm (0.5") spacer for sample clamp	1
C	Height gauge for wheel (5 mm, 10 mm, 15 mm, 20 mm)	2
D	Hexagonal wrench	1
E	Screws for load beam base	4 sets
F	Screws for sample clamp	2 sets
G	Height adjustable wheel	1

Refer to Figure 7 for the location of the parts (A, B, C, etc.).

Fit the parts in accordance with the recommendations given in Table 1.

Table 1: Adjustment kit - fitting parts

Sample thickness		(A) 5 mm (0.2") spacers for load beam base	(B) 12 mm (0.5") spacer for sample clamp	(C) Height gauge for wheel (mm)
(mm)	(inches)			
0.5 to 5	0.02 to 0.2	0	No	5
5 to 10	0.2 to 0.4	1	No	10
10 to 15	0.4 to 0.6	2	Yes	15
15 to 20	0.6 to 0.8	3	Yes	20

Fix the load beam base and sample clamp using screws of an appropriate length (parts E and F).

Use the height gauge (part C) to adjust the height of the nylon wheel and then tighten the knurled wheel to lock in place.

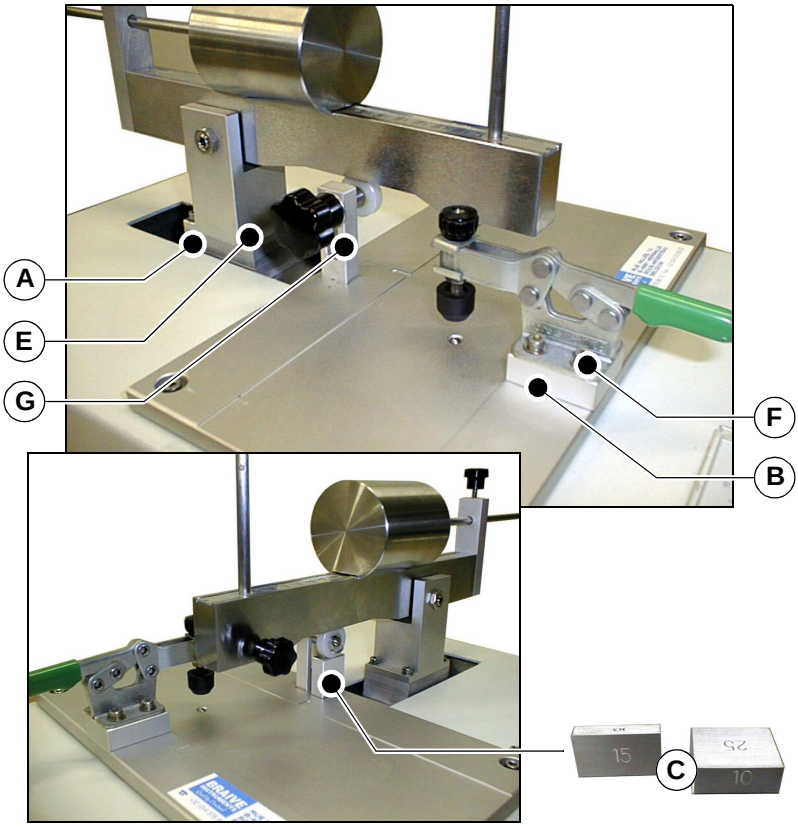


Figure 7. Adjustment kit - location of parts

6 TOOL ACCESSORIES

Due to the nature of the test, the ball tool will wear with use. It is advisable therefore to keep a spare tool in stock - see “Spares” on page 15 for ordering information.

In addition to the standard 1 mm (0.04") ball tool, a number of other tools are available:

6.1 Cutting tool - for scratch testing

The optional cutting tool gives a much more aggressive scratch than the standard ball tool. When using a cutting tool, follow the same adjustment and test procedure as given for the standard ball tool.

6.2 Rubber tool - for drying time assessment

The optional 1 cm^2 rubber tool is used for drying time assessment.

Typical drying time test procedure

Set the load to 100 g. Clamp the test sample[a] onto the platform and then place a sheet of cigarette paper, or textile fibres, cotton wool, etc. on top of the sample. Place the rubber tool carefully onto the paper.

After one minute, lift up the tool, remove the test panel and turn it upside down so that the painted side is facing down. If the paper remains stuck, the paint is not yet dry.

7 MAINTENANCE

The Elcometer 3000 Clemen Unit is designed to give many years reliable service under normal operating and storage conditions.

The tester does not contain any user-serviceable components. In the unlikely event of a fault, the Elcometer 3000 should be returned to your local Elcometer supplier or directly to Elcometer. The warranty will be invalidated if the instrument has been opened. The warranty will be invalidated if the instrument has been opened.

a. The time since application of the paint layer on the sample must be known and recorded.

Details of Elcometer offices around the world are given on the outside cover of these operating instructions. Alternatively visit the Elcometer website, www.elcometer.com

8 TECHNICAL SPECIFICATION

8.1 Manual model

Load range:	0 g to 2000 g (0 lb to 4.4 lb)
Dimensions:	410 mm x 200 mm x 155 mm (16.1" x 7.9" x 6.1")
Weight:	6 kg (13.2 lb)

8.2 Motorised model

Load range:	0 g to 5000 g (0 lb to 11 lb)
Operating voltage:	UK, 240 V AC 50 Hz EUR, 220 V AC 50 Hz US, 110 V AC 60 Hz
Power consumption:	100 W
Dimensions:	460 mm x 280 mm x 330 mm (18" x 11" x 13")
Weight:	20 kg (44 lb)
Fuse rating (power input)	1 A (2 fuses)

8.3 Sample size

Width:	In order to fit correctly in the sample platform, the sample *must* be 75 mm (3") wide.
Length:	Recommended sample length is 150 mm (6").
Thickness:	Sample thickness can vary between 0.5 mm and 3[b] mm (0.02" and 0.12")

8.4 Packaging

The Elcometer 3000 Clemen Unit 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.

b. Maximum thickness = 20 mm (0.8") using Adjustment Kit on 3000/3 Motorised Clemen Unit.

9 SPARES

The Elcometer 3000 Clemen Unit is complete with all the items required to get started, however over the life of the tester replacements may be required.

The following replacement items and optional accessories are available from your local supplier or direct from Elcometer:

Description	Part Number
Adjustment kit[c] to test samples 0.5 mm to 20 mm thick (0.02" to 0.8" thick)	KT003000N015
Illuminated microscope x30	KT007210M001
Magnifier x 10	KT001546N002
1 mm (0.04") Ball Tool (tungsten carbide)	KT003000P021
2 mm (0.08") Cutting Tool (tungsten carbide)	KT003000N001
VW Cutting Tool	KT003000N013
1 cm^2 (0.16 $inch^2$) Rubber Tool for Drying Time	KT003000N002

10 RELATED EQUIPMENT

In addition to the Elcometer 3000 Clemen Unit, Elcometer produces a wide range of other equipment for determining the physical characteristics of surface coatings. Users of the Elcometer 3000 may also benefit from the following Elcometer products:

- Elcometer 3030/3040 Pendulum Hardness Tester
- Elcometer 3092 Sclerometer Hardness Tester

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

c. Adjustment Kit is for Elcometer 3000/3 Motorised Clemen Unit only - see “Testing thick samples” on page 10.