

**Elcometer 1620**

**Cupping Tester**

**Operating Instructions**



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A copy of this Instruction Manual is available for download on our Website via [www.elcometer.com/downloads](http://www.elcometer.com/downloads)

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**T**hank you for purchasing this Elcometer 1620 Cupping 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 1620 Cupping 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](http://www.elcometer.com)

## **1 ABOUT YOUR TESTER**

The Elcometer 1620 Cupping Tester is a robust and simple-to-use instrument for assessing the cupping capability of coatings applied onto metal sheets up to 1.2 mm (0.05") thick.

The metal sheet is firmly clamped into a hardened steel die. Reduction gears drive a 20 mm (0.79") diameter ball (the punch) onto the underside of the metal sheet, causing the sheet to cup. The coated surface of the metal sheet is viewed and the drive mechanism is stopped when the coating begins to crack. The amount of cupping is then read from a gauge mounted on the instrument.

The Elcometer 1620 is available with a manual or motorised drive and an analogue (dial) or digital gauge.

### **1.1 Standards**

The Elcometer 1620 can be used in accordance with the following National and International Standards EN13523-6, *supersedes* ECCA T6, ISO 1520, *supersedes* BS 3900-E4, DIN 53156, DIN 53232, NBN T22-104, NF T30-019.

## 1.2 What the box contains

- Elcometer 1620 Cupping Tester
- Gauge
- Gauge holder (for setting zero)
- Zero setting sheet
- Illuminated magnifying glass with magnet
- Mains cable (*motorised models only*)
- Operating instructions

The Elcometer 1620 Cupping 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.

## 1.3 These instructions

These instructions describe the operation of the following Elcometer 1620 Cupping Testers:

- Elcometer 1620/2 - Manual operation, Analogue gauge
- Elcometer 1620/3 - Motorised operation, Analogue gauge
- Elcometer 1620/4 - Manual operation, Digital gauge
- Elcometer 1620/5 - Motorised operation, Digital gauge

**To maximise the benefits of your new Elcometer 1620 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

### 2.1 The parts of your tester

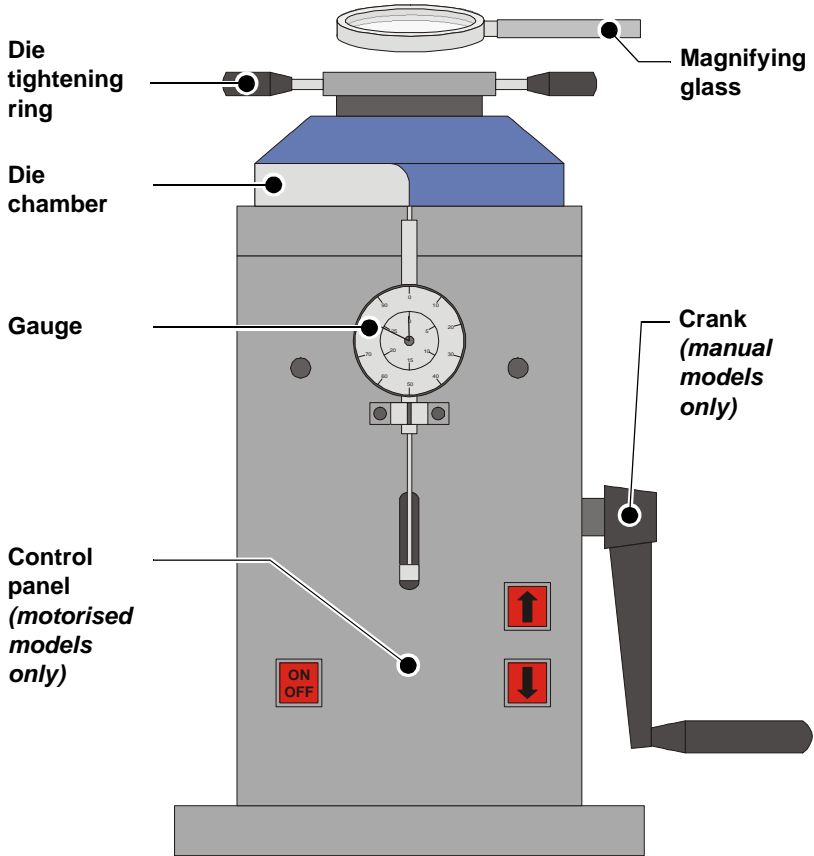


Figure 1. Parts of the tester

### 2.2 Installation

Fasten the tester onto a rigid table. Four holes are provided in the mounting flange for this purpose.

