

**Elcometer 1510**

**Conical Mandrel Bend Tester**

**Operating Instructions**

elcometer® is a registered trademark of Elcometer Instruments Ltd.

All other trademarks acknowledged.

© Copyright Elcometer Instruments Ltd. 2005.

All rights reserved. No part of this Document may be reproduced, transmitted, transcribed, stored (in a retrieval system or otherwise) or translated into any language, in any form or by any means (electronic, mechanical, magnetic, optical, manual or otherwise) without the prior written permission of Elcometer Instruments Ltd.

## CONTENTS

Section	Page
<b>1 About your tester</b> .....	<b>2</b>
1.1 Standards .....	2
1.2 What the box contains .....	2
<b>2 Getting started</b> .....	<b>3</b>
2.1 The parts of your tester .....	3
2.2 Installation .....	4
2.3 Specimens .....	4
<b>3 Testing a specimen</b> .....	<b>4</b>
<b>4 Calculating elongation - ASTM D 522</b> .....	<b>5</b>
<b>5 Maintenance</b> .....	<b>6</b>
<b>6 Technical specification</b> .....	<b>7</b>
<b>7 Related equipment</b> .....	<b>7</b>

**T**hank you for purchasing this Elcometer 1510 Conical Mandrel Bend 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.

Your Elcometer 1510 Conical Mandrel Bend 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 1510 Conical Mandrel Bend Tester is used to determine the elasticity, adhesion and elongation of coatings on sheet metal.

The specimen is clamped against a conical mandrel and is bent around the mandrel by a roller mounted on a hand operated lever. The diameter of the mandrel at the point where the coating starts to crack can be determined from a scale marked on the specimen clamp.

The tester is of heavy duty construction and provides excellent resistance to deformation and long service life.

### **1.1 Standards**

The Elcometer 1510 Conical Mandrel Bend Tester can be used in accordance with the following National and International Standards:

ASTM D 522	BS 3900 E11
DIN ISO EN NF 6860	ECCA T7

### **1.2 What the box contains**

- Elcometer 1510 Conical Mandrel Bend Tester
- Operating instructions

**To maximise the benefits of your new Elcometer 1510 Conical Mandrel Bend 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 GETTING STARTED

This section of the instructions is intended for first-time users of the tester. It contains information on the parts and installation of your tester and specifications for the specimen. When you have finished reading this section you will be ready to start using your Elcometer 1510 Conical Mandrel Bend Tester.

### 2.1 The parts of your tester

Figure 1 identifies the parts of your Elcometer 1510 Conical Mandrel Bend Tester.

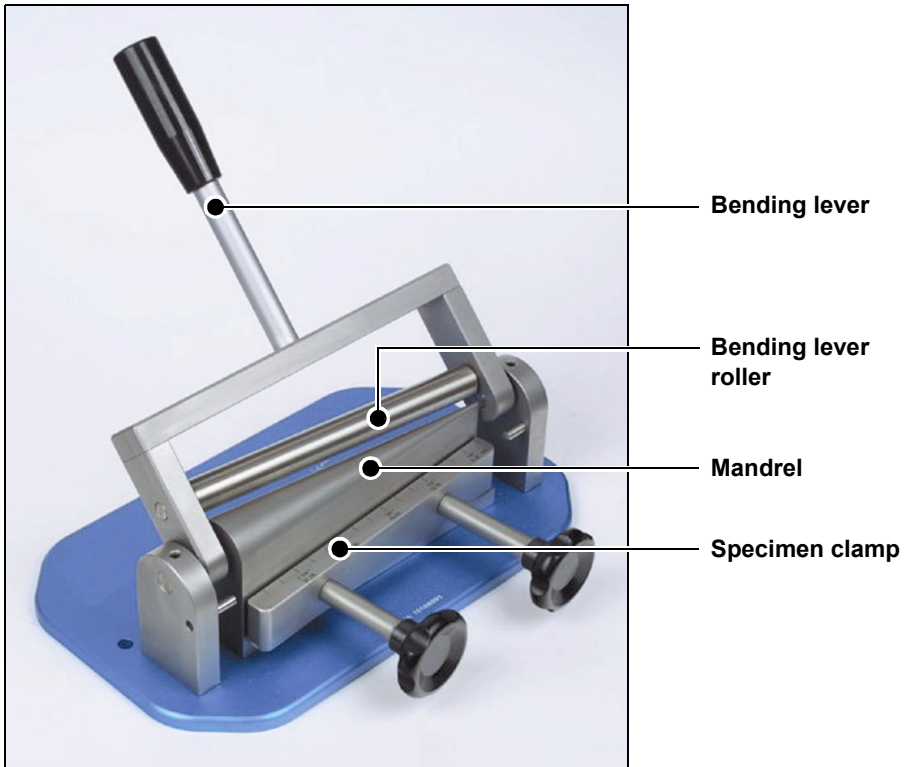


Figure 1. Elcometer 1510 Conical Mandrel Bend Tester

## 2.2 Installation

Mount the instrument on a sturdy table in a clean and dry environment. Fasten in place using the mounting holes in the base of the instrument.

## 2.3 Specimens

Specimens should be prepared according to the requirements of the test standard. Specimens should be flat, free from distortion and the coated surface should not contain any visible cracks. Specimen dimensions are given in “Technical specification” on page 7.

