

# **Elcometer 3080**

## **Hardness Testing Pencils**

### **Operating Instructions**

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

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Thank you for your purchase of this set of Elcometer 3080 Hardness Testing Pencils. 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 set of Elcometer 3080 Hardness Testing Pencils 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 THIS INSTRUMENT**

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This set of Elcometer 3080 Hardness Testing Pencils is a simple but effective way to determine the hardness of a coating.

A pencil is pushed into the coating at 45 degrees.

The hardness of the pencils is increased (ISO) or decreased (ASTM) until one or both of the following defects mark the coating:

- The pencil that will not cut or gouge the coating
- The pencil that will not scratch the coating

The set of pencils supplied covers a wide range of lead hardness; 6H (very hard) to 6B (very soft).

## 1.1 WHAT THE BOX CONTAINS

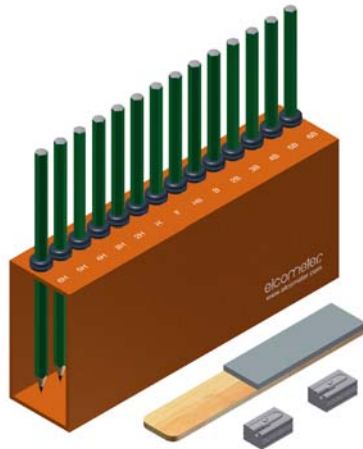
- Set of 14 pencils, 6B to 6H
- 2 Pencil sharpeners
- Storage stand
- Sandpaper block
- Operating instructions

The set of Elcometer 3080 Hardness Testing Pencils 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 3080 Hardness Testing Pencils please take some time to read these Operating Instructions. Do not hesitate to contact Elcometer or your Elcometer supplier if you have any questions.**

## 1.2 STANDARDS

The Elcometer 3080 Hardness Testing Pencils can be used in accordance with the following National and International Standards : ASTM D 3363, BS 3900-E19, EN 13523-4 *supersedes ECCA T4*, ISO 15184, JIS K 5600-5-4.



## 2 USING THE PENCILS

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### 2.1 BEFORE YOU START

The test should be carried out at  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$  ( $73.5^{\circ}\text{F} \pm 3.5^{\circ}\text{F}$ ) and  $50\% \pm 5\%$  relative humidity, unless otherwise agreed.

### 2.2 PREPARE THE PENCILS

1. Use the special pencil sharpeners supplied:

Use sharpener T99923040-1 for pencils 6H, 5H, 4H, 3H, 2H, H, F, HB, B and 2B.

Use sharpener T99923040-2 for pencils 3B, 4B, 5B and 6B.

Sharpen until approximately 5 mm to 6 mm ( $\frac{1}{4}$ " ) of lead, is exposed taking care to leave the exposed lead unmarked.

2. Place a sheet of abrasive paper (400 grade) on a flat, hard surface.
3. Hold the pencil at  $90^{\circ}$  to the abrasive paper and rub the lead until a flat, smooth and circular cross-section is achieved. Ensure that the edge is free of chips or nicks.



### 2.3 SELECT A PENCIL

When testing to BS 3900 E19 and ISO 15184, always start with the softest pencil (6B) and then work up the hardness scale.

When testing to ASTM D 3363, always start with the hardest pencil (6H) and then work down the hardness scale.

## 2.4 PUSH THE PENCIL

Place the test panel on a level, firm, horizontal surface.

Hold a pencil firmly with the lead at an angle of 45° to the surface of the test panel and the point facing away from you.

Push the pencil away from you approximately 6 mm (¼") applying sufficient downward pressure to cut or scratch the coating or to crumble the edge of the lead.

## 2.5 INSPECT

Check the test surface by either close visual inspection, by feel using a fingernail or, if agreed, using a microscope with between x6 and x10 magnification.

For ASTM D 3363 identify the end point of the test as follows:

- *Gouge hardness*; the hardest pencil that leaves the coating uncut over a stroke length of at least 3 mm.
- *Scratch hardness*; the hardest pencil that will not rupture or scratch the coating.

For ISO 15184 note one or both of the following defects:

- *Plastic deformation*; a permanent indentation in the paint surface without cohesive fracture.
- *Cohesive fracture*; the presence of a visible scratch or rupture in the surface of the paint film, material having been removed from the paint film.

## 2.6 REPEAT THE TEST

The test procedure (2.3 to 2.5) should be repeated 12 mm (½") away from the first test using the next pencil.

If the two test results differ by more than one unit of pencil hardness, discard the results and repeat the test.

## 2.7 TEST REPORT

The following information should be contained in any report on the results of the Pencil Test:

- The type of defect resulting from the test; see “About this instrument” on page 2.  
**Note:** *In some cases the two test end points will be the same.*
- The make and manufacture of the pencils used.
- Any deviation from standard conditions including the temperature and humidity conditions of the test and the roughness of the coating surface.
- The magnification of the microscope, if one is used.

## 3 TECHNICAL SPECIFICATION

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Pencil Type: Marked on edge of pencils

Grades: 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B, 5B, 6B



## 4 SPARES

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The following spare parts are available from your local Elcometer supplier or direct from Elcometer:

Description	Sales Part No.
Replacement pencil set:	T99923039
Sharpener, for 6H to 2B:	T99923040-1
Sharpener, for 3B to 6B:	T99923040-2
Sandpaper Block:	T99923041
Pencils, 6B, box of 12:	T99923042-1
Pencils, 5B, box of 12:	T99923042-2
Pencils, 4B, box of 12:	T99923042-3
Pencils, 3B, box of 12:	T99923042-4
Pencils, 2B, box of 12:	T99923042-5

Description	Sales Part No.
Pencils, B, box of 12:	T99923042-6
Pencils, HB, box of 12:	T99923042-7
Pencils, F, box of 12:	T99923042-8
Pencils, H, box of 12:	T99923042-9
Pencils, 2H, box of 12:	T99923042-10
Pencils, 3H, box of 12:	T99923042-11
Pencils, 4H, box of 12:	T99923042-12
Pencils, 5H, box of 12:	T99923042-13
Pencils, 6H, box of 12:	T99923042-14

## 5 RELATED EQUIPMENT

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In addition to the Elcometer 3080 Hardness Testing Pencils, Elcometer produces a wide range of other Hardness Testing Equipment.

Users of the Elcometer 3080 Hardness Testing Pencils may also benefit from the following Elcometer product ranges:

- Elcometer Elasticity and Resistance to Deformation Testers
- Elcometer Appearance Testers
- Elcometer Washability, Brushability and Abrasion Testers

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