## 2.3 Power input

*(These instructions apply to motorised models only)*

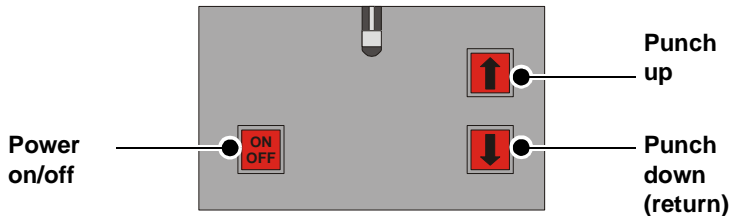
The power input panel at the side of the Tester (Figure 2) is protected by two fuses - see “Technical specification” on page 12 for fuse rating.



**Figure 2. Power input panel and fuse holder**

## 2.4 Control panel

*(These instructions apply to motorised models only)*



**Figure 3. Control panel**

### 2.4.1 Power on/off

To switch on the tester, press the power on/off button. The button will illuminate when the tester is switched on. Press again to switch the tester off.

### 2.4.2 Punch up

Press and hold this button to move the punch upwards. The punch moves at a constant speed of 200  $\mu\text{m}$  (7.9 mils) per second. The punch stops when the button is released.

### 2.4.3 Punch down (return)

Press and release this button to return the punch to the start position.

## 2.5 Digital gauge

Some models of the Elcometer 1620 are fitted with a digital gauge.

To switch the gauge on, press the ON/OFF button. Press again to switch off. To zero the gauge, see “Zeroing the gauge” on page 9. The battery is located under the battery compartment cover; use a coin to remove and replace the cover.

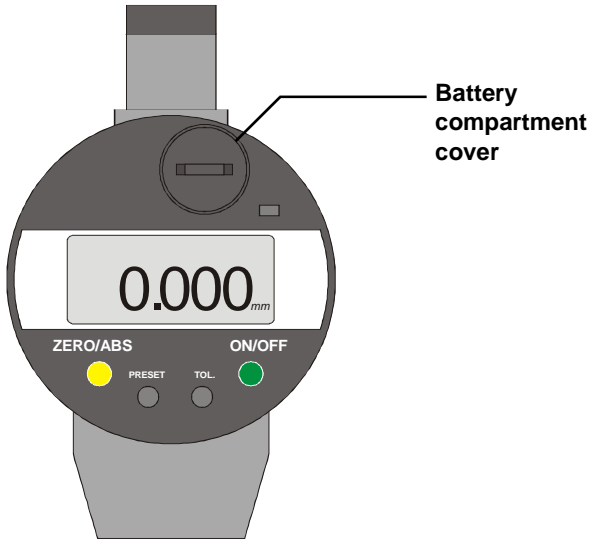


Figure 4. Digital gauge

## 2.6 Caution

The Elcometer 1620 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 tester. There are no user-serviceable parts inside.

To reduce the risk of fire or electric shock, do not expose the tester to rain or excess moisture.

The mains plug on your Elcometer 1620 may be fitted with a fuse. When replacing this fuse, ensure a fuse of the correct rating is used.



### 3 TESTING A SPECIMEN

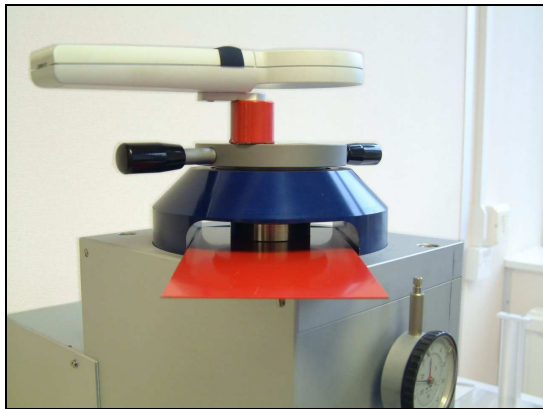
#### 3.1 Before you start

*Digital gauges only:* Press ON/OFF button to switch on the gauge (Figure 4).

*Motorised models only:* Connect the tester to the mains supply.