**Note:** *When testing to BS 3900 E11 and DIN ISO EN NF 6860, make incisions in the coating through to the substrate, parallel to the short edges of the specimen at distances of 20 mm (0.79”).*

## 3 TESTING A SPECIMEN

1. Swing the bending lever towards the specimen clamp until it reaches the stop position.
2. Open the specimen clamp.
3. Insert the specimen into the clamp such that;
  - the coated surface of the specimen faces away from the mandrel, and
  - one short edge of the specimen is touching the narrow end of the mandrel.

4. Tighten the specimen clamp until the specimen is held tightly.

*If the specimen clamp is not tightened sufficiently, the specimen may slip during bending.*

*A sheet of paper placed against the coated surface will help to protect the surface from damage caused by the bending lever roller.*

5. Hold the bending lever firmly, and with a smooth action, swing the bending lever away from the specimen clamp until it reaches its stop position.

The specimen will now be bent into a conical ‘U’ shape.

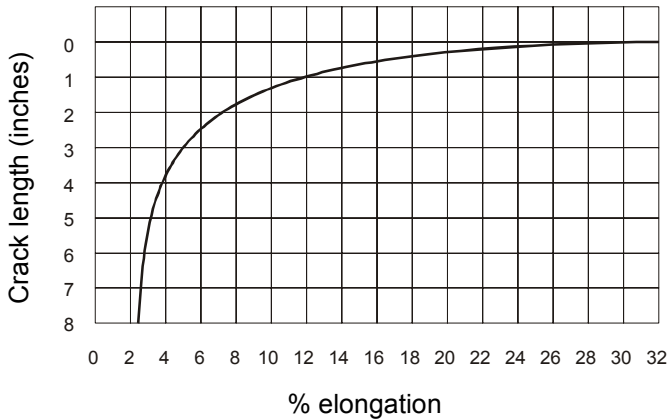
6. Using a magnifier if necessary, inspect the coating for cracks in accordance with the requirements of the test standard. Mark the end of the crack furthest from the narrow end of the mandrel. The diameter of the mandrel at this point can be determined from the scale marked on the specimen clamp.

7. Swing the bending lever back towards the specimen clamp until it reaches the stop position and then release the specimen from the specimen clamp and remove.
8. Measure and record the length of the crack from the narrow end of the mandrel.

Repeat the test on two further specimens and calculate the average of the three results.

#### 4 CALCULATING ELONGATION - ASTM D 522

If required, use the curve shown in Figure 2<sup>a</sup> to determine the elongation of the coating.

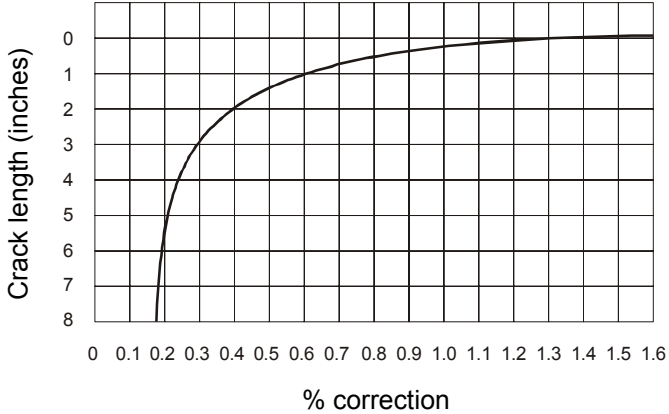


**Figure 2. Crack length versus % elongation - Cold rolled steel, 0.8 mm (1/32") thick, 25 µm (1 mil) coating**

---

a. The curves shown in Figure 2 and Figure 3 are reproduced from ASTM D 522

If necessary, adjust for coating thickness; add the correction value obtained from the curve in Figure 3 to the percentage elongation obtained from the curve in Figure 2.



**Figure 3. Crack length versus % elongation correction value - per 25 µm (1 mil) coating thickness**

## 5 MAINTENANCE

The Elcometer 1510 Conical Mandrel Bend Tester is designed to give many years reliable service under normal operating and storage conditions.

Periodically, clean the mandrel using a cloth slightly dampened with oil.

The tester does not contain any user-serviceable components. In the unlikely event of a fault, the Elcometer 1510 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)



## 6 TECHNICAL SPECIFICATION

Dimensions:	325 mm x 350 mm x 100 mm (12.8" x 13.8" x 4")
Weight:	9 kg (20 lb)
Mandrel diameter:	3.2 mm to 38.1 mm (0.12" to 1.5")
Mandrel length:	203 mm (8")
Specimen dimensions:	180 mm x 100 mm x 0.8 mm (7" x 4" x 0.03")

The Elcometer 1510 Conical Mandrel Bend Tester is packed in a cardboard and foam package. It is recommended that this packaging is retained and reused in the event that the instrument needs to be transported.

If the packaging materials are disposed of, please ensure that this is done in an environmentally sensitive manner. Consult your local Environmental Authority for further guidance.

## 7 RELATED EQUIPMENT

In addition to the Elcometer 1510 Conical Mandrel Bend Tester, Elcometer produces a wide range of other equipment for determining the physical characteristics of surface coatings.

Users of the Elcometer 1510 may also benefit from the following Elcometer products:

- Elcometer 1506 Cylindrical Mandrel Bend Tester
- Elcometer 1615 Variable Impact Tester
- Elcometer 1620 Cupping Tester
- Elcometer 1542 Cross Cut Adhesion Tester

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