#### 3.2 Procedure

1. Unscrew the die tightening ring approximately 15 mm (or until there is sufficient clearance between the halves of the die as observed in the die chamber).
2. Ensure the top of the punch is below the top of the die.
3. Place the metal sheet in the die chamber and screw down the die tightening ring until the sheet is clamped firmly (Figure 5).



**Figure 5. Metal sheet clamped in the die and ready for cupping test**


4. *Manual drive models:* Rotate the handle at a constant speed of 1 revolution per second to raise the punch.

*Motorised drive models:* Press and hold the Punch Up button  to raise the punch.

5. While the punch is moving upwards, use the illuminated magnifying glass to observe the metal sheet through the aperture in the top of the die tightening ring.

As soon as cracks appear in the paint, stop the punch and record the cupping reading on the gauge.

6. *Manual drive models:* Rotate the handle to lower the punch below the level of the die.

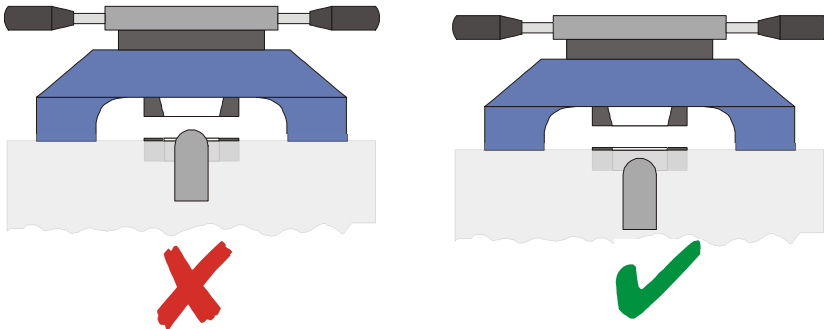
*Motorised drive models:* Press and release the Punch Down button  to lower the punch.

7. Unscrew the die tightening ring and remove the metal sheet.

## 4 ZEROING THE GAUGE

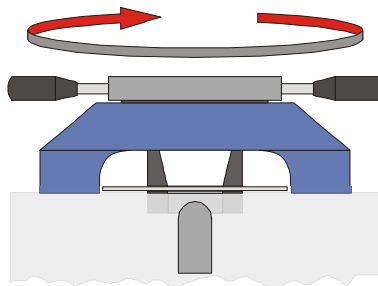
The tester is supplied from the Elcometer factory correctly set to zero and ready to use. If the gauge is changed or calibrated, it must then be set to zero using the following procedure.

1. Unscrew the die tightening ring approximately 15 mm (or until there is sufficient clearance between the halves of the die as observed in the die chamber).
2. Ensure the punch is below the level of the top of the die (Figure 6).



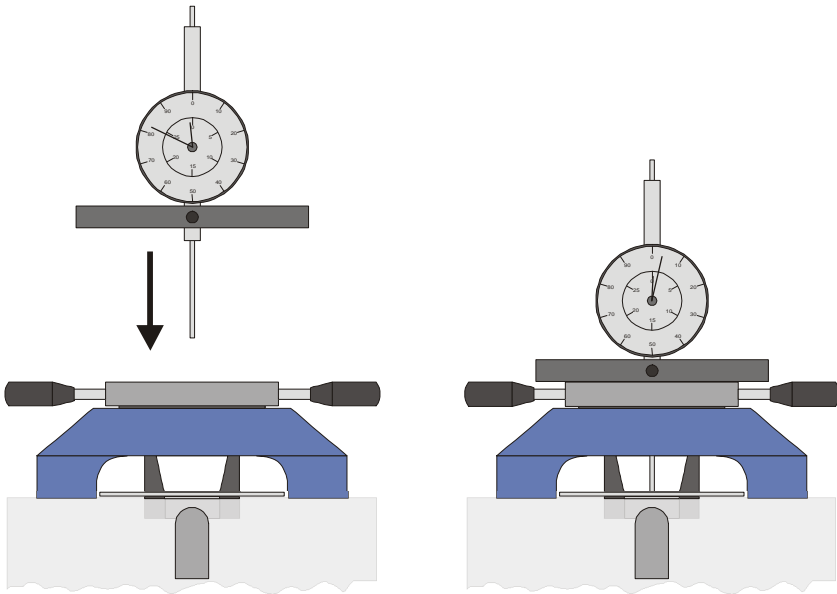
**Figure 6. Set punch below top of die**

3. Place setting sheet in die chamber and screw down die tightening ring until setting sheet is clamped firmly (Figure 7).




**Figure 7. Clamping the setting sheet**

4. Remove the gauge from the tester (unscrew the clamping screw), place the gauge into the holder and tighten the retaining screw gently (Figure 8).
  5. Place the gauge and holder into the aperture of the die tightening ring; the gauge sensor should touch the setting sheet (Figure 8).
  6. *Analogue gauges:* Rotate the bezel of the gauge until the '0' (zero) mark is aligned with the black pointer.
- Digital gauges:* Switch on the gauge (press ON/OFF button), then press ZERO/ABS button (Figure 4, page 6).



**Figure 8. Using the gauge holder**

7. *Manual drive models:* Rotate the handle to raise the punch until the gauge reading has increased by one graduation (analogue) or one digit (digital).
  - Motorised drive models:* Briefly and repeatedly press the Punch Up button  to raise the punch until the gauge reading has increased by one graduation (analogue) or one digit (digital).
- The punch is now set at the 0.01 mm (0.5 mils) cupping point. This is the point at which the gauge must be set to zero.
8. *Analogue gauges:* Remove the gauge from the holder and rotate the bezel of the gauge until the '0' (zero) mark is vertical (at the 12 o'clock position). Replace the gauge on the tester and adjust the position in the clamp until

both pointers (black and red) are pointing to '0' (zero). Clamp the gauge in place. Remove the setting sheet. The gauge is now correctly set to zero and the tester is ready for use.

*Digital gauges:* Remove the gauge from the holder. Replace the gauge on the tester; check that the gauge sensor is touching the measuring system and clamp in place. Remove and then replace the battery (Figure 4, page 6). The display will show '----' and a flashing 'P'. Press the PRESET button twice<sup>a</sup>. Remove the setting sheet. The gauge is now correctly set to zero and the tester is ready for use.

## 5 MAINTENANCE

The Elcometer 1620 Cupping Tester is designed to give many years reliable service under normal operating and storage conditions.

To prevent the formation of rust, rub the dies, the punch and the die tightening ring with a lightly oiled cloth. This procedure should be carried out every six months, or sooner if the tester is used intensively.

Once a year, grease the threads of the die tightening ring and the sides of the punch with oil, Molykote™ grease, or equivalent.

The tester does not contain any internal user-serviceable components. In the unlikely event of a fault, the Elcometer 1620 should be returned to your local Elcometer supplier or directly to Elcometer.

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](http://www.elcometer.com)

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a. If you press the ZERO/ABS button inadvertently, the display will show INC. If this happens, press and hold the ZERO/ABS button for 2 to 3 seconds to reset the gauge.

## 6 TECHNICAL SPECIFICATION

### 6.1 Manual models

Maximum width of metal sheet:	100 mm (4")
Maximum thickness of metal sheet:	1.2 mm (0.05")
Dimensions:	300 mm x 240 mm x 500 mm (12" x 10" x 20")
Weight:	24 kg (53 lb)

### 6.2 Motorised models

Maximum width of metal sheet:	100 mm (4")
Maximum thickness of metal sheet:	1.2 mm (0.05")
Operating voltage:	UK, 240 V AC 50 Hz EUR, 220 V AC 50 Hz US, 110 V AC 60 Hz
Power consumption:	120 W
Fuse rating - plug (if fitted):	4 A
Fuse rating - machine:	4 A (2 off)
Dimensions:	410 mm x 240 mm x 500 mm (16" x 10" x 20")
Weight:	30 kg (66 lb)

### 6.3 Digital gauge models

Gauge battery:	1.5 V, SR44 or equivalent
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## 7 SPARES

The Elcometer 1620 Cupping Tester 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:

<b>Description</b>	<b>Qty</b>	<b>Part Number</b>
Illuminated magnifying glass	1	KT001620P004

## 8 RELATED EQUIPMENT

In addition to the Elcometer 1620 Cupping Tester, Elcometer produces a wide range of other equipment for determining the physical characteristics of surface coatings.

Users of the Elcometer 1620 may also benefit from the following Elcometer products:

- Elcometer 1510 Conical Mandrel Bend Tester
- Elcometer 1506 Cylindrical Mandrel Bend Tester
- Elcometer 1615 Variable Impact Tester
- Elcometer 1542 Cross Cut Adhesion Tester

For further information contact Elcometer, your local supplier or visit [www.elcometer.com](http://www.elcometer.com